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August, 1894.

THE OTTAWA NATURALIST

VOLUME VIII. No. 5.

THE BEAVER (*Castor Canadensis*, Kuhl).

CONTENTS.

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(*Continued from page 60.*)

Nitroglycerine was found so difficult to handle that five years afterwards Noble invented dynamite, which is simply a sand soaked with nitroglycerine. Other absorbents for it have also been used, and the giant powder so much used in western mines is a mixture of common gunpowder and nitroglycerine. The new blasting gelatine is simply nitroglycerine in which 7 or 8 per cent. of gun cotton has been dissolved. Lithofracteur, dualine, colonia powder, fulminatine, sebastine, serranine, rackrock, atlas powder, vulcan powder, neptune powder, forcite, are all mixtures containing nitroglycerine. Hellhoffite, carbonite, roburite and kinetite have nitrobenzol for the explosive constituent. Mellinite consists essentially of picric acid. As for smokeless powders their name is legion and it would be useless to go into their composition. One of them, however, may be mentioned, namely cordite said to have been invented by Sir Frederick Abel and Professor Dewar. It is said to consist of nitroglycerine and gun cotton or some other nitrocellulose, and to have been adopted by the British Government for the army and navy.

(Experiments were here introduced; the burning of gun cotton and of nitrocellulose.)

I have already indicated to you the percentage composition of the albumen of eggs, the casein of milk, and the fibrin of blood, and I might go on and characterise many other of the animal albumenoids which have been separated by chemists. This is, however, unnecessary for our present purpose and besides there have been detected in the examination of the animal fluids and tissues other albumenoids very difficult to classify under the headings which have so far been adopted by chemical physiologists. In fact; products seem to have been discovered which indicate the existence of transitions or gradations betwixt those albumenoids which have already been accepted as pretty well defined compounds.

There exists, however, another set of albumenoids in the bodies of animals which it is impossible in a lecture on Nitrogen to pass over without notice. Beilstein calls them the Protein substances of the connective tissue. In English they are sometimes called the fibrous albumenoids and are a very curious class of substances. To it belong hair, wool, glue, etc., which in spite of their different characters are similar in composition.

Possibly these nitrogenous substances might be classed by themselves as colloids. They are possibly less hydrous than the proteids or albumenoids. This table exhibits their per centage composition.

	C.	H.	N.	S.	O.
Hair	49.7	6.4	17.1	5.0	21.8
Wool	50.6	7.0	17.7	?	
Feathers	51.9	7.2	17.8	?	
Skin (humansole)	50.3	6.8	17.2	?	
Oxhorn	50.7	6.7	16.2	?	
Glue	50.0	6.5	17.5	?	
Gelatine	50.0	6.7	18.3	?	

Formulae of the Colloids.

Gelatine	102.0	151.	31.		39
Chondrine	99.0	156.	40.		42
Keratine	230.5	381.	70.	6.	77

We learn from the characters of the colloids that some nitrogenous substances are very stable. Such are the compounds which constitute the horns and hoofs of animals, the latter constituting the raw materials for the manufacture of those important products used in the arts and called cyanides, ferrocyanides, sulphocyanides, &c. The first step in their production is the fusion of the substances rich in nitrogen with carbonate of potassa in iron vessels. Subsequent lixivation and crystallisation yield what was long known as yellow Prussiate. The essential constituent of these salts is the compound radical Cyanogen $C_2 N_2$ as it is also of the well-known pigment called Prussian Blue. In fact the history of these compounds begins with the production of Prussian Blue about 180 years ago. Equal parts of cream of Tartar, saltpetre and and ox-blood were heated together in order to produce the solution from which, by the use of green vitriol, the colour was precipitated.

EXPERIMENTS.—Production of Prussian Blue. Decomposition of mercuric sulphocyanide.

Another very interesting set of nitrogenous substances are those which are formed in dead and decomposing animal matter. These are sometimes of a basic nature, are formed in the human corpse after

death, and have been called by Selmi, their discoverer, Corpse-alkaloids or Ptomaines. Some of these compounds are very poisonous, and Brieger calls them Toxines. To such substances are to be attributed the cases of sickness and death we frequently hear of from eating unsound meat and meat preparations. All decaying animal and vegetable matter produces substances dangerous to health in various ways, and among the most dangerous and disagreeable of these products are those resulting from the decomposition of the albumenoids.

But why is it that organic substances when left to themselves are so prone to decomposition? We have seen that they can exist and pass through vegetable and animal organisms, nourishing and sustaining them, and exercising most beneficent influences in the economy of living organised bodies. Why is it that outside of these they behave in an altogether different and most dangerous fashion? What is it that regulates and controls their chemical affinities for good when they form part and portion of an active living organism? More than forty years ago Justus Von Liebig put forth a theory according to which the force which controls the affinities is the vital principle. This theory I have never seen any reason to abandon, and I shall try to state it in Liebig's own words.

"The production of organs, the co-operation of a system of organs, and their power not only to produce their component parts from the food presented to them, but to generate *themselves* in their original form and with all their properties, are characters belonging exclusively to organic life, and constitute a form of reproduction independent of chemical powers.

"The chemical forces are subject to the invisible cause by which this form is produced. Of the existence of this cause we are made aware only by the phenomena which it produces."

"The chemical forces are subordinate to this cause of life just as they are to electricity, heat, mechanical motion and friction."

"Such an influence, and no other, is exercised by the vital principle over the chemical forces."

"The vital principle opposes to the continual action of the atmosphere, moisture and temperature upon the organism, a resistance which is, up to a certain point, invincible. It is by the constant neutralisa-

tion and renewal of these external influences that life and motion are maintained."

(Agriculture and Physiology, pp. 389-90.)

When Liebig wrote thus he was perfectly well aware of the artificial production of urea by his fellow investigator, Woehler in 1828, and therefore could not have thought that that discovery was antagonistic to his theory of the influence of the vital principle. Gmelin, the author of the great hand-book of Chemistry, had in 1817 maintained that organic compounds cannot, like in-organic compounds, be artificially built up from their elements, and Berzelius also enforced this distinction, asserting that while in-organic bodies could, organic bodies could not be artificially produced. Woehler's discovery and others of a like nature since, have gone to prove that this was too sweeping an assumption. Many organic bodies have been produced artificially but by means and from substances altogether different from those employed in nature. Take the production of urea by Woehler. He obtained it by heating a solution of cyanate of ammonia. But that substance was produced, by decomposing the potash salt, and the latter from fusing yellow prussiate of potash and caustic potash with red lead. All of these substances are foreign to food and organic life and most of them are of a highly poisonous character. No wonder then that Liebig took no notice of such discoveries as invalidating in the slightest degree his contention that Life modifies and controls chemical affinities. He knew very well that chemists would never be able to produce an organic cell or a starch granule, and we know that, since his time every attempt to produce urea by the oxidation of the albumenoids has failed. And even although it should be found possible in the distant future, to fabricate, let us say, some grains of sugar in a roundabout way from strange artificial materials and with the help of complicated apparatus, would it be reasonable to consider that as equivalent to its production from the carbonic acid of the atmosphere in the tissues of the sugar cane? I trow not. Nevertheless we have chemical authorities of high reputation expressing themselves in the following way. "At the present day the belief in a special vital force has ceased to encumber scientific progress. We now know that the same laws of combination regulate the formation of chemical compounds both in animate and inanimate

nature. So soon as the constitution of any product of the organic world has been satisfactorily ascertained we look forward with confidence to its artificial preparation." Roscoe Schorlemmer, Vol. III, part 1, page 10. I confess to much impatience on reading such a statement. Talk of the arbitrary assumptions of ecclesiastical authority! There never was anything of that sort equal to this scientific popery. It is enough to justify the clergy of the present day in exclaiming "Quare fremuerunt gentes." "Why do the heathen so furiously rage together and why do the people imagine a vain thing?" And no wonder that some unbelievers in science feel justified in adding "He that dwelleth in heaven shall laugh them to scorn; the Lord shall have them in derision."

But apart altogether from the opinions of those among us who are of a religious turn of mind, I feel bound to maintain that such assertions as the one I have quoted from Roscoe Schorlemmer are not reasonable. To ignore the existence of life and the wonderful influence which it exerts on organic substances is not a scientific proceeding. And it appears to me to be still more unscientific to ignore the Author of life and of the unity and order of the universe. Is it reasonable, I ask, after having contemplated the myriads of miracles observable all around us, the wonderful intelligence and power displayed in nature, the astonishing phenomena and inexplicable results which are exhibited in every department of science, to stop short in our reasoning, shut up our mental vision and declare that we can know nothing of the Originator of all these marvels, because perhaps their complete explanation does not lie ready to our hands. To me the wonder is that men are forthcoming so trained or school bound as to be able to put fetters on their reasoning faculties just at this point. No doubt there are limits to the powers of the human intellect, but I do not see why we should stop short of these limits. They have been defined by Emmanuel Kant in his treatise on pure reason, but that did not prevent Liebig and others from thinking and writing of an unfathomable wisdom "The philosopher who has attained to the highest summit of moral wisdom, is he who, if he use his mind aright, has the clearest perception of the limits of human knowledge, and yet the most earnest desire for the lifting of the veil that separates him from the unseen.

So writes Carpenter the physiologist and further: "All our science is but the investigation of the mode or plan in which the Creator acts; the power which operates is infinite and therefore inscrutable to our limited comprehension." I am afraid that of late it has not been customary or very fashionable, in discoursing of the wonders of nature, to make much reference to the existence of a higher power than nature. In this I think we err grevlously and I do not hesitate to range myself with those who believe it to be their duty, on such occasions as the present, to acknowledge with reverence the Creator and His wondrous works. I have no desire to depreciate the powers of the human intellect or disparage full and free investigation, but we should remember that to err is human in scientific as well as moral respects. As Schiller says: "Error leaves us never; but a high desire conducts the striving soul ever on towards the truth." Yes; "towards the truth," but possession of the whole truth can never be ours. Newton's ocean will always be spread out before us, and although here and there an adventurous ship may dredge in its depths and add slightly to the sum of our knowledge, still infinite space will remain for the labour of the investigators of countless human generations yet to come. Do not let us therefore become impatient or querulous or sceptical because we are not permitted to know everything. Let us acknowledge that we are woefully shortsighted at the best, and when in our reading or thinking or investigations we find ourselves face to face with wonderful and inscrutable phenomena let us stand silent in awe and reverence, or if we must attempt to explain the ways of the omniscient Author of the universe let us simply repeat what we are told in Scripture, that "He upholdeth all things by the word of His power."

SECOND GENERAL EXCURSION.

On Saturday afternoon, June 23rd, the members and friends of the club made their second excursion of the season, leaving by the 1 p.m. train for Wakefield and La Pêche.

Owing to several important events transpiring in Ottawa during the afternoon (notably a lacrosse fight) and the fact that many arrived at the station by electric car just too late to get on board, the party of excursionists was smaller than usual--about 70 being present.

Many of these, however, were among the most enthusiastic and indefatigable members of our society. Mr. R. B. Whyte, Mr. A. G. Kingston, Mr. Latchford, Dr. Ami, Dr. Bell, Col. White, Mr. Lambart, Mr. Whiteaves, Mr. Frank T. Shutt, Mr. R. A. Johnston, Mr. Glashan and many others of the "old reliables" were there and did all in their power to make the outing a pleasant and profitable one for their friends.

The afternoon proved to be cool, and all enjoyed the picturesque run up the Gatineau Valley. It is worthy of remark that though the club has has made so many excursions into this romantic district, there always appear to be new charms for the lover of Nature in this beautiful vale. On the arrival at Wakefield, the excursionists separated into parties, under the guidance of the several leaders. The writer was with those who went to the top of the mountain, from which there was a magnificent view of the valleys of the Gatineau and La Pêche. The climb was a steep one, but all felt amply repaid for the fatigue. After a rest on the summit and the collection of specimens of rocks and flowers and ferns—among the latter some lovely *Woodsia* were brought home—and not forgetting the insects (for there were several ardent entomologists with us), the descent was made to the valley of the Pêche, where, about 5 o'clock, all the parties assembled for refreshments, which by this time proved most acceptable.

Arriving at the station, addresses were given by the vice-president, Mr. Shutt, and by Mr. R. B. Whyte and Dr. Ami. These short talks by the leaders on the collections of the day—which were on this occasion by no means insignificant—and on the flora, fauna and geology of the district visited, are always of practical character and should prove not only an encouragement, but a great help to those who are endeavouring to learn somewhat of the manifold ways and phases of Nature.

Due notice of date and place of the August outing will be given, and it is hoped that all with whom it is possible will be present—thus assisting the council in the very best way to make the excursion a pleasant and successful one.—F. T. S.

OBITUARY.

The sudden death on Thursday, March 29th 1894, of Mr. Scott

Barlow, geographer and chief-draughtsman to the Geological Survey, makes another gap in the ranks of the associates of the first Director, inasmuch as the subject of this notice aided his father, the late Mr. Robert Barlow, in the compilation of the beautiful maps and sections in the Atlas to accompany the general report for 1863, and to illustrate the labor of Sir William Logan and his associates in the first twenty years of the life of the survey; a monument to their memory which will not soon perish, and for which medals were awarded at the first Paris and London Exhibitions.

His death is a loss to the profession generally, and his familiar face will be missed by his many friends and especially by his colleagues, with whom he was on terms of the kindliest intimacy, and who all bear willing testimony to his high sense of honour and his devotion to duty. He leaves with them pleasant memories of his unfailing humour, generous, considerate forbearance and friendly counsel and assistance.

Mr. Barlow joined the Survey in November 1856, and had thus been more than thirty-seven years employed as surveyor, explorer and draughtsman. During the first years of his service he made important researches in conjunction with the late Mr. James Richardson, along the south shore of the St. Lawrence, and owing to his skill and pains-taking accuracy was engaged to work up the field-notes of Sir William Logan.

In 1870 he was employed in the Springhill coal-field in Nova Scotia. By digging and boring by hand along the outcrop of the coal-seams he ascertained their extension north and south so well, that the workings for the last fifteen years at that colliery have not passed beyond the ground proved by him. He was withdrawn from Nova Scotia in 1878, and after he succeeded his father as chief draughtsman, the duties of that office occupied most of his time, although he made surveys of certain mining districts in the valley of the Ottawa River.

He also made original surveys of the north and south shores of the Ottawa River for a radius of some twenty miles, with a view to preparing a complete geological map of Ottawa and its environs, to form the first of a series of geological maps of the larger cities and centres of Canada.

Mr. Barlow leaves a widow, daughter of John Crichton Esq.,

formerly manager of the Valleyfield paper mills, and a family of six children. He also leaves two brothers, John R. Barlow, Deputy City Surveyor, Montreal, and Mr. Alfred E. Barlow, M. A., F.G.S.A.

H. F. & H. M. A.

Ottawa, June, 1894.

REPORT OF THE ENTOMOLOGICAL BRANCH 1893.

To the Council of the Ottawa Field Naturalists Club:

The Leaders have much pleasure in reporting that the Branch is in a prosperous condition and that a satisfactory amount of work has been accomplished during the past season. Frequent excursions were held and as a consequence many species have been added to the local lists. The occurrence of some of the rarer species has already been recorded in the Ottawa NATURALIST under the head of Entomology. It is proposed for the future to continue this method of recording captures, instead of making an extended annual report.

The publication of the Fauna Ottawaensis has been continued by printing a complete list, with notes, of the Phytophagous Hymenoptera by Mr. Harrington. In addition to the above a complete list of the Butterflies of the locality with notes on their habits has been prepared by Mr. Fletcher and is ready for publication.

LEPIDOPTERA.—Good work has been done, particularly in breeding. Two additions have also been made during the past summer to the list of diurnals, viz: *Argynnis Triclaris* Hüb. a northern species, taken in Labrador, Hudson Bay and westward. Seven specimens of this rare insect were taken on June 13th and 14th in the Mer Bleue. *Thecla Augustus*, Kirby was also taken in the same place on the third day of the same month. Two specimens of *Exyra Rowlandiana* were bred from cocoons found in the pitchers of *Sarracenia purpurea*. These cocoons were at the extreme base of the leaves, beneath the mass of decomposing insect remains, and were white, closely-spun and elastic. The beautiful moth *Dryocampa rubicunda* is recorded as taken at Ottawa this year for the first time. In Western Ontario it is sometimes injurious to the maples grown as shade trees.

COLEOPTERA.—Several good additions have been made in this order. The more notable of which are the following: *Dicælus teter; Oodes fluvialis*, hybernating under moss at St. Louis Dam, with *Lachnocrepis parallelus; Donacia pubescens* taken in small numbers on bulrushes along the Rideau river early in June; *Toxotus vittiger*, twelve males of this handsome longicorn were taken at Casselman on June 13th; *Hypomolyx pinicola*, one specimen, and *Ditylus cæruleus*, two specimens, with numerous examples of *Tritoma humeralis* were taken on the same occasion. An interesting addition to the list was made in *Aphodius prodromus*, a European species recorded from the Northeastern States and as far west as Montreal, but not observed here until last spring when it was taken in some numbers at Ottawa and Caselman.

NEUROPTERA.—Very little has been done so far by members of the club in collecting and studying the true Neuroptera; but in the Pseudoneuroptera Mr. T. J. MacLaughlin has continued his collecting again this year. Last summer was particularly favourable for the insects of this family; no less than eight species were taken which had not been taken here before. Several specimens of the rare *Diplax costifera* were captured late in the summer, the first by Master Stephen MacLaughlin at the rear portion of the Powell property to the north of Bank street; others were taken later in the same locality and at the Experimental Farm. Previously only one specimen had been taken, in 1886. This species resembles the female of *Diplax rubicundula*, the most apparent difference is that the anterior margins of the wings of *costifera* are conspicuously shaded with a yellowish brown tint.

HEMIPTERA.—Several additions have been made to the list published in June, 1892. These will be submitted for publication later, when some unidentified species have been determined. *Pœcilocapsus lineatus* and *Lygus pratensis* were noticeable from their abundance and injuries in gardens. An important discovery has been made by Mr. Slingerland, of Ithaca, that the former of these hybernates in the egg state in the twigs of bushes. This knowledge indicates judicious pruning as a means of checking the increase of this pest.

HYMENOPTERA.—A list of the phytophagous species observed during the season was published last January. The only species noticed as unusually abundant were the Ash Saw-fly, *Monophadnus bardus*, Say;

the Cedar Saw-fly, *Monoctenus fulvus*, Norton, which was taken in some numbers on an ornamental cedars on the Experimental Farm at the end of May, and the Cornel Saw-fly, *Harpiphorus tarsatus*, Say, also at the Experimental Farm where it attacked chiefly *Cornus siberica*. It may be mentioned that of a brood of the Rose Saw-fly, *Cladius pectinicornis*, of which the larvæ were collected in the autumn of 1892, it was found that, when the flies emerged last spring, there were just as many males as females, although in collecting the males are very rarely taken. In other sections of the order the species have not been so fully worked up as to justify the immediate publication of lists. Of the family Proctotrypidæ, however, our knowledge has been enormously increased by the publication of Mr. Ashmead's magnificent monograph, in which seventy species collected in this locality are mentioned, of which no less than fifty were new to science. Mr. Ashmead is now engaged on a monograph of the Braconidæ, and a series of our species has been placed in his hands for study.

DIPTERA.—In this order two observations of special interest are worth recording. (1) The root-maggot of the cabbage, *Anthomyia brassicæ* was very abundant, but was found to be much infested by two true parasites, *Alœochara anthomyiæ*, Sprague, and an undescribed insect to be called *Eucoila anthomyiæ*, Fletcher, both of which were bred from puparia collected last autumn. (2) The now notorious Horn-fly, *Hæmatobia serrata*, B. D., which made its first appearance in Canada last year at Oshawa, has now spread over the whole of the central portion of the Dominion from Essex, in the west of Ontario, to New Brunswick.

COLLECTIONS.—In addition to the fine collection of insects in the museum of the Geological Survey, we are glad to record that the collection specially prepared for the World's Fair is now on exhibition in museum of the Experimental Farm. This consists of twenty cases of Lepidoptera, Hymenoptera and Coleoptera, and forms the nucleus of what will be a most important exhibit.

Among the active members of the Branch mention should be made of Mr. W. Simpson who has done some good work. He has collected chiefly at King's Mere, in the Chelsea Mountains, where he has taken many of our rarer insects. He has also brought to our notice three in-

teresting monstrosities discovered by him in examining his coleoptera, in each of which the right antenna is curiously malformed. The species are *Dytiscus Harrisii*, *Desmocerus palliatus* and *Adimonia cavicollis*.

Moss-sifting.—We would specially call the attention of our entomologists to the value of the method of collecting moss late in the autumn for examination during the winter. This consists simply of tearing the moss to shreds and shaking it through a sieve over a sheet of white paper, when large quantities of small species, otherwise seldom found, can be collected. As an instance of what may be done in this line, two small cotton bags were filled with moss early in November, which, when carefully examined, yielded over one hundred species of insects in different orders. This method also gives valuable information regarding the species which hybernate in the perfect state. The bags should be kept slightly frozen, but not exposed to excessive cold, as 20° below zero has been found to kill everything in a bag.

J. FLETCHER,
W. H. HARRINGTON,
T. J. MacLAUGHLIN,
} *Leaders.*

ENTOMOLOGICAL NOTES.

During July many of the grasshoppers and other members of the order Orthoptera become fully grown, and as their numbers increase they do marked damage to vegetation. In the adult state the majority of the species possess fully developed wings, and can thus move more rapidly to new feeding grounds. There are however, wingless forms and of these a very interesting species is now abundant, although perhaps many of our members may not observe it. This insect is commonly known as the "Walking Stick," a name which its appearance easily gains for it, while entomologists have named it *Diapheromera femorata*. When young the "Walking Sticks" are pale green and not easily discerned on the young foliage of the trees, hickory and oak, upon which they feed. They grow brownish with age, and attain a length of about three inches, the female being stouter and less active than the male. The legs and autennæ are very long and slender and the whole structure of the insect tends to disguise it and to prevent its enemies from detecting it as long as it remains upon its food plants. A charming article by Dr. Scudder on this group of insects, with beautiful illustrations, appeared in a recent number of Harper's Magazine.

W. H. H.

SUMMARY

— OF —

Canadian Mining Regulations.

NOTICE.

THE following is a summary of the Regulations with respect to the manner of recording claims for *Mineral Lands*, other than Coal Lands, and the conditions governing the purchase of the same.

Any person may explore vacant Dominion Lands not appropriated or reserved by Government for other purposes, and may search therein, either by surface or subterranean prospecting, for mineral deposits, with a view to obtaining a mining location for the same, but no mining location shall be granted until actual discovery has been made of the vein, lode or deposit of mineral or metal within the limits of the location of claim.

A location for mining, except for *Iron*, shall not be more than 1500 feet in length, nor more than 600 feet in breadth. A location for mining *Iron*, shall not exceed 160 acres in area.

On discovering a mineral deposit any person may obtain a mining location, upon marking out his location on the ground, in accordance with the regulations in that behalf, and filing with the Agent of Dominion Lands for the district, within sixty days from discovery, an affidavit in form prescribed by Mining Regulations, and paying at the same time an office fee of five dollars, which will entitle the person so recording his claim to enter into possession of the location applied for.

At any time before the expiration of five years from the date of recording his claim, the claimant may, upon filing proof with the Local Agent that he has expend. 1 $500.00 in actual mining operations on the claim, by paying to the Local Agent therefor $5 per acre cash and a further sum of $50 to cover the cost of survey, obtain a patent for said claim as provided in the said Mining Regulations.

Copies of the Regulations may be obtained upon application to the Department of the Interior.

A. M. BURGESS,
Deputy of the Minister of the Interior.

DEPARTMENT OF THE INTERIOR,
Ottawa, Canada, December 1892.