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# THE OTTAWA NATURALIST.

VOL. XII. OTTAWA, OCTOBER AND NOVEMBER, 1898. NOS. 7 & 8.

## CHANGE OF FUNCTION IN FISHES' FINS.

By Professor E. E. PRINCE,  
Dominion Commissioner of Fisheries, Ottawa.

In the OTTAWA NATURALIST, of October last year, a book notice appeared of the nature of a brief review of that highly interesting subject the life-histories of fishes. It included amongst other new and important statements the affirmation that in young fishes "the breast fins, and in some species the hind pair of fins, become enormously developed, and project like wide-spread fans from the sides of the body. These, no doubt, are effective for protection rather than locomotion." Having watched young fishes half an inch to one or two inches in length, when schooling at the surface of the sea in calm summer weather, I have repeatedly noticed that the enormous paired fins, often deeply coloured, black and white in the Rockling (*Motella*), orange red in the Gurnard (*Trigla*), ochre yellow in the Ling (*Molva*), or gleaming white in the American Hake (*Phycis*), are of little or no use in outward locomotion: but hang helplessly by the side of the body. Projecting like richly tinted fans when expanded, or like stout spines and rods when closed, they must effectively deter many enemies eager to make a mouthful of the tender young fish; and thus serve a purpose similar to the points and projections of caterpillars or the spines of the porcupine, and the like. As I ventured to point out many years ago, the theory put forward by Dr. Albert Gunther, of the British Museum, that they were simply instrumental in balancing the fish is wholly inadequate, and certainly a large number of minute larval fishes (*e.g.*, the cod and mackerel), which would appear to need them most, do not possess these large (supposed) balancing organs.

Upon a recent visit to Cape Breton, I observed vast numbers of American Hake (*Phycis chuss*, Walbaum) 3 in. to 4 in. in length, hovering around the wharves at the various harbours which were included in my tour. Like most species of the genus *Phycis* the American Hake retains when adult extremely elongated ventral fins, which, as already stated, are characteristic of the young or the advanced larval condition of many of the family *Gadidae*. These long fins of the hake are of an opaque white colour and they are used in a most unexpected and interesting way. The little fish were observed by me foraging about the weed-covered piles, moving over sunken logs, and all the time nibbling zoophytes and other food upon the stones at the bottom. Thousands of them could be observed, each stretching forward a large pair of white hands, so to speak, with long fingers probing amongst moss and weeds. These, which I have described as white hands, with slender fingers, were nothing more nor less than the huge hind pair of fins  $\frac{3}{4}$  of an inch in length (in fishes about 3 inches long), and instead of being allowed to hang downward or backward as is usual in fishes, these ventral fins were turned so far forward as to extend along each side of the head. They exactly resembled a pair of chalk-white hands. It was an odd sight to see schools of these dark coloured infant fishes feeling about amongst the weeds, and actually creeping up stumps and piles under water, by means of these actively moving limbs. M. H. Perley in his account of the fishes of New Brunswick says of the hake: "It has one barbule under the chin; the ventral fins are simple rays, divided or forked, one of the divisions longer than the other." The rays or rods, forming each fin, are three in number, and united by a fin-membrane for a short distance, beyond which the rays are separate and free, like attenuated fingers, capable of considerable varied movements. These fins appear indeed to have wholly changed their original purpose and in the young stages of the hake are no doubt sensory organs, and used like fingers in feeling for food. A minute histological study of these fins would no doubt show that the sensory nerve supply is unusually largely

developed. If the plevic fins in fishes really represent the legs and feet of higher animals, while the pectoral fins are homologous with the arms and hands, the change of function described is of great interest, for the hind limbs in this case have not only lost their principal locomotor purpose, but have assumed the complicated functions of the fore-limbs. Mr. H. Charles Williamson, an able expert officer of the Scottish Fishery Board, published in 1893 a thorough research upon the free fin rays of the gurnard's pectoral fin, and described in detail the bones, myology, and nerve supply in the finger-like rods of the breast fins in that fish,\* illustrated with nearly a hundred figures, and his conclusion is that, in view of their abundant sensory nerve supply, and the remarkable structure of their tips, and apart from any mechanical uses they may have, the free rays of the gurnard's fins are primarily extremely sensitive organs of touch. Mr. Williamson points out that it is generally agreed that the fin-rays in these cases are sensitive, "but one zoologist, Deslongchamps, has maintained that they also have a mechanical action. He had the opportunity of watching some gurnards, which were confined by means of a net in shallow water. He states that he observed the gurnards marching about on the fin rays, and also stirring up sand by means of these structures. Bloch, according to Tiedmann, suggested that the free rays may be lures to attract prey." The use of such rays as lures, or for digging or other mechanical purposes is questionable, when we find it proved that they are extremely sensitive. In the case of the Goose-fish (*Lophius*), which uses its breast fins as legs, or the still more remarkable Jumping Goby of Ceylon and Fiji we have a change of function scarcely inferior in interest. Moseley describes the latter extraordinary fish as follows:—"Hopping about on the mud, beneath the mangroves on the (Fiji) shore was the *Periophthalmus*, at which I had often been astonished in Ceylon. This little fish skips along the surface of the water, by a series of jumps, of the distance of as much

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\* 11th Ann. Rep. Scottish Fishery Board, pp. 322-332.

as a foot, with great rapidity, and prefers escaping in this way to swimming beneath the surface. . . . The fish are very nimble on land and difficult to catch. They use their muscular pectoral fins to spring with, and when resting on shore the fore part of their body is raised and supported on these." Other fishes instead of using the paired fins for movement may use them as anchors like some of the shore gobies, the lump-fish, and the suckers (*Liparididae*) whose ventral fins unite to form a broad sucking disk under the body, enabling them to adhere to rocks and stones with the firmest tenacity.

A study of the nerve-supply and myology of the American hake's hind pair of fins has not yet been made, but it would yield some valuable results. Williamson's research on the gurnard and Harrison Allen's account of the microscopic study of the free rays in the Atlantic sea-robin (*Prinotus*) have shown that these separated rays in the breast fins function as tactile organs, and are really fingers. As I watched, some months ago, the young hake pushing forward their ventral fins like long fingers, poking into crevices with them, and touching particles of food, or climbing over stones, and resting quietly upon these fins just as a dog rests his head upon his paws, the conclusion was irresistible that total change of function had taken place with the change of form in these fins. It is necessary to add that the eyes of these small hake are unusually large and prominent, and the remark of Williamson does not apply in this case that "in many fishes which have comparatively broad heads, and in which the eyes are situated high up on the head, some of the fin-rays of either the pectoral or pelvic fin are filamentous. From the position of its eyes, the fish is unable to see objects of prey close to itself. It therefore depends on organs of touch for aid in the capture of its food."

These fishes illustrate, indeed, a change precisely the reverse of that seen in the bat, for their wing-like fins have been converted into a kind of hand with separated fingers, extremely sensitive as organs of touch, whereas the fingers of the bat have been elongated, and united by membrane to form a fin-like wing.

## LIST OF SPECIES OF MAPLES GROWING AT THE CENTRAL EXPERIMENTAL FARM, OTTAWA.

By W. T. MACOUN.

The maple is an interesting tree to most people, and the following notes are published in order that more may know how many species and varieties can be grown in this district, whence they come, whether they are hardy, half-hardy, or tender; and which of them are the most ornamental.

Only 5 species and 1 variety of maple are growing wild in the vicinity of Ottawa, namely, *A. pennsylvanicum*, L.; *A. spicatum*, Lam.; *A. saccharinum*, Wang.; *A. saccharinum nigrum*; *A. dasycarpum*, Ehrhart; *A. rubrum*, L. In cultivation the only foreign kinds noticed are the Norway Maple (*Acer platanoides*, L.), Wier's Cut-leaved Maple (*Acer dasycarpum laciniatum*, *Wieri*) and Schwedler's Maple (*Acer platanoides Schwedleri*). In the Arboretum at the Central Experimental Farm there are 19 species and about 65 varieties which have lived through from one to eight winters. Some of these are quite hardy.

In the following list, of species only, the nomenclature is according to the "Hand-list of Trees and Shrubs grown in Arboretum, Royal Gardens, Kew," which, with few exceptions, is the same as the "Index Kewensis."

When a tree is not killed back one-sixth of its growth it is called *hardy*; when it is killed back one-half, *half hardy*; when to near the ground or to the ground, *tender*.

*A. campestre*, L.—Common Maple. Europe, West Asia. Planted 1896. Half hardy until last winter when it proved hardy. A small slow-growing tree. Fairly ornamental.

*A. circinatum*, Pursh.—Vine Maple. Western North America. Planted 1894. Hardy. Some specimens of this maple have not proved hardy. It is a very pretty native species with drooping branches and vine-like foliage which becomes brightly coloured in autumn.

*A. cissifolium*, C. Koch.—Japan. Planted 1894. Half hardy. This has finely cut foliage, and if it continues to stand our winters will probably prove very ornamental.

*A. dasycarpum*, Ehrh.—White or Silver Maple. Eastern North America. Planted 1890. Hardy. This is a large rapid growing native tree, but should not be planted for shade where the sugar maple will succeed.

*A. glabrum*, Torr. and Gray.—Smooth Maple. Western North America. Planted 1891. Hardy. A very pretty shrub, with glossy deep green foliage. It is a native of British Columbia.

*A. Heldreichi*, Orph.—Eastern Europe. Planted 1896. Hardy. As yet there is nothing to recommend this as an ornamental tree, but it has made good growth and seems quite hardy.

*A. insigne*, Boiss. and Buhse.—Northern Persia. Planted 1896. Tender. This tree has been killed to the ground during each of the past two winters.

*A. japonicum*, Thunb.—Japanese Maple. Planted 1897. Hardy. It is too soon yet to say whether this will succeed here or not. One specimen received from Tokio last year proved quite hardy. It is a beautiful little maple with finely cut foliage.

*A. Myabei*.—Japan. Planted 1896. Hardy. This maple is not recorded in the Index Kewensis. The specimens at the Experimental Farm were procured from the Arnold Arboretum, Boston. It is not very ornamental at present, but is a strong growing species.

*A. monspessulanum*, L.—Montpellier Maple. Mediterranean region. Planted 1896. Half hardy. A small tree with three-lobed leaves, the lobes being equal and entire. Rather ornamental. Some specimens of this tree have proved quite hardy.

*A. Negundo*, L.—Box Elder, Manitoba Maple. Canada, United States. Planted 1890. Hardy. This is a very rapid growing tree, and fairly ornamental, but it is seldom that symmetrical trees are formed and often they are disfigured by the limbs being broken off by the wind, as the wood is soft. This tree should only be planted in the coldest parts of the country where few trees will grow, as there are so many other trees of greater merit that will succeed in climates as severe as that of Ottawa.

*A. pennsylvanicum*, L.—Striped Maple. Eastern Canada and United States. Planted 1890. Hardy. It is surprising that this handsome little tree is not more used for ornamental purposes. Its pretty greenish flowers in long drooping racemes, deep green leaves, and beautifully sriped bark, give it a unique appearance.

*A. platanoides*, L.—Norway Maple Europe. Planted 1890. Hardy. The Norway Maple is being planted more and more every year as a shade tree in Canada. It certainly is a tree of great merit. Our hard maple has, however, a good record for longevity, and should be planted in preference wherever it will succeed. The leaves of the Norway maple remain on the trees about two weeks longer than those of the sugar maple, but do not assume the bright tints of the latter.

*A. Pseudo-platanus*, L.—Sycamore. Central Europe, Western Asia. Planted 1890. Half hardy. It is not advisable to plant this tree with hopes of much success here.

*A. rubrum*, L.—Red or Swamp Maple. Planted 1890. Hardy. As its name indicates, the habitat of this maple is swampy or moist soil. Is it any wonder that so many of these trees are dying throughout the city, where granolithic pavements and permanent roads are excluding the much needed rain and air? The red maple is a beautiful tree, especially in the autumn, when it is all aglow with charming tints; but it should not be used either for shade or ornament unless there is plenty of moisture in the soil.

*A. saccharinum*, Wang.—Sugar or Rock Maple. Canada, United States. Planted 1889. Hardy. The sugar maple is well known. It is the most satisfactory maple for shade purposes and will grow in a diversity of soils, but succeeds best in a rich sandy loam, and does poorest in wet soil.

*A. spicatum*, L.—Mountain Maple. Canada, United States. Planted 1890. Hardy. This is a native shrub and is fairly ornamental.

*A. tataricum*, L.—Tartarian Maple. Eastern Europe. Planted 1890. Hardy. A small, ornamental tree. The bright red fruit

at the beginning of August makes this tree very attractive at that time of year. A variety of this, *A. tataricum Ginnala*, is far more ornamental. It has deeply cut foliage which in autumn rivals in brilliancy that of the red or sugar maples.

*A. Volxemi*, Masters.—Caucasus. Planted 1897. One specimen proved nearly hardy and the other died. This is said to make a fine tree.

## ON THE REMAINS OF MAMMOTH IN THE MUSEUM OF THE GEOLOGICAL SURVEY DEPARTMENT.

By LAWRENCE M. LAMBE, F.G.S.

Previous to 1898 the only remains of the mammoth in the museum of the Survey were as follows:—

1. The right ramus and symphysis of a lower jaw, a symphysis, a fragment of a large tusk, part of a smaller tusk, portions of two scapulæ and several fragments of other bones, found at Burlington Heights near Hamilton, Ont., in 1852, and presented to the museum by Mr. R. Benedict then Chief Engineer of the Great Western Railway. The lower jaw and the smaller tusk were described by Mr. T. Cottle of Woodstock, Ont., in the *Annals and Magazine of Natural History* for 1852, 2nd series, vol. 10, p. 395, and in the *American Journal of Science and Arts* for 1853, 2nd series, vol. 15, p. 282. The then Palæontologist to the Survey, Mr. E. Billings, mentions the discovery of these bones in the *Canadian Naturalist and Geologist* for 1857, vol. 1, p. 380, and later, in 1863, in vol. VIII of the same publication, p. 135, describes them at length and refers them to *Elephas Jacksoni*, Briggs and Foster, at the same time remarking that Mr. Cottle "was the first to announce the discovery of mammoth remains in Canada" (*i.e.*, what was then called Upper and Lower Canada). In his communication to the *American Journal of Science and Arts*, Mr. Cottle refers the bones to *Elephas primigenius*, Blumenbach, with a query.

2. Three well preserved teeth from Norton Sound, Alaska, and a tooth, tusks, limb-bones with a few ribs and vertebræ from

the Yukon River, Alaska, forty miles below the mouth of the Tanana River ; collected previous to 1886. and forming part of the Mercier\* collection acquired by the Survey in 1886.

3. A molar from St. Catharines, Ont., purchased for the museum by Mr. Whiteaves in 1887 ; this specimen was found whilst an excavation was being made for a sewer under the Opera House on Queen Street.

4. A molar from near Nulato, on the Yukon River, Alaska, presented in 1894 by Mr. C. Constantine, North-west Mounted Police.

5. Part of a tooth from the drift about six miles above Edmonton, Alberta, and presented by Mr. James Gibbons of Edmonton, in 1895.

6. A cast of a molar, the original of which is in the Provincial Museum, Victoria, B.C. and is said to be from the shore of Shuswap Lake, B.C. ; received for the museum in 1895.

On behalf of the department the writer visited Muirkirk, Ont., in September last, and purchased the remains of a mammoth (presumably *Elephas primigenius*, Blumenbach) found there by a farmer named Charles Fletcher on his farm about a mile and a half north-east of the village. The bones were discovered about three years ago in a field that had a short time previously been burnt over and was being ploughed for the first time. A surface layer of peat from two to three feet in depth had been removed by the fire, leaving exposed a brownish-gray clay holding small pebbles, known as the Erie † clay that in this region has an extensive development. The bones were found just beneath the surface, lying horizontally, partly embedded in the clay and scattered over an area of about two rods square. The ploughshare first struck and broke in two one of the tusks that proved to be eight feet and a half long, a second tusk ten feet in length was found near the other, and in the immediate vicinity the following remains were unearched—nearly all the limb-bones, an almost complete lower jaw with teeth in place, portions of the upper jaw with the teeth, fragments of the upper part of the cranium, some of the ribs, the remains of a few vertebræ and a number of the bones of the feet. The two hind legs are almost entire, some of the bones of the feet only being wanting.

\* Quarterly Journal of the Geological Society of London, 1894. vol. 1., p. 1, "Notes on the occurrence of mammoth-remains in the Yukon District of Canada and in Alaska," by George M. Dawson, C.M.G., LL.D., F.R.S., &c.

† *Vide* Geology of Canada for 1863, p. 896.

## DEPARTURE OF SUMMER BIRDS,

By F. A. SAUNDERS.

Yellow Warbler, Aug. 17th ; Redstart, Aug. 21st , Night-hawk, Aug. 25th ; Cliff Swallow, Aug. 27th ; Kingbird, Aug. 27th ; Barn Swallow, Aug. 28th ; Purple Martin, Sept. 2nd ; Chimney Swift, Sept. 2nd ; Wood Pewee, Chestnut-sided Warbler, Canada Warbler, Red-headed Woodpecker, Olive-backed Thrush, Warbling Vireo, Sept. 10th ; Yellow Palm Warbler, Sept. 18th ; Oven-bird, Magnolia Warbler, Wilson's Thrush, Sept. 19th ; Black-throated Blue Warbler, Black and White Warbler, Sept. 21st ; Maryland Yellow-throat, Black-throated Green Warbler, Nashville Warbler, Sept. 25th ; Catbird, Sept. 27th.

## FALL ARRIVALS.

Blue-headed Vireo, Philadelphia Vireo, Sept. 10th; Golden-crowned Kinglet, Sept. 17th ; Black-poll Warbler, Bay-breasted Warbler, Sept 19th ; Pine Siskin, Sept. 20th ; Ruby-crowned Kinglet, White-crowned Sparrow, Sept. 21st ; Rusty Blackbird, Tree Sparrow, Sept. 25th. The Philadelphia Warbler was seen a second time on Sept. 19th.

## DEPARTURE OF SUMMER BIRDS.

By GEO. R. WHITE.

Tree Swallow.....	2	July	Virginia Rail.....	10	Sept.
Whip-poor-will.....	7	Aug.	House Wren.....	18	"
Short-eared Owl.....	14	"	Black-throated Green		
Hummingbird.....	16	"	Warbler.....	18	"
Kingbird.....	19	"	Swamp Sparrow.....	21	"
White Eave Swallow....	5	Sept.	Barn Swallow.....	21	"
Sand Martin.....	5	"	Eave Swallow.....	21	"
Swift.....	5	"	Blue-winged Teal.....	21	"
Sora Rail.....	5	"	Scarlet Tanager.....	25	"
Fish Hawk.....	5	"	Goldfinch.....	25	"
Wilson's Tern.....	5	"	Golden-winged Wood-		
Night Hawk.....	6	"	pecker.....	25	"
Sparrow Hawk.....	7	"	Wood Duck.....	27	"
Spotted Sandpiper.....	9	"	Greater Yellow-legs.....	28	"
Night Heron.....	10	"	Red-headed Duck.....	28	"

Solitary Sandpiper . . . . .	28	Sept.	Green-winged Teal . . . . .	18	Oct.
Savannah Sparrow . . . . .	29	"	Ring-necked Duck . . . . .	18	"
White-headed Sparrow . . . . .	30	"	Pintail Duck . . . . .	18	"
Woodcock . . . . .	2	Oct.	Wilson's Snipe . . . . .	18	"
Pigeon Falcon . . . . .	2	"	Bittern . . . . .	18	"
Myrtle Warbler . . . . .	4	"	Flooded Merganser . . . . .	18	"
Catbird . . . . .	7	"	Pied billed Grebe . . . . .	18	"
Ruby-crowned Kinglet . . . . .	3	"	Goosander . . . . .	18	"
Bluebird . . . . .	9	"	Kingfisher . . . . .	23	"
Phoebe . . . . .	9	"	Song Sparrow . . . . .	20	"
Meadow Lark . . . . .	9	"	Black Duck . . . . .	1	Nov.
Vesper Sparrow . . . . .	9	"	Mallard . . . . .	1	"
Junco . . . . .	14	"	Horned Lark . . . . .	1	"
Purple Grackle . . . . .	14	"	Blue Heron . . . . .	1	"
White-throated Spar-			Herring Gull . . . . .	1	"
row . . . . .	16	"	Red-winged Blackbird . . . . .	1	"
Golden-crowned Kinglet . . . . .	16	"	Robin . . . . .	2	"

Robins and Prairie Horned Larks still here, Nov. 8th.—W.T.M.

### BOOK NOTICES.

AGRICULTURE.—By C. C. James, 200 pp. Toronto, 1898.—It has been the lot of few authors to accomplish so satisfactorily what in their preface they state to have been their object as Prof. James has in preparing the 200 hundred page Manual of Agriculture which has lately been given to the farmers of Canada. The author has had special opportunities which he has made the most of, of learning not only what was needed by the intelligent farmers of the Dominion, but what was the best way of presenting this information to them. Both as Professor of Chemistry at the Ontario Agricultural College and as Deputy Minister of Agriculture, Prof. James has been brought into close contact with the leading and rising farmers of Ontario. The new Manual will fill a decided want, which is none the less from the fact that this want may not have been noticed by some until their attention was drawn to it by seeing how well it has been filled.

The purpose of the book it said to be "to aid the reader in acquiring a knowledge of the *science* of agriculture, as distinct from the *art* of agriculture, that is, a knowledge of the 'why,' rather than a knowledge of the 'how.' The science of agriculture may be said to consist of a mingling of chemistry, geology, botany, entomology, physiology, bacteriology, and other sciences, in as far as they have a bearing upon agriculture. The aim has been to include but the first principles of these various sciences and to show their application to the art of agriculture. . . . An intelligent understanding of the science underlying the art of agriculture will add much interest to what is otherwise hard work, and as a natural consequence, the pleasure of such work may be greatly increased."

Every day the fact is being recognized more and more that the elements of those sciences which underlie all progress in every branch of agriculture *must* be taught in the Public and High Schools of the country. Already simple nature studies and the first steps in chemistry and geology are taught in the schools of Manitoba and Ontario, and these studies have proved to be not only of use and attractive to the students, but a ready means of creating a bond of sympathy between the teacher and his pupils; more especially has this been the case with those energetic and restless souls too often now called "bad boys" more, perhaps, from lack of understanding or skill in management on the part of the teacher than from a superabundance of real badness on the part of the taught. Boys play truant because they find more to interest them outside the school than at their desks. If therefore the things which appertain to out-of-doors can be brought inside the schoolroom without robbing them of too much of their outside flavour, they will be a sure bait to catch the attention of all bright healthy boys and girls. Their study will arouse interest at once and the habits of concentration, power to observe and compare, and the necessary development of the faculties of exact thought and accurate description will be available for all other branches of study with which the pupil is engaged.

This book may be used as a text-book in High Schools and Public Schools. It would be well indeed for Canada if its use were made compulsory in every school in the land. The great truths laid before the reader are presented in a simple straightforward manner intelligible to all. The subjects are so skilfully arranged and concisely stated that a surprising amount of accurate information is given in this small octavo of 200 pages. The value of this simple knowledge to practical men is not, I believe, overstated when I aver that if all the farmers in Canada would read this little work, as they most certainly should, its appearance would mark an epoch in the history of the Dominion, which would be made manifest to all by an enormous increase in the crops and wealth of the whole country.

The scope of the work is shown by the following brief epitome of subjects : Part I. treats of the Plant, its development, structure, food and functions ; Part II., Soil, its nature and treatment ; Part III., Crops of the Field ; Part IV., The Garden, Orchard and Vineyard ; Part V., Live Stock and Dairying ; Part VI., Bees, Birds, Forests, Roads and the Home.

In these different sections the insect and fungous enemies of crops are treated at some length. This little volume is bound in cloth and well got up; although some of the illustrations are rather roughly executed, it is on the whole most excellent and for the price, 25c, is a marvel of cheapness.

THE WINTER FOOD OF THE CHICKADEE, Bulletin 54, New Hampshire College of Agriculture, by Clarence M. Weed—There is something particularly charming about those confiding little feathered denizens of the woods which brave our cold northern winters and stay to cheer us at a time of the year when there is so little animated life. The Chickadee or Black-capped Tit-mouse (*Parus atricapillus*) is at once one of the most cheerful as well as one of the most useful of our common native winter birds. What a bright, busy, happy sight is presented by a flock of these little friends; for they are all friends these little balls of black satin and grey down, they are far too busy and well employed to waste

time in fighting. Satan has a hard time of it in "some mischief finding" for these little fellows to do, for their hands are never idle, as they hurry through the woods, running up or around the trunks of trees or hanging head downwards from a slender twig, never still for more than an instant, as they peer into every tuft of moss, every crack or cranny in the bark, along the twigs, under the bud scales of deciduous trees or among the leaves of evergreens, talking cheerfully to themselves and each other all the time as they carry out their useful mission in clearing the trees and shrubs of countless insect enemies: woe to the luckless caterpillar, chrysalis, spider, or beetle which comes within the range of their sharp black eyes. Nothing comes amiss to these insatiable hunters, from the minute, shining black eggs of an aphid to the fat chrysalis of a Cecropia Emperor Moth; with deft blows the hard sharp beak soon penetrates the thick silken cocoon and in a very short time the marauder is away looking for another victim. Dr. Clarence Weed publishes in this interesting bulletin the results of some careful investigations which he has carried out as to the winter food of the chickadee. He shows that more than one half of the food of this bird during the winter months consists of insects, a large proportion being in the form of eggs. Vegetation of various sorts made up a little less than a quarter of the food, and two thirds of this quarter consisted of the buds or bud scales which were believed to have been accidentally eaten along with the eggs of plant-lice. These eggs made up more than one fifth of the entire food and formed the most remarkable element of the bill of fare. This destruction of myriads of eggs of the plant-lice which infest fruit, shade and forest trees is probably the most important service which the chickadee renders during his winter residence. More than 450 of these eggs are sometimes eaten by one bird in a single day as well as the eggs of many other kinds of our most important insect enemies of the forest, garden and orchard. Dr. Weed figures in his bulletin some twigs of various trees, upon which the eggs of insects have been deposited. Among these are represented the egg masses of the tent caterpillars and the Fall

Canker-worm, both of which are favourite foods of those useful little birds. In addition to eggs of insects, many caterpillars and other stages in the development of insects are destroyed. One interesting figure shows the winter cases of a small caterpillar, closely hidden behind apple buds ; these are, in all probability, those of the Eye-spotted Bud-moth, sometimes one of the most troublesome and destructive enemies of the fruit-grower. This bulletin shows much careful work in a field which has been, to a large extent, neglected by entomologists, and Dr. Weed should receive the thanks of all lovers of birds for the proofs which he furnishes of the real benefits we receive from these little favourites. It was pleasing for some to know and most people to think that these birds were useful, but it is now possible to prove it to all who are willing to learn.—J. F.

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#### NOTES AND REVIEWS.

NATURAL HISTORY IN NEW BRUNSWICK,—The sixteenth annual bulletin of the Natural History Society of New Brunswick has just been issued. Like its predecessors, it is full of interest to all students of the natural sciences in the Maritime Provinces. Prof. L. W. Bailey gives a sketch of Dr. James Robb, a pioneer of agricultural science. John Moser gives a list of New Brunswick mosses. S. W. Kain gives an annotated catalogue of earthquakes which have been felt in New Brunswick, and Dr. G. F. Matthew records some recent discoveries in the rocks about St. John. A good map in connection with the article shows the formations in the Kennebecasis valley about Torryburn, Rothesay, etc. Prof. W. F. Ganong has ten short notes on botanical, zoological and physiographic subjects. These are of considerable general interest. Dr. Philip Cox gives a list of New Brunswick batrachians with notes on their distribution. The appendix contains a report on the work done at a summer camp held at Quaco last summer. It consists of reports by P. G. Hall, Dr. G. F. Matthew, President G. U. Hay, and Professors Duff and

Ganong. The zoological report shows considerable activity in the study of birds, fishes and insects of the Province. Other items are a meteorological abstract for 1897, mean sea level at St. John, by E. T. P. Shewen, and reports of committees.

MOULDING MARBLE UNDER PRESSURE.—Experiments have been carried on at McGill University, Montreal, under the direction of Professor Adams, of the Faculty of Arts, and Professor Nicholson, of the Faculty of Applied Science, which show that marble may, under certain conditions, be moulded like clay. Without going into technical details, the experiments may be said to consist of placing miniature columns of pure Carrara marble, or granite, in sheaths of iron, and submitting them to long-continued but gradual pressure, with the result that the marble shortens and expands laterally, so as to swell the iron sheath. The iron is then cut away ; the marble is altered greatly in shape, but remains as solid and brittle as before. The difference between the deformed marble and the original rock is that the former is said to have a dead white colour, the sparkling cleavage faces of calcite being no longer visible. Although not quite so hard as the original, it is still firm and compact, especially when its deformation has been carried out slowly. No accurate measurements as to its strength have been received, but it was found to withstand a very sharp blow, and fragments of it weighing ten grammes, were allowed to fall from a height of 8ft. on to a wooden platform, from which they rebounded without breaking. Thin sections of the deformed marble when examined under the microscope showed that the calcite individuals composing the rock had in many cases been twisted and flattened. It is stated that the moulded marble when microscopically examined presented many striking resemblances to certain natural rocks whose peculiar cleavage it has hitherto been difficult to explain. But the recent experiments at McGill show that however brittle a rock may seem to be it is in reality a plastic substance capable of flowing into new shapes as surely as putty or dough.

Dr. Adams has not as yet published any full account of these experiments because they are incomplete, in fact they can now be said to be only beginning. A second machine is being built so that the work which is necessarily very slow, may be carried forward more rapidly. The best account of Dr. Adams's discovery is that in the *Scientific American* of April 23rd, 1898.

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## ORNITHOLOGY.

Edited by W. T. MACOUN.

A SWALLOW ROOST.—About a mile west of London, on what are called the Cove Flats, there are fifteen or twenty rows of willows, very thick-set, about 75 yards long and 15 feet high—evidently the relics of an ancient nursery, plainly showing what kind of tree was the most difficult to sell.

Passing these on the evening of August 4th of this year, I was attracted by the large number of Barn Swallows circling near it, which, as the night drew on, became more and more numerous, until I judged there were about 5,000 birds,—almost all Barn Swallows—in the flock. They flew at random until about 8 o'clock, only a few alighting in the roost before that time, but at 8.04 my note-book records them "falling like leaves," and by 8.05 half were settled. Their manner of descent was both interesting and beautiful, especially of those from the upper strata, for they were flying at all elevations from those just skimming the ground, to those so far up that they could with difficulty be seen, and these latter, in descending at an angle of only 20 degrees from the perpendicular, performed the most beautiful aerial evolutions it has been my fortune to witness. Setting their wings for the drop, they would waver from side to side as they came, much as a leaf wavers, but of course with many times greater speed. A few Purple Martins could be heard, and a few Bank Swallows; once or twice I thought I could detect the Cliff Swallow's note, and next morning I found

a single Tree Swallow on a wire with them, but all the remainder of this vast host were Barn Swallows.

Within five minutes of the time of the first general movement, barely a tenth remained in the air, and their voices, which are so liquid and soft when heard singly, became one of the harshest dins imaginable—English Sparrows could be no worse—and it certainly sounded as if they were all talking at once.

At 8.12 only a few are recorded as remaining, and at 8.19 the last one went in. That evening a beautiful cream-coloured specimen was noted, but later search failed to reveal him again. I visited the roost many times in August, and found the numbers gradually waning as the month wore on. All were gone on September 3rd and none had been noted by the boys near by for two or three days.

After the roost was once known, it was easy to notice the Barn Swallows—no matter in what direction one happened to be—between 7 and 8 p.m., flying toward this roost, and indeed such large numbers must drain a vast area, at least five miles in diameter.

I had read of only one such roost before, reported by Mr. Widmann of St. Louis, where the Barn Swallows come by thousands to the islands in the Mississippi, but doubtless many would be found throughout the country if they were searched for.—  
W. E. SAUNDERS, London, Ont.

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#### BOTANICAL NOTES.

One of the largest collections of plants ever brought into the herbarium of the Geological Survey by a private collector was that made by Mr. William Spreadborough while with Mr. McEvoy of the Geological Survey staff in his recent exploration of the approaches to and the mountains in the vicinity of the Yellow Head Pass. The flora of this region has not before been thoroughly worked up, no botanist having collected there since Drummond's time (1826). Though Mr. Spreadborough does not profess to be a botanist, his keen naturalist's eye enabled him

to detect many species that would have been overlooked by a less trained observer. More than 500 species of flowering plants were collected and though a hurried examination of the specimens discloses no new species the known range of many Rocky Mountain species has been extended northward and several species were collected of which there were no Canadian representatives in the herbarium of the Geological Survey though they were known to occur in Canada.

Altogether, Mr. Spreadborough's collection is one of the most valuable ever made by a non-professional and adds much to our knowledge of the distribution of Rocky Mountain species.

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Though the flora of Cape Breton Island was pretty well known in a general way, no systematic botanical exploration of the Island was made until this year, when Prof. Macoun spent the months of July and August in thoroughly exploring the Island. Over 1000 species were collected of which about 700 were flowering plants. These show that no part of the Island is so cold as the so-called barren region was supposed to be. No arctic plants were found. Those collected in the coldest part of the Island were identical with the species found at the Mer Bleue near Ottawa.

Several European plants not known to have become naturalized in America were collected by Prof. Macoun; nearly all of these were so thoroughly naturalized that it is possible that many of them are escapes from the gardens of the original French settlers, especially at Louisburg.—J. M. M.

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### HONEY BEES ACCLIMATISED.

By P. H. SELWYN.

It has been a matter of considerable doubt as to whether the Honey Bee (*Apis mellifica*, L.) when in a wild state can survive the cold of the ordinary Canadian winter as experienced in the vicinity of Ottawa. Personal observations lead to the conclusion

that even under moderately favourable conditions as to location, the honey bee can and does winter successfully in hollow trees, and possibly in other self-chosen abodes.

In this connection the following may be of some interest to the readers of THE OTTAWA NATURALIST.

On the 1st of July, 1897, a strong colony of bees (first swarm) absconded from the apiary of Mr. S. Short, near Rockcliffe, and took possession of a hollow tree some quarter of a mile distant. All efforts of the owner to dislodge them proved futile, as the tree, a giant basswood, is some 70 or 80 feet in height and the cavity in which they had located is within 20 feet of the top. After clearing out the decayed wood they settled down to business in their lofty abode, and it may reasonably be supposed that the winter found them fairly comfortably established, with abundance of honey.

Being much interested in the question as to whether they would survive the intense cold of our climate, I visited the tree early this spring and to my satisfaction I found them apparently as vigorous and strong as ever, judging from the hundreds of bees to be seen passing in and out.

This condition of affairs still exists, and if the cavity is sufficiently large they have doubtless accumulated a large quantity of honey during the past very favourable season, and will therefore be in a better position to withstand another winter.

That many colonies which have escaped from their owners do perish during the winter months seems almost certain, but in most cases probably from causes with which the climate has comparatively little to do, viz.: The abode too small to accommodate both brood and stores in sufficient quantity; small second swarms too weak numerically to gather surplus stores for winter; loss of queens; and possibly ravages of the bee moth grub (*Galleria mellonella*, L.)

NOTE ON THE PHYSIOGRAPHY AND GEOLOGY OF  
KING'S COUNTY, NOVA SCOTIA.\*

By H. M. AMI, Geological Survey, Ottawa.

King's County, Nova Scotia, is bounded on the north by the Minas Channel and Minas Basin (eastern extension of the Bay of Fundy), on the east by the Basin of Minas and Hants County, on the south by Lunenburg County, and on the west by the County of Annapolis. It is traversed in a north-easterly and south-westerly direction by three principal ridges, viz :

(1) *The North Mountain*, an eruptive axis from six to eight miles in breadth and extending from Cape Blomidon to Brier Island at the southern entrance to the Bay of Fundy, referred by geologists to the Triassic System.

(2) *The Ridge*, on and near which the town of Wolfville is built, consists of an axis of sedimentary rocks of Devonian and Silurian age overlaid unconformably, in its eastern extremity, by a series of granitic sandstones, shales and limestones holding plant and fish remains, referable to the Horton division of the Carboniferous system. This "Ridge" extends west through Kentville and Canaan to Nictaux in Annapolis County.

(3) *The South Mountain*—Formed by a belt of granite, in contact with the Silurian slates, sandstones, &c., of the Gaspereau Valley the latter being unconformably capped by rocks of the "Horton Series."

## THE CORNWALLIS VALLEY.

Between the "North Mountain" and "The Ridge" lies the beautiful and fertile Triassic Valley of the Cornwallis river, the largest and most southerly of the four streams which flow east into the Basin of Minas. The other streams are : the Canard, the Habitant and the Pereau rivers—the latter sometimes called the Canning river. "Look-off," on the North Mountain, is a favourite spot from which the beautiful and broad valley or the Cornwallis river, with its numerous dykes and orchards, can be seen to advantage, as well as the extensive meads of historic "Grand

Pré," besides portions of four other counties of Nova Scotia, viz :— Cumberland, Colchester, Hants and Annapolis. North Mountain is well clad with a forest of conifers and hard wood trees ; and though 700 feet above the level of the Bay, has sufficient soil on its flattened top to make good farming land.

#### THE GASPEREAU VALLEY.

Between "The Ridge" and the "South Mountain" flows the Gaspereau river, which finds its source in the picturesque and beautiful Gaspereau lake. This is a narrow but charming little valley, very fertile, abounding in orchards on both sides. The Duncan, Angus, Trenholm and Wall Brooks flowing from the South Mountain fall into the Gaspereau, have furnished fine exposures in the rocks of the Horton formation where Sir J. Wm. Dawson, Sir Charles Lyell and the late Professor C. Frederick Hartt obtained interesting series of fossil plants. In the district around the head-waters of the Gaspereau Valley and in many other places down to its mouth, are dense forests of spruce and hemlock and hard wood trees. The Gaspereau river enters the Basin of Minas near the mouth of the Avon River.

#### LONG ISLAND.

Over one mile in length and about half a mile across, situated four and a-half miles from Wolfville, is a favourite resort for many kinds of birds. It is formed by a mass of red Triassic sandstones, which have withstood the action of the denuding atmospheric agencies in times past. These sandstones are now being washed away rapidly and large masses frequently fall down from the bluffs on the north-western extremity of the Island and are carried away to sea by the powerful tides and tidal action of the Basin which is connected with the Bay of Fundy by a narrow but swift channel between Cape Split King's County and Cape Sharp, below Parrsboro', in Cumberland County.

## NEW SPECIES OF CANADIAN VIOLETS.

We are pleased to announce for our next issue a paper on some new species of violets, which will be hailed with great satisfaction by Canadian botanists. This paper is now being prepared by Mr. James M. Macoun, Assistant Botanist of the Geological Survey Department, and is the result of a critical study of the whole group of several species, which up to the present time have passed under the name of *Viola cucullata*, Ait. In the last number of "Pittonia" (24th Sept., 1898), the editor, Dr. Greene, who has described the new species, speaks in the following complimentary terms of Mr. Macoun's careful work :—

"Whatever of value these notes may contain is largely, if not chiefly, due to abundant living specimens and very copious and intelligently made field-notes, which have been forwarded to me by Mr. Macoun, whose modesty alone seems to have stood in the way of his publishing them himself; for all the new species here described were so carefully studied by him, that independently of my own opinion, he regarded them as undescribed."

Mr. Macoun has grown all of the species referred to, and studied them at every stage of their growth. We hope to publish with this paper figures illustrating the salient characters by which they may be recognized.

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EXCURSION NO. 2 TO CHATS FALLS.

Notwithstanding the threatening aspect of the weather a very large number attended the excursion to the beautiful Chats rapids of the Upper Ottawa on June 25th. The route taken was by electric cars to Aylmer and thence by the comfortable steamer *G. B. Green* to the falls. Unfortunately owing to the lowness of the water in the Ottawa, it was impossible to land at our original destination, Fitzroy Harbour. The party accordingly disembarked at Moore's wharf some two miles below the above point. As this was a new district it was full of interest to our naturalists, and the members of the Camera Club, many of whom we were pleased to have with us on the expedition, found

ample opportunities of adding many a scenic gem to their collections.

In the matter of botany, Professor Macoun was a host in himself, and despite the almost continuous down-fall of rain during the afternoon, he made several very successful foraging sorties into the woods, coming back laden with numberless floral treasures, which he exhibited and described to the delight of everybody. The success of this excursion under somewhat adverse circumstances was distinctly due to the energy and good management of Mr. F. T. Shutt, of the Executive Committee.

#### EXCURSION NO. 3 TO AYLMEK.

On Saturday afternoon the 24th of September, a small party of twenty-five visited Blueberry Point, Aylmer. The weather was overcast, but no actual rain fell, and a most instructive afternoon was spent. Prof. Macoun collected about 75 species of toadstools and mushrooms, the qualities and characters of which he explained to all who accompanied him through the woods. Miss Marion Whyte returned with her band of botanists and, notwithstanding the lateness of the season, showed a collection of over 20 plants in blossom. Addresses were given by the President, Professor Prince, by Principal Pollock on the geological formation of the locality, by Prof. Macoun on edible and poisonous fungi, and by Messrs. Sinclair and Fletcher on the general teachings of Nature, showing that this charming book lay open for all who would learn.

#### EXCURSION NO. 4 TO CHELSEA.

One of the most enjoyable outings of the whole season was held on the 1st of October to Gilmour's Grove, Chelsea, when nearly a hundred ladies and gentlemen, chiefly students from the Normal School, took advantage of the opportunities afforded by the Club of visiting the above charming locality under the guidance of the leaders of the different branches of the Club. The addresses were delivered around a roaring bonfire on the bank of the Gatineau River, the speakers being Messrs. Sinclair, Shutt, Fletcher and Bryson.

## VEGETATION IN THE BERMUDAS.—PART. III

## PLANTS AND FLOWERS.

By H. B. SMALL.

If after the fall of man any truant flowers of Eden escaped its bounds their seeds must have found a kindly soil in Bermuda. Plants and flowers there attain a daring loveliness which stamps them on the memory of even the transient visitor. The island group may well be called "the Land of the Lily and the Rose" for each of these attains a perfection far beyond the conception of a dweller in the north. The many and beautiful varieties of the garden rose—both bush and standard—bloom in profusion all the year round, and the air is literally laden with their perfume. Bermuda is a botanists' paradise, but how many pluck every striking flower they see, only to toss it carelessly aside, regardless of its loveliness or its brilliancy. The Passion-flower, Narcissus, Geranium, Heliotrope, Verbena, Violet, Wistaria and a Creeper known as *Bougainvillea*, one of the handsomest adjuncts to a wall or verandah that the world produces, are all remarkable for their luxuriance. The *Bougainvillea* was introduced from Gibraltar by Governor Lefroy in 1874, and has now so established itself as to be seen gracing the majority of private buildings.

There are two species of Passion-flower, one remarkable for its blossoms (*Passiflora cærulea*), the peculiar formation of which representing the emblems of Christ's Passion has given rise to the name, the other (*Passiflora minima*), a wild species covering roadside banks and old stone walls in profusion, but the flower of which is far less conspicuous than its congener. Of the Narcissus two species are abundant, one (*N. Tazetta*) bearing a cluster of numerous white flowers with a yellow eye, the other (*N. jonquilla*) with two or three deep yellow fragrant flowers. These plants are abundant on some hillsides along the edge of the cedar groves or beneath the Oleander shade, and in the glades in the valleys. There are two Honeysuckles (*Caprifolium sempervirens*) and (*Lonicera Japonica*), which cover the walls or trail along

the road-sides, lending a fragrance all their own, suggestive of English lanes and road-side hedges. The Morning Glory (*Convolvulus major*) is abundant both wild and cultivated, and its purple flowers two or three inches in diameter are produced in profusion all the year round. Many a rugged corner or way-side copse is festooned with this beautiful creeper, and its graceful hangings of nature's tapestry hide many an unsightly corner or debris of a ruin.

The most important flower, and cultivated to a very large extent for exportation, is the Easter Lily (*Lilium Harrisii*), and a dwarf species (*L. longiflorum*) both bearing numerous large flowers of the purest white. A specimen of the latter grown by the late Harvey Trott, Esq., at Waterloo in Pembroke parish produced on one stem 145 flowers. This was exhibited in May 1883 at the St. Nicholas Hotel, New York, and an illustration of it appeared in the *London Graphic*. A field of several acres in extent planted with these lilies presents a strikingly beautiful appearance, not only when in full bloom, but when maturing their buds; the latter are carefully cut and boxed for shipment, blossoming after arrival at their destination, and keeping fresh for some days. Besides the Easter Lily, the Blue Lily (*Agapanthus umbellatus*) and the Egyptian Lily, or more properly Arum (*Calla Ethiopica*) grow luxuriantly, and where escaped they seem to flower better than in cultivation. The Cane Shot (*Canna coccinea*) from 3 to 5 feet high, with showy flowers two or more inches long, yellow, red and with lip variegated with yellow, has taken well to waste places, and with its leaves 10 inches long and 4 wide it is a very noticeable plant. A lily species known as Elephant's Ears (*Caladium*) remarkable for its large-sized leaves, is abundant in moist valleys.

A very abundant and attractive plant miscalled Heath, (*Russelia juncea*) with rush-like pointed branchlets and long scarlet tubular flowers, giving the idea of brilliant red coral, grows by the way sides and edges of private grounds, delighting in stony and rocky localities. The Poppy (*Papaver dubium*) with scarlet flower, and (*P. somniferum*) are common on waste

ground and the edges of fields. The Stock (*Matthiola incana*) with purple blossoms is abundant along the sandy margin of the bays, and in sea shore nooks and crannies. A plant known as the Stinging Thistle (*Argemone Mexicana*) with yellow blossoms, and easily mistaken for a yellow poppy, is common at all seasons in old worn out grounds and waste places. The flower itself reminds one of the *Eschscholzia*.

There are four species of Evening Primrose, the (*Oenothera longiflora*) with yellow flowers three inches in diameter, not uncommon in waste land, (*O. sinuata*) with smaller yellow flowers, common in fields and roadsides, (*O. rosea*) with rosy flowers three-quarters of an inch in diameter, found in grasslands, and (*O. luteiflora*) with Orange yellow blossoms, found on the sea shore. The Four o'clock plant (*Mirabilis Jalapa*) opens its brilliant flowers at four p.m., and closes early next morning. Although red is its prevailing colour, other varieties are by no means uncommon, as white, yellow, and white with a red centre. Its blossoms are profuse, and continue unfolding all through spring and summer. The Golden Rod (*Solidago sempervirens*) is as elsewhere in America a very common plant along the shore, by waysides and fence walls, always showy from its long, compact panicle of golden yellow flowers. Two *Salvias* (*S. splendens* and *S. purpurea*) with respectively scarlet and purple flowers, are cultivated, whilst (*S. coccinea*) with very showy scarlet flowers, three-quarters of an inch long, is common on dry hills and wayside banks, and (*S. serotina*) clothed with a whitish pubescence, and bearing white flowers a quarter of an inch long, is found in similar localities. Both of these blossom from April to October.

The Barbadoes Fence (*Poinciana pulcherrima*) with its orange-red flowers and long stamen and style keeps in full bloom from November to April, with straggling blossoms all through summer, is very pretty and showy, and being almost a shrub, forms a charming hedge when cultivated. The Red *Justicia* (*J. lurida sanguinea*) is common, although originally

escaped from gardens, in wild corners of fences, and (*J. alba*) also grows occasionally with the former.

What appears to be the most universally spread plant in Bermuda is the Life Plant (*Bryophyllum calycinum*), locally known as "Floppers," a name attributable to the cracking noise produced by pressing the buds before they are fully open. Every old wall or rocky road margin is literally covered with its growth, the large fleshy leaves tending to make it conspicuous, and its pendulous flowers, of a green and purple hue with a bladder-like appearance, on stalks eight or ten inches high, all through the winter season at once attract attention. The leaves or leaflets when placed on a moist surface, produce rootlets and young plants at the marginal creases, a peculiarity which appears to render the usual methods of propagation unnecessary, as its seeds are said not to mature. One leaf will sometimes shew when lying detached from the parent plant, a dozen young plants forming around it.

From the prolific display of the whole flora of Bermuda, mention of any one more than another seems almost invidious, and in the enumeration of the above-mentioned plants, imagination must supply the reality to those who have not visited that flower land. Before closing, I must mention three plants, more of a commercial than botanical value. First is the Dwarf Banana (*Musa Cavendishii*) of which family there are several kinds, viz., the common one (*M. sapientum*), the Red (*M. rosacea*), the Fig (*M. spicatum*), and the Plantain (*M. paradisiaca*). The Dwarf is the kind most frequently grown, bearing heavy bunches of choice fruit, consequent probably on this variety being more easily sheltered from the wind, which when blowing heavily tears the exposed parallel-veined leaves of the taller varieties to shreds. A large reddish-brown or chocolate-colored drooping flower pendent from each bunch of fruit is a curiosity in itself, and is not unlike the closed bloom of a water lily or Night-blooming Cereus. The graceful palmlike appearance of the large feathery leaves and tree-like stems adds not a little to the tropical appearance of the landscape, for there is

scarcely a house without its Banana plantation beside it. The Cassava (*Jatropha Manihot*), from which is prepared tapioca, is cultivated to a limited extent. It is a smooth shrubby plant three or four feet high, producing tubers or roots not unlike those of the dahlia, but much more massive and of a harder texture. Amongst the colored population a Christmas dinner is not complete without a Cassava pie, a poor substitute however for the plum pudding of the north. The third plant is the Arrowroot (*Maranta arundinacea*) growing three or four feet high, with large spear-head-shaped leaves, and bearing root-like tubers which mature in February. From these a starch is manufactured which, after going through several processes, is known as Bermuda Arrowroot and holds a high place in the market, but its place has been lately taken by the article now produced all through the West Indies, in Australia, and in the Fiji Islands.

There is a plant which I have been unable to place, neither can I find any description corresponding with it in the few botanical papers bearing on the flora of Bermuda. I am inclined to think it is a *Sanseveria*. Its leaves are from 18 to 24 inches long, and about three inches wide, smooth, leathery, of a dark green mottled with purple spots, like some of the Orchis tribe. The under side is purplish. When the leaves dry off they turn a greenish brown with the spots still showing, and are not unlike the back of a snake. It grows in shady places, about rock cuttings or disused quarries, preferring shade to the open. It was not in blossom during my stay.

Owing to the extreme moisture in the air, vegetation is always luxuriant, growth being sustained by the heavy dews and the great evaporation at night. These conditions approach the description of Eden, where "a mist went up from the garden and watered the face of the earth." The coral rock too is favorable to growth, and vegetation of all kinds flourishes apparently out of the face of the rock wherever fissures allow the roots to penetrate.

## NOTES AND COMMENTS.

DONATION TO THE LIBRARY.—It will be remembered that last year the Club's library was enriched by a valuable donation from Madame Ville, of Paris, France, who presented to us, through Mr. Shutt. twelve handsomely bound volumes containing the record of the labours of her husband, the late Professor Georges Ville, the eminent agricultural chemist. During the past month a further volume has been received from the same donor. Its title is "*Le dosage de l'Ammoniaque de l'air et l'absorption de l'Azote de l'air par les Plantes,*" and contains an account of the chief work undertaken by this scientist. The thanks of the Club have been forwarded to Madame Ville for her valuable gift.

DR. ADOLF LEHMANN, a member of the Club, and a contributor to the OTTAWA NATURALIST, who for years was Assistant Chemist at the Experimental Farm, Ottawa, has been appointed Agricultural Chemist for the district of Mysore, India. This is an important position, and we offer him our heartiest congratulations, wishing him all success in his new and distant field of labour.

Since his return from Leipsic Dr. Lehmann has been at Queen's College, Kingston, as Demonstrator and Lecturer in Organic Chemistry. Dr. Lehmann will leave in Canada many warm friends, and we trust that from time to time we may be able to inform them of the good work and good health of our erstwhile co-labourer.

AMERICAN PUBLIC HEALTH ASSOCIATION—This important Society, with its membership extending over the United States, Mexico and Canada, held its 26th annual meeting in Ottawa, September 27th to 30th. There was an attendance of about two hundred visiting members, including a party of six from the City of Mexico. A goodly number of Canadians were present, and Ottawa, as might be expected, was well represented.

The deliberations of this association include all subjects relating to public hygiene, and papers and discussions upon

the disposal of sewage and garbage, the pollution of water supplies, disinfection, quarantine and kindred matters occupied the attention of the members throughout the three days during which the society was in session.

Three papers were presented by Ottawa gentlemen. The first was by Thos. Macfarlane, F.R.S.C., Chief Analyst of the Inland Revenue Dept., "Upon the disposal of refuse in some European cities." This was an exhaustive account of how sewage is disposed of in many cities and towns of Great Britain and the Continent, and comprises the carefully recorded observations made by the author in person on a recent tour made purposely for that object. It is a most valuable paper for reference, since it contains in concise form useful information not hitherto collated. Mr. Macfarlane emphasized the use of "moss litter" as an absorbent and deodorizer and stated that the experience of all who had tried it for this purpose showed it to be entirely satisfactory.

"The Interpretation of the Chlorine number in Well Waters" was the title of a paper read by Mr. A. McGill, B.Sc. The author claimed that most valuable data would be obtained if the chlorine content of the ground waters throughout a district were determined and tabulated according to locality. Such results would materially assist in the diagnosis of rural well waters.

A paper on a closely allied subject was given by Mr. Frank T. Shutt, M.A., Chemist of the Dominion Experimental Farms. It was entitled "The Farm Well." Since the institution of the Experimental Farms the useful work of examining well waters for farmers has been done, free of charge to the agricultural public, and the writer stated that in this way the water from more than 1,000 wells had been analysed. The results, as regards the general quality of the waters were far from satisfactory, the chief cause of pollution arising evidently in the majority of cases from the proximity of the well to the barn yard or a similar source of contamination. It was pointed out that life was being jeopardized for the sake of convenience in too many farm homesteads. The paper concluded with a use-

ful set of rules to be followed by the farmer for the procuring and preservation of a pure water supply.

The Local Committee of Arrangements, with Sheriff Sweetland as Chairman, and Mr. Thos. Macfarlane as Secretary, are to be congratulated on the success that attended their labours both before and during the convention. The visiting members agreed that their reception had been most cordial and that the hospitality they had received and the entertainments and excursions provided had made their short sojourn in Ottawa a most pleasant one.

A BLACK SQUIRREL AT OTTAWA.—A fine Black Squirrel was shot recently on the property of Mr. George Holland on the Richmond Road. The specimen was in good condition and has been well stuffed by Mr. Dupuy, of Hintonburgh. It is now in the possession of Mr. Holland. The Black Squirrel, which is a melanic variety of the Gray Squirrel (*Sciurus Carolinensis*), is very rare at Ottawa. There are only one or two records of its having been seen here.

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#### SOIREES.

The usual Evening meetings will be held during the coming winter for Lectures, the reading of Papers and Short Notes, and the reception of the Reports of the various Branches. It is hoped to make the *exhibition of specimens* and *informal discussions* conspicuous features of next winter's meetings. Members of the Club who are desirous of submitting papers are invited to communicate with the Soirée Committee or with any member of the Council as soon as possible, so that the programme may be arranged without delay.

The names of the members of the Council are printed on the last cover of each number of the OTTAWA NATURALIST.