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Acadian Scientist,

DEVOTED TO THE INTERESTS OF

THE ACADIAN SCIENCE CLUB, TEACHERS AND NATURALISTS.

The Acadian Science Club,

A CANADIAN NATURAL SCIENCE ASSOCIATION.

This Society aims to awaken and foster a more general interest in Scientific knowledge, to induce young men and young women to engage in systematic study at home, and to afford its members the means for mutual assistance in the pleasing and ennobling study of Nature's works. All efforts used to make the connection of students with the Club pleasant and profitable.

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A. J. PINEO, WOLFVILLE, N. S.

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The Acadian Scientist.

VOL. II.

WOLFVILLE, N. S., FEBRUARY, 1884.

No. 2.

The Acadian Scientist,

A MONTHLY MAGAZINE,

Devoted to the interests of Education and Popular Science, and designed to assist all classes, but especially the young, to the reverent study of the Works of Nature.

A. J. PINEO, EDITOR AND PROPRIETOR.

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TO CANADIAN NATURALISTS.

Nearly two years ago a few working Naturalists, in their zeal and desire to aid in the advancement of the cause of science in general, and especially to be of assistance to the young in this direction, organized themselves into the nucleus of a society whose objects should be "to awaken and foster a more general interest in scientific knowledge, to induce young men and young women to engage in systematic study at home, and to afford its members the means for mutual assistance in the pleasing and ennobling study of Nature's works." It was to aid this laudable enterprise and to supplement the same that the publication of the SCIENTIST was undertaken, not indeed as exclusively the "organ" of the Society, but, on a liberal basis, to seek the same worthy ends. Upon these grounds we feel confident that

we shall have the sympathy and well wishes, as we trust we shall also have the tangible support and co operation of every Canadian Naturalist. And we hope to make our little journal of value to this class. We believe that such a periodical as the SCIENTIST aims to be is a growing necessity in Canada. While in the carrying out of our original purpose of encouragement and helpfulness to the young, much of the matter that shall appear in our columns must necessarily be of a somewhat elementary and untechnical character, still a large portion of our space is to be devoted to the interests of the *working Naturalists of Canada*. Among all the excellent periodicals which form so important a part of the growing literature of our country, there is, we believe, none in which earnest investigators in all departments of scientific work are accustomed to record, for mutual benefit, the results of their study. That the SCIENTIST may become such a journal, and be a worthy addition to Canadian scientific literature, is the ambition of its modest editor. Already a number of very eminent naturalists have, unsolicited, expressed their large approval of the undertaking, and kindly assured us of their willingness to render assistance. May we not confidently hope for similar good will on the part of all? In conclusion, we beg that the present appearance of the SCIENTIST may be considered as but the "embryonic state" of what shall, in its later developments, be a larger and more useful publication—useful and helpful to young and amateur naturalists, interesting and profitable to those of raturer years and larger experience.

THE PRACTICAL NATURALISTS' SOCIETY.

We are gratified to learn of the existence of this Association, whose headquarters are at Great Horton, Yorkshire, England, and whose aims are quite similar to those of the A. S. C. The methods are also similar with this exception, that the P. N. S. prescribes no course of study. Like the A. S. C. it seeks to build up a fraternity of youthful naturalists, who shall be mutually helpful to one another by means of correspondence, exchange of specimens, etc. The Society has now over one hundred members, "most of whom are young collectors, though some are naturalists of considerable experience." The entrance fee is *sixpence*, which the Secretaries, Messrs. Ward & Riley, report is insufficient to pay expenses. May this and all similar societies live and grow.

If every one interested in scientific work, to whose notice this number of the SCIENTIST may come, will at once favor us with his subscription, if he has not already done so, and also induce others to do the same, we shall be enabled to make *now* some much desired improvements.

In another column we direct attention to the good fortune of the A. S. C. in securing Dr. Garnier as a member of the directorial staff. The Doctor will soon commence in the SCIENTIST a series of papers on the Herpetology of British North America. As there is nothing of the kind now extant this will be exceedingly valuable and interesting.

We are pleased to assure our readers that they may soon expect contributions from the following well known Naturalists, Dr. Garnier, Lucknow, Ont., (Herpetology;) Messrs. G. U. Hay, (Botany,) and Montague Chamberlain, (Ornithology,) St. John, N. B., and L. Abbe Provancher, (Entomology.) Cap Rouge, P. Q.

Astronomical Department.

Conducted By Prof. A. E. COLDWELL.

THE PONS-BROOKS COMET.

This comet, called also the comet of 1812, was discovered by Pons at Marseilles, July 20. 1812. Encke predicted that it would return in 70.68 years. Schulhof more recently predicted a return in September, 1884. It was actually found by Brooks, of Phelps, N. Y., September 1st, 1883. It made its nearest approach to the earth on January 8th, and was in perihelion on January 25th. It passed within 53 million miles of the earth and 70 millions from the sun. This strange visitor from the celestial realms, after having been visible to the eye for a few weeks, is now receding into the depths of space, tracing his immense orbit, but getting beyond the powerful grasp of the Sun.

THE PLANETS FOR FEBRUARY.

MERCURY is a morning star this month. He makes his greatest angle with the sun on the 31st, and may be seen for a few days at that time about an hour before sunrise.

NEPTUNE is an evening star. He sets on the 1st about 1 o'clock in the morning; on the 29th at 11.30 in the evening. Though 76 times as large as our earth it requires a good telescope to find it.

The four planets, *Mars, Jupiter, Venus* and *Saturn*, are very conspicuous this month. Mars shines with his peculiar mild light in the Eastern sky immediately after sunset. He is now in opposition, and in a most favorable position for observation.

JUPITER is about an hour high at sunset. He is one of the most magnificent objects in the star-spangled

canopy that nightly unveils its glory to our admiring eyes. He is now very near the twins, Castor and Pollux, between them and Procyon on the South, while Orion and Sirius precede him.

SATURN is brighter than he has been for fifteen years. He is near the point where his rings will be most widely open, and astronomers are making the most of their opportunity. He may be seen about half-way between the Pleiades and Aldeberan.

VENUS is easily recognized by her conspicuous brilliancy in the Western sky, where she reigns supreme. She is increasing in radiance. On the 29th she sets about 9 o'clock.

THEORY OF DEW.

Prof Levi Stockbridge's 'new theory' of dew seems to stand the test of time. It will be remembered that about four years ago he made a large number of investigations into the temperature of the soil and air, finding in almost every instance that the soil was warmer than the air at nightfall. The moisture constantly being driven off by the soil is condensed at night by the cooler air, and so forms dew. This is contrary to the old ideas that dew "falls" from the air, or is the moisture of the air condensed by the "cold damp earth," about which the poet sings. The agricultural editor of the New York Times recently attacked this new theory of dew, and was most effectually answered by the professor's son, Mr. H. E. Stockbridge, who is now studying in Germany. There he has made a series of experiments in different climates and at varying elevations, which confirm the Stockbridge theory of dew in the most emphatic manner. The theory is now accepted by the leading scientists and agriculturists of Europe.—*New England Homestead.*

Botanical Department.

Conducted by Prof. A. H. McKAY.

AMONG THE CRYPTOGAMS.

NO. III.

GENERAL CHARACTER OF LICHENS.

"Not alone in trees and flowers
The spirit bright of beauty dwells ;
And not alone in lofty towers
The mighty hand of God is seen :
But more triumphant still in things men
count as mean."

This is true of all the lower orders of vegetation, as well as of the Lichens of which we are now going to speak more generally. We selected the *Usnea* and the *Sticta*—*Sticta pulmonaria*—the "Tree Lungwort," because of their abundance on the trees of our woods, which are the only fields accessible for botanical exploration during the present weather. We thus gave a chance for the commencement of easy practical work to our young scientific amateurs. After some little time we shall return to point out some other interesting specimens. If our young people, who unfortunately cannot take a walk to the woods at present, will only look at the logs piled up near the house for firewood, they will find many of them covered with the most beautiful lichens. The *sticta* will be noticed on the hardwood logs, with some mosses, but more generally other lichens. Some of these spread in circular patches of lovely gray and white and black, the edges being scalloped, wavy, or star shaped. Others have a wide range of configuration, sometimes strikingly original and suggestive, and at other times quite commonplace. They are sometimes loosely attached, and their curling margins rise up from the bark on which they grow; at other times we find species spread out quite flat and attached like a crust. And these crusts are sometimes exactly like stains, yet

they are plants which have as distinct an existence and as fixed laws of growth as the trees upon which they grow. Lichens, which generally grow upon trees, are spoken of, loosely, as *Corticolous* (*cortex*, bark.) But some are characteristic of rocks and stones, and are therefore termed *Saxicolous* (*saxum*, a rock) Those habitually growing on the ground are said to be *terricolous* (*terra*, the earth.) Some grow in the air while falling to the earth, and appear as a granular substance upon the surface of the ground.

We shall notice specially at present some of the principal forms of lichens. At some other time we shall attempt to answer, generally and simply, the question, "What is a lichen?" and point out some of their uses.

Well, as regards form, lichens may be divided into two great divisions, namely, those typically *horizontal* and those *vertical*. Those of the first have a tendency to spread flat; those of the second to grow *up* or to grow in a drooping, pendulous attitude. The *horizontal* may be further divided into the *crustaceous*, which appear as incrustations, firmly attached to the object on which they grow, and the *foliaceous* or *frondose* (*folium*, a dead leaf, *frons*, a green leaf), which are attached only about their central parts, and have the lobes of their margins free like leaves. The former—the *crustaceous thallus*—when comparatively thick and hard is termed *tartareous*. The tartareous thallus is often whitish or pale colored, chalk-like, friable, and rough or warted on its surface. It contains a considerable amount of mineral matter, especially lime, in its composition, and many of them give valuable purple coloring substances. These very often grow on rocks, to which they become so firmly attached as to be nearly inseparable, and they corrode or eat into even quartz rock by the silent chemical

force developed during their growth. When these incrustations are very thin and scale like they are denominated *leprose*. These are often found on rocks and the bark of trees. Many of these species belong to the genera *Lecanora* and *Lecidea*. Sometimes the thallus is found even in a simpler state than the thin leprose crust just mentioned. It may consist of a powdery coating of various colors on a rock or tree. Such lichens are said to be *pulverulent*. This form is found often on moist, rotten wood stumps, or in damp, shady fissures of rocks. The following terms are applied to some of the principal shapes of these crustaceous lichens. The thallus is *effuse*, when it has no definite shape, with a vanishing or invisible border; *uniform* when it has a definite shape and distinct margin; *effigurate* when it has a rayed or starlike appearance; and *squamulose* or *imbricate* when the lobes of its edges overlap each other like scales or shingles. The *foliaceous* or *frondose* thallus, that is, the "leafy lichens" are said to be *membranaceous* when quite thin and pliable like a membrane; *coriaceous* when thicker and leather like; *cartilaginous* when still more firm like cardboard. Their margins are divided into *lobes* or *lacinae*, the former being rounded, the latter being more elongated, narrow and linear. Small fibres generally attach them to the bark of trees on which they are most commonly found. These are denominated *rhizinae* or *fixurae*—literally "rootles" or "fixers," because they fix the thallus to the tree.

The chief sub-divisions of vertical, or typically *free*, thallus are *fruticulose* and *filamentose*. The former are shrubby on a small scale, the latter threadlike and generally pendant. The first term is from a Latin word, meaning "a little shrub," the second from

a word meaning "thread." As an example of the fruticulose lichens we have the beautiful red capped little *cladonias*, which are so often found on the ground or on decaying wood in the margins of woods, and in old stump land. And also in the pretty coral-like masses of *stereocaulon*, and the grey beds of the reindeer moss. The small stalks which rise from a kind of crustaceous thallus and bear the red capped *apothecia*, which produce the spores in the *cladonias*; are called *podetia*, from the Greek *podēs* feet.

The *filamentous* thallus is seen in the *usnea* and some species of *cornicularia* which may be noticed growing in white or black hairy tufts on old fences and trees. These two genera are those which constitute the great bulk of the poetic moss, which "moss with age the patriarchs of the forest." We recapitulate our classification of forms, as follows :

- | | | |
|---------------------------|-------------------|---------------------------|
| THALLUS. | { | I. HORIZONTAL. |
| | | (a), <i>Crustaceous</i> . |
| | | 1. Tartareous. |
| | | 2. Leprose. |
| | | 3. Pulverulent. |
| | | (b). <i>Frondose</i> . |
| | 1. Membranaceous. | |
| | 2. Coniaceous. | |
| | 3. Cartilaginous. | |
| | II. VERTICAL. | |
| (b). <i>Fruticulose</i> . | | |
| (c), <i>Filamentous</i> . | | |

Of course there are all degrees of gradation between these leading forms, still there is a great convenience in having the principal forms named, especially if we are required to describe any specimen we come across.

"Some are reddish, some brown, some grey, and some black.
And they're puckered, edged, buttoned or fringed, front and back ;
Some are lying like leather close under your feet,
Some waving from trees in the forest you'll meet."—*Miss Twamley*.

NOTES.

According to Lr. Sach of Buenos Ayres, there is no danger of an exhaustion of the quinine supply. The experimental plantations in Java and the Island of Reunion have been very successful, and besides these nurseries the trees have been cultivated in Bolivia by the million for ten years. At three places in the last named country, taken as they come, the number of trees growing is given, severally, at 70,000, 200,000 and 3,500,000.

MILLEMAINE is the name of a new cereal which has been introduced into South Carolina from Columbia, South America. It is allied to Sorghum and Guinea Corn, and has the merit of an almost unlimited capacity to endure drought. Cakes made from the meal have been described as better than corn cakes, and the grain has been pronounced by the chemist of the Savannah Guano Company superior in food qualities to wheat.

Lichens can be sent for identification or naming to Principal McKay, Pictou, Nova Scotia.

 Entomological Department.

Conducted by Dr J. E. WHITE.

 PRACTICAL ENTOMOLOGY

NO. II.

 PRESERVING EGGS, LARVA, PUPA, AND IMAGO.

A great deal has been written regarding and various receipts given for the preservation of specimens in the cases. You may try one and all of them and still fail to get satisfactory results. The reason is that too much dependence is placed upon these plans, and not enough upon complete preparatory

drying, exclusion of the air after the specimens have been placed in the case, the occasional careful scrutiny of the whole collection. There are two kinds of enemies which will utterly destroy your collection if permitted to have undisturbed possession of it viz, those minute insects belonging to the Dermestidae, and Anthrenidae, and a low vegetable growth known as "mould."

When you examine your cases looking for these minute insects, look closely around the pins, where they are fastened in the bottom of the case. If there is a fine dust around the pin the insect on that pin is being destroyed and probably when you touch it it will fall to pieces, and be worthless. The whole of this case will have to be removed, the case thoroughly washed, dried, and painted anew, with arsenic added to the paint, and each insect separately examined and washed over with a camel's hair pencil and benzine, before being replaced in the case. For months afterwards examined frequently. In order that the chances of these attacks may be reduced to the minimum, it is necessary, as stated before, that the specimens be perfectly dry. If you have any doubt as to the dryness of any specimen, before it is put into the case put it in the oven for a shorter or longer time, according to the size, watching it carefully the while, of course. If your case permits the free entrance and exit of air you need not expect anything to escape those energetic and pertinacious little pests. Whatever the style of your case, have it as near air tight as it is possible to make it. To prevent the wood warping have it thoroughly seasoned and painted and over this, when dry, a thin coat of shellac varnish. Finally go over every specimen and every case carefully at least once in each three months.

To prevent *mould* from appearing

among your specimens, it is only necessary to keep your cases in a *dry atmosphere*, dipping each specimen into a solution of corrosive sublimate, 8 grains, in alcohol, one-half pint, is recommended, but any solution containing arsenic or corrosive sublimate will injure your pins and make them look unsightly, unless carefully looked after, and is not even attended with the best results as far as the insects are concerned, and some insects, such as Lepidoptera, cannot be put into these solutions without spoiling them.

For preserving eggs, larva, pupa and some insects such as colloptra. Arsenic, 10 grs. ; whiskey, one half pint, is a solution which will yield very good results Prof. Verrill recommends a mixture of common salt, 6 oz, saltpetre, one-half oz, boiling water, 1 pt; strain and add arsenite of potash, 2 drachms. But lately, the mode adopted, for preserving larvæ which yields the best results is *heat*. Eviscerate the larva through a small slit made near the anal orifice on the under side; gentle pressure and rolling from the head towards the slit will accomplish the complete extrusion of the contents. Then insert a quill or straw to fill the slit and gently inflate to the natural size; now hold the specimen over a spirit lamp or quick heat of any kind, rotating it slowly until it is dry, when, if the distention has been kept up, it will be quite stiff and have the natural form and size. A little practice will make you quite proficient. The heat must be regulated so as to make its stiffening effect rapidly without scorching the specimens, and the inflating must be sufficiently gentle not to burst the wall or dilate it in some places. Do not have the slit larger than the quill or straw will neatly fill.

Some recommend that the larvæ be kept in small vials of alcohol but, besides the shrinking which the alcohol

causes and the change of colors, these little vials will not retain the spirit, with the best of corks and it is not a satisfactory way of inspecting specimens.

For repairing fractured wings, legs or antennæ, ox gall softened with water is used as glue would be; or strong mucilage or shellac varnish.

If your insects have become dry before being set up in your cases, or the legs, wings or antennæ are not symmetrically extended, by steaming them for a few minutes a sufficient amount of flexibility will be obtained to make the necessary changes; or, by putting them, if there are a number to be corrected, into a flat pan of moist warm sand, covering and leaving them in a warm place until next day. In arranging your insects on the setting board do not handle them with your fingers, take a butcher's wooden skewer or a wooden pen holder, and insert a stout sewing needle into the end, leaving the needle projecting three-fourths of an inch, and you will have as complete an appliance as necessary for arranging the specimens in the proper way. Hang the filled setting boards (if you are active in collecting you will have half a dozen) in the book case or some closet secure from dust and disturbance. The larger the insect the longer it takes to dry, and the time will vary from one to ten days. A few minutes in the oven will hasten the drying process. Card board securely pinned over the wings will keep them in the place intended. If necessary a number of pins may be used in order to obtain proper symmetry, and this you will find to be the case more particularly with insects which have not been put on the setting board soon after capture. Brushing with a camel's hair brush will improve some specimens very much. Some collectors brush every specimen, after setting up, with benzine.

I would strongly advise making collections of larvæ. They are most valuable, and may be placed side by side with the perfect insect, or imago in the case, giving variety, instructiveness, and comparative completeness to one's collection. Owing to the fact that strong alcohol takes the watery constituents of the larva out of them, altering their color and leaving them shrivelled and distorted, it is recommended to first dip them in boiling water for half a minute or so, according to the size, then put them into common whiskey for a few days, after which they ought to be put into one or other of the alcohol mixtures. Dry mounting, as described before, is preferable to any other. These remarks also refer to the preservation of the egg and pupa stages as well.

Breeding from Larvæ.—In England entomologists enter much more largely into breeding from larvæ rather than waiting to catch the perfect insects, than we do here. It would be better to do both, and a great deal of pleasure is to be obtained in rearing larvæ. They should be kept as near as possible to their natural habitat and suitable food supplied to each; thus aquatic larvæ should be kept in bottles of water or aquaria, carnivorous larvæ supplied with flesh of various kinds, and those found in the earth to be kept in boxes or vessels of earth frequently moistened, and those which feed on plants must have the leaves brought to them, or they must be put upon their food plants or trees. Frequently the larva can be found while the imago or perfect form is difficult to catch, some seasons one form being numerous and the other very scarce; hence the desirability of both collecting and rearing. Those who rear from the lower forms will secure better average specimens. In doing this the larvæ must be kept secure, with plenty of light and air,

What answers very well as a cage is a preserving jar with top covered with muslin and the bottom with moist sand into which the stems of the food plants are put, that the leaves may be kept fresh until they are consumed, when more must be secured. A memorandum must be kept of the plant on which each larva feeds, and its locality, so that it may be secured at any time, paste the note on the bottle or jar. Towards the fall of the year the larvæ will pupate, that is, cease their active voracious life and become quiet and go into the pupa state. When they do each one must be marked, numbered, dated, food plant noted and locality, number of moultings, characteristics, outline drawings, size, colors, and other distinguishing points in the life history of each one, made in your memorandum book; and let me hint to you that in proportion to the copiousness of your notes, so will your collection and knowledge be valuable to you and every one else. After this you will put the pupa away securely for the winter recollecting to imitate, as closely as possible, the natural surroundings of each. Do not be in a hurry to have the pupa give signs of the transformation which has been going on. My own impatience and curiosity nearly cost me a valuable rearing of the "preying mantis" that I had received from Texas. Thinking that the change to Canada was too great for them, and desiring to know the peculiar structure of the "mantis nest" I, much to my regret, cut through a large number of immature specimens, and found them alive. A short time afterwards however the remainder came out.

When undertaking "rearing" of insects it is very necessary to have a separate recording note book in which every peculiarity of each stage, dates of appearances, time and number of moultings, size, shape, colors, the para-

sites and their names, etc., (they are called Ichneumons), description of cocoons or pupa cases, in what places found, name of favorite food plant of each, or other food, mode of escape from pupa case, number of broods each season, length of life of the imago form, giving date of each event and remarks. This if carried out in a methodical manner will give you the life history of every thing you rear, give you exact information and material for comparison with the work of the next year, and a fund of interesting and valuable information not obtainable, with such little exertion, from any other source.

As before mentioned one will require plenty of pill boxes for collecting larvæ. After the fall of the leaves, you will see numerous cocoons suspended from the bare branches; these you will secure, and label the name of the tree or shrub, and the locality, on the pill box. Most of the moths can be secured in this manner. If the eggs are hatched in captivity, the larvæ may be taken to their food plant and watched day by day as they feed and grow. As soon as they form their cocoons, remove them to a secure place otherwise they will form food for various kinds of birds during the winter.

Now a few words in regard to books to study up the subject. The chief value of a work on entomology, to the beginner is in the illustrations and in proportion as they are abundant in a book so is its cost increased. I will mention some which I have carefully selected with a view to cheapness and thoroughness, and arrangements have been made with Mr. Boyles' book store, Yonge St., Toronto, by which members of the A. S. C. can procure them at reduced rates.

Packard's Guide to the Study of Insects.
 Packard's Half Hours with Insects.
 Lubbock's Origin and Metamorphosis of Insects.

Willet's Wonders of Insect Life.
 Manton's How to Catch and Prepare
 Insects.
 Orton's Comparative Zoology.
 Wood's Illustrated Natural History.
 Label List of the Insects of Canada.
 Check List of the Insects of Canada.

Some of these are expressly for students and others better adapted to the larger and more general study of Natural History. The last two will not be required until you have your cigar boxes full and wish to put them up in regular cases, or until you have such a number of duplicates that you wish to exchange with others.

Mineralogy.

By Prof. S. K. HITCHINGS.

In the interests of teachers and others, who may wish to take advantage of an elementary course in this interesting department of Natural History, this series of papers is undertaken. We aim to treat the subject in such a manner that those at present unacquainted therewith will be enabled, by the application of a few simple tests, to readily identify the more common minerals. We shall consider first the minerals included in the excellent collection, put up under the direction of the editor of the ACADIAN SCIENTIST for the use of schools and private students. We aim also to add notes to this department from time to time such as will be of interest to more advanced workers in mineralogy.

QUARTZ—SILICA.

Quartz is an oxide of silicon, and is the most abundant of minerals, comprising nearly one-half of the rocks of the globe. There are a great many

varieties, according to the structure or color given by impurities. They may be classed under three heads :

- I. The glassy or vitreous varieties.
- II. The chalcedonic varieties, having a waxy lustre, and translucent.
- III. The jaspery varieties, having little or no lustre and opaque.

I. VITREOUS VARIETIES.—*Rock Crystal*. This is found in six-sided crystals terminating in six-sided pyramids, or nearly so. No cleavage seen; not fusible before blowpipe; not acted on by common acid; hardness 7. Sometimes used for making lenses and in jewelry.

Amethyst is like the above, but is of a purple color, supposed to be due to manganese.

Smoky Quartz (Cairngorm Stone.) This is of a smoky-brown color, often nearly opaque.

Rose Quartz.—Pink, or rose-red, seldom in crystals, imperfectly transparent.

Milky Quartz.—Milk-white, massive, nearly opaque. This is the most common variety.

II. CHALCEDONIC VARIETIES.—*Chalcedony*, Color white, gray or brown, translucent; waxy lustre.

Carnelian is a rich red variety of chalcedony much used in jewelry,

Chrysoprase has an apple green color due to the presence of nickel.

Agate is a variegated chalcedony. The colors may be so arranged as to make it *banded*, *clouded*, or in irregular spots often resembling *moss*.

Onyx is a kind of agate, with colors in horizontal layers.

Flint is a massive compact quartz, of a brown or gray color, feebly translucent; usually occurs in chalk. It probably owes its origin to low forms of vegetable life existing in the water at the time of the chalk formation.

III. JASPERY VARIETIES.—*Jasper* is an impure opaque quartz, usually

red, but sometimes yellowish or dark green.

Bloodstone has a deep green color, with spots of red jasper resembling drops of blood. It is much used as a gem.

Basanite or *Touchstone* is a velvety-black, opaque variety, used on account of its hardness and color to compare different alloys of gold. Streaks are made upon it, side by side, then tested with acid.

OPAL. This is silica with from 3 to 9 per cent, of water. Its hardness is 5.5 to 6.5; transparent to opaque; white, or of various light shades.

Precious opal exhibits a beautiful play of colors from internal reflection, and is highly prized as a gem.

Silicious sinter is an irregular cellular form produced by deposition from the water of geysers or hot springs.

Float stone is a very porous or fibrous variety of opal, light enough to float on water.

Infusorial earth is a silicious deposition of microscopic plants called diatoms. It is found in some places in extensive beds, as at Richmond Va. It is used as a polishing powder.

AMERICAN ORNITHOLOGISTS' UNION.

BIRD MIGRATION.

"At the first congress of the American Ornithologists' Union, held in New York City, September 26-28, 1883, a Committee on the Migration of Birds was appointed. It is the purpose of this Committee to investigate in all its bearings, and to the fullest extent possible, the subject of the migration of birds in the United States and British North America. The work will not be limited to the accumulation of records of the times of arrival and departure of the different species, but will

embrace the collection of all data that may aid in determining the causes which influence the progress of migration from season to season. For example, severe storms, gales of wind, protracted periods of unusually high or low temperature (for the locality and time of year) are among the atmospheric conditions that are known to exert marked effects upon the movements of birds. The opening of the leaves and the flowering of certain plants, with the correlative appearance of a multitude of insects, are also among the actors that have to do with the abundance of many species. Hence the careful registration of certain meteorological phenomena, and of the state of advancing vegetation from day to day, will constitute prominent items in the record books of the observer.

For the purpose of rendering the result of the season's work as full and valuable as possible, the Committee earnestly solicits the co-operation of every ornithologist, field collector, sportsman, and observer of nature in North America. Indeed a large corps of observers is absolutely essential to the success of the undertaking, and the Committee hopes to receive substantial aid from many who profess no knowledge of ornithology. Efficient service can be rendered by those familiar with only our commonest birds, and the Committee will gladly accept data concerning any well-known species."

We are glad to make the above extract from the committee's circular, and elsewhere we publish an interesting note from Dr. C. Hart Merriam, Chairman of the Committee. The undertaking is a highly important one, and deserves the hearty co-operation of all. For convenience the territory embraced in the United States and Canada has been divided into thirteen districts, of which three are included in Canada. These are: The

division known as Canada, embracing the Eastern and older Provinces; Manitoba, including that Province, and also, we presume, the "North-West" and British Columbia. Each division is under the direction of a competent superintendent. The Canada division is under the charge of Supt. Montague Chamberlain, of St. John, N. B., a gentleman abundantly capable of discharging the duties of the office. Any one in this district willing to assist in the work should address Mr. Chamberlain, and will thereupon receive full instructions.

HOW INSECTS ARE ABLE TO WALK ON VERTICAL POLISHED SURFACES.

The December number of the ACADIAN SCIENTIST related on this subject the studies of Dr. Dewitz, who thinks that the hairs of the feet emit a fluid by means of which the insects are enabled to adhere to vertical glass surfaces. This is the opinion of the greater part of entomologists, who deem that the adhesion is due to the validity of this liquid. Dr. J. E. Rombouts has recently shown in an interesting work that this last view is not correct. He gathered and examined little drops of the fluid, and observed that it is not a slimy, but a decidedly liquid and oily substance. He therefore concluded that the adherence is not due to *viscosity*, but to *capillarity*, that is, molecular attraction between liquid and solid bodies. In his opinion the adhesion of flies on glass is produced by the action that each little drop exercises on the hair, which emits it. In order to prove this theory Dr. Rombouts made numerous experiments on capillary attraction, and came to the conclusion that the molecular action between the fluid and the hairs of a fly

can bear up a weight of 0.69 grains, whereas the average weight of a fly is 0.49 grains. He also found that the attraction is sufficient to enable flies to remain on a vertical surface, even were ordinary water substituted for the emitted fluid.

J. M. EM. BONNET.

Cette, France.

Correspondence.

THE BIRDS OF NOVA SCOTIA.

Locust Grove, N. Y., Jan. 31, 1884.

Editor Acadian Scientist:

SIR, — In looking over the back numbers of your little Journal, I find a great many interesting articles upon minerals, shells, plants, and other natural objects, but almost nothing on birds. This want is the more noticeable because, in most regions, birds are far better known than are the other groups which claim the Naturalist's attention. Their comely forms, sweet songs, and pretty ways, together with their presence in all sorts of places, tend to force themselves upon the notice of all classes of persons. The school-master, the store-keeper, the farmer—in fact everybody—knows the robin, bluebird, wren, yellowbird, meadow-lark, kingbird, and many more that spend their summers near the haunts of man. Perhaps it is this very familiarity that explains the silence of the ACADIAN SCIENTIST on this subject, for it is well known that rare and unusual objects attract notice far sooner than those of equal interest that are met with every day.

I will venture to assert that every one of your readers is able to contribute facts of value concerning the birds found about his home. Those who know only the commoner kinds can record the dates of arrival and departure of the same; while those more

versed in ornithological lore can furnish lists of the species that breed in different parts of Acadia. The birds of Cape Breton Island, and of the bold rocky coast from Halifax to the Gut of Canso, are very different from those that inhabit the beautiful Minas Basin and the fertile valley of the Annapolis.

The only general lists of the birds of Nova Scotia that have thus far appeared, are those of J. R. Willis (Smithsonian Report 1859) and J. Mathew Jones (Forest and Stream 1879), neither of which are complete or sufficiently reliable. There are some half dozen local lists, but these are very fragmentary and leave much to be desired. These facts are mentioned merely with the view of calling attention to the meagreness of our knowledge of the Birds of Nova Scotia, and in the earnest hope of enlisting at least a few of your readers in this little explored, but peculiarly attractive, field of research.

C. HART MERRIAN, M. D.

A TERRIBLE MAIL SERVICE.

In the February CENTURY appears the first of a series of illustrated papers on the mainland and islands of the Gulf of St. Lawrence, entitled "The Cruise of the Alice May." The papers are the record of an expedition in the interest of the magazine. S. G. W. Benjamin, now United States Minister to Persia, contributes the text, and M. J. Burns supplies the pictures. Of the winter mail service between the mainland and Prince Edward Island, Mr. Benjamin says: "From January until May, at least, Northumberland Strait is frozen over. The mails are carried across at the narrowest part, near Cape Tormentine, or Jourimain, a distance of nine miles. The carriers drag a boat over the hummocks of ice which is provided with runners like a

double keel. When they come to open water they cross in the boat. It is a dangerous and arduous journey, and few undertake it besides the hardy mail-carriers. For two or three winters past the passage has been made sometimes by the steamer *Northern Light*, constructed especially for this service. She has a frame of enormous strength, somewhat of a wedge form, with a solid shoe of iron at the bow; everything about her was planned to enable her to crush her way through the ice, which is often from two to four feet thick. Her course is from Pictou to Georgetown, a distance of some eighty miles, although she often has to go over two or three times that distance to reach her port. In all the annals of steam navigation there is no such packet service recorded as this of the *Northern Light*. Sometimes the ice is so dense that she can make no headway, but is jammed fast for days and weeks, or carried to and fro by the combined fury of ice and storms. The passenger who starts in her for Prince Edward Island in March has before him the horrors of polar solitude and hazard. In the spring of 1882 the *Northern Light* was three weeks making this brief passage, fast locked in the ice-packs. Sometimes she was carried close to the shore, but no one could bring aid to the starving passengers, owing to the threatening condition of the ice. It was only after burning all the woodwork in the cabin for fuel, and being reduced to the last biscuit, that the worn-out and hopeless passengers reached the destined port. Think of a civilized and enlightened people, in this age, shut off from the rest of the world by such a frightful siege of ice and tempest and snow! Nor is this an occasional thing. As regularly as the winter comes around, the islanders look forward to this long hibernation and isolation. Were it not for this drawback, the island might be a paradise."

THE ACADIAN SCIENCE CLUB.

SECRETARY'S REPORT.

A NEW DIRECTOR.

It is exceedingly gratifying to the friends of the A. S. C. and proves beyond a doubt the wisdom of founding such an association, that active scientists who stand among the first in their departments approve of the movement and are willing to identify themselves therewith. The club has recently had the good fortune to secure, as an occupant of the chair of *Herpetology*, John F. Garnier, M. D., of Lucknow, Ontario. We believe that we are correct in saying that no man has accomplished so much in the study of the reptilian fauna of British North America, as Dr. Garnier, and throughout all America, they who have done better or even equal work in his favorite department are very few. His valuable collection numbers thousands of specimens from all parts of the world, and he is in intimate correspondence with all the leading Herpetologists of England, France, Russia, Calcutta, in short of the world. He is Vice-President of the Natural History Society of Toronto, and his frequent papers read before that society are said to be of peculiar interest. That the Dr. has the interests of the club at heart may be inferred from the following extract from a recent letter to the Secretary. "I desire to give you my full sympathy, and wish that every success may attend your desire to diffuse a spirit of enquiry, and the wish to know more of Natural History and the Natural Sciences. I shall be pleased to assist you in this respect, and you may rest assured of my full co-operation and hearty assistance." Our readers will have the pleasure of perusing Dr. Garnier's "inaugural" next month.

Members of the club in corresponding with the Directors should not neglect to enclose stamp for reply.

In addressing Director or secretary the members are requested to place their number on the upper left-hand corner of the sheet.

WESTERN GEOLOGY.

We have recently received, through the kindness of Prof. Schofield, of Winnipeg College, copies of the *Manitoba Daily Free Press*, containing a very interesting account by Prof. Pantou, President of the 'College, of a Geological trip eastward along the line of the Canada and Pacific Railway. At the close of this paper, which was read before the Historical and Scientific Society of Winnipeg, the author summarizes the result of his observation during the trip as follows:—

Seven miles west of Calgary—Laramie deposits; impressions of leaves belonging to the genera *Protophyllum*, *Corylus*, *Alnus*, *Platanus*, *Populus*; univalve shells of the genera *Campe-loma*, *Bulimus*, *Planorbis*, *Vivipara*; bivalve shells of the genus *Unio*.

Medicine Hat Cretaceous deposits petrified wood and coal; bivalve shells 200 feet below the prairie level, largely of the genus *Ostrea* and an undetermined species.

Irvin Ravine—Cretaceous deposits petrified wood in large quantities; fragmentary remains of eight extinct vertebrates, some of which are of the order Dinosauria; innumerable crystals of selenite; shell fragments of the genus *Ostrea*, and a very complete specimen of *Mactra*.

Buffalo Lake—Cretaceous deposits, genera *Mactra* and *Inoceramus*; a mass of shell fragments not identified; some small cretaceous bivalves.

Pense Station—Cretaceous deposits many fossils of the genera *Inoceramus* and *Ostrea*; a rare specimen of *Ammonite*, one *Baculite*; many small shells of an undetermined species; a beautifully sculptured univalve."

Geography.

In the vicinity of Bona, Algeria, the Naiba, an isolated mountain 800 meters high, is gradually descending into the earth, forming a deep excavation round the sinking mass.

The Red River valley embraces an area of 6,900 square miles.

The changes of level of the Caspian puzzle geographers. It has risen and fallen, at irregular intervals, since 1870, but was ten feet lower in 1830 than in 1870. In 1882 it was ten inches and a half higher than in 1830.

The International Geodetic Association, recently held at Rome, have recommended the unification of longitudes and of time by the adoption of the same standards for all nations. The initial meridian selected by the conference is that of Greenwich. The cosmopolitan time is also to be that of Greenwich, and the hours are to be reckoned from 0 to 24.

Literary Notices.

Any article that appears in the *North American Review* needs no further commendation. The February number of this classic periodical contains the following articles: "Corporations, their Employes and the Public;" "Henry Vaughan Silurist," a poet of the 17th century; John Brown's Place in History," an answer to the recent indictment of this hero by the Rev. David N. Utter; "Must the Classics Go," by Prof. Andrew F. West, of Princeton College; Race Increase in the United States," "Defects of the Public School System," and an article of hygienic interest on "Rival Systems of Heating." The magazine can be obtained from all news dealers

THE MANHATTAN deserves to be classed among the best American Magazines. The February number before us is of particular interest. The opening article on "Autumn Camps at Cayuga," amply illustrated, presents us charming bits of landscape scenery, accompanied by equally fine descriptions "Shakespeare's Sonnets in a New Light," by Junius Henri Brown; "Across the Caucasus," by S. T. W. Benjamin; "Creator or Evolution? a Philosophical Inquiry," by George Ticknor Curtis. Stories, poetry and "Recent Literature" make up an unsurpassed table of contents. \$3 a year, 25 cents a number. Manhattan Magazine Co., Temple Court, New York.

THE AMERICAN NATURALIST for February has its usual load of good things. First, we have an entertaining and valuable account of the war customs of the Osages, as given by Red Corn, of the Tshishu peace making Gens, to the Rev. J. Owen Dorsey. Then notes on some apparently undiscovered Infusoria from Putrid Waters, by Alfred C. Stokes, and Colonial Organisms, by Charles Morris, and some others. The general notes on Geography and Travels, Geology and Palaeontology, Mineralogy, Botany, Entomology, Zoology, Psychology, Anthropology and Microscopy are as full and as interesting as can be desired. These notes especially are a monthly fund of inestimable value.

Exchange Department.

Every subscriber has the privilege of inserting in this department one notice, not exceeding five lines, each year. Beyond that, and for non-subscribers the charge is five cents a line.

Land Shells and L. S. Fossils in exchange for Minerals, Sea Corals, and Star Fish.

Actinolite, Albite, Amethyst, Beryl, Fluorite, Rose Quartz, and Tourmaline, especially desired.

W. H. BEAN,
Lebanon, Ohio.

Florida Shells for exchange, by
A. HAWORTH,
Mayport, Fla.

Fine Ammonites from France, to exchange for Crinoids and Trilobites. Also Palaeozoic Fossils, especially Lower Silurian, for Fossils, Minerals and Shells.

D. A. McLEOD,
Oxford, Butler Co., Ohio.

Silurian Fossils to exchange for those of other formations.

ABEL KNIGHT,
Jonesboro, Grant Co., Ind.

WANTED.—To exchange Indian Stone Relics of Ohio for Rare Books and Scientific Publications.

J. R. NISSLEY,
Box 288, Mansfield, Ohio.

Anthon's Latin Dictionary, Bentley's Botany, Guide to Indian Civil Service, and other works, in exchange for standard works on Chemistry, Mineralogy, &c.

WM. TRAQUAIR,
Beaver Rapids, Manitoba.

THE ACADIAN SCIENCE CLUB.

An International Corresponding Association

President—A. E. Coldwell, A. M., Instructor in Natural Science, Acadia College, Wolfville, N. S.

Directors.

Physiology—C. W. Roscoe, A. M., Inspector of Schools, Wolfville, N. S.

Geology—Alexander McKay, Supervisor of Halifax City Schools, Dartmouth, N. S.

Botany—A. H. McKay, A. B., B. Sc., Principal Pictou Academy, Pictou, N. S.

Astronomy—Prof. A. E. Coldwell, A. M., Wolfville, N. S.

Mineralogy—S. K. Hitchings, B. Sc., State Assayer and Principal High School, Biddeford, Maine.

Natural Philosophy—Prof. F. H. Eaton, A. M., Provincial Normal School, Truro, A. J. Denton, A. B., Halifax, N. S.; W. W. Saunders, Bridgetown, N. S.; Professor F. H. Schofield, A. B., Winnipeg, Manitoba.

Secretary and Treasurer.—A. J. Pineo, Wolfville, N. S.

OBJECTS.

This Society aims to awaken and foster a more general interest in scientific knowledge, to induce young men and young women to engage in systematic study at home, and to afford its members the means for mutual assistance in the pleasing and ennobling study of Nature's works.

METHODS.

A course of study has been arranged extending over three years, and including the various departments of Natural History. This is to be pursued by means of prescribed text-books or their equivalents, and by the aid of notes and lectures, each as shall from time to time be published and made accessible. Members are also invited to correspond with the directors in regard to their work when any information or advice is desired.

The formation of local clubs is strongly recommended as a means of

adding interest and value to the work. This should be practicable in any community where there are three or more members.

The year is divided into three terms. At the end of each term the students report, and at the close of each year receive examination papers to be answered at their homes. The questions however will be of such a nature that by means of the replies the directors will be able to determine whether or not the students shall have gained an intelligent knowledge of the subjects studied. At the end of the third year an essay is prepared by the student on some scientific subject. The student who successfully completes the course of study and presents his thesis receive a certificate and is recognized as a Life Member of the Association.

COURSE OF STUDY.

FIRST YEAR.

Jan., Feb., March. *Physiology*.—"Fourteen Weeks in Physiology." Steel.

April, May, June, Sept. *Botany*.—"How Plants Grow." Gray.

Oct., Nov., Dec. *Natural Philosophy*.—"Fourteen Weeks in Physics." Steel.

SECOND YEAR.

Jan. Feb. March. April. *Chemistry*.—"Fourteen Weeks in Chemistry." Steel

May, June, Sept. *Zoology and Mineralogy*, on alternate weeks. "Zoology." Macalister. Lectures on Mineralogy in the *Scientist*.

Oct., Nov., Dec. *The same continued*.

A small collection of minerals will be sent to each student member.

THIRD YEAR.

Jan., Feb., March. *Astronomy*. Primer, Lockyer. Also, "Wonders of the Heavens." Flammarion.

April, May, June, Sept. *Geology*.—"Geological Story Briefly Told." Dana.

Oct., Nov., Dec. *Preparation of Essay*.

READING COURSE.

The following works, all published in the *Library of Science*—a cheap and valuable

series—are recommended for supplemental reading.

FIRST YEAR.

Light Science for Leisure Hours—Proctor. Conservation of Energy—Stewart. Lessons in Electricity—Tyndal.

SECOND YEAR.

Lectures on Evolution—Huxley. Scientific Sophisms—Wainwright. Life in Nature—Hinton.

THIRD YEAR.

Romance of Astronomy—Muller. Town Geology—Kingsley. Geological Sketches (2 vols.)—Geikie.

Each member must pursue the Course of Study, but it is optional whether he will take the Reading Course or not. It is advisable however that he should do so, if possible, as it is designed to give him a broader view of the subjects studied than he would obtain from the text-books alone. If it shall seem to be advisable, advanced courses will be marked out in special lines for the benefit of such graduate members as may wish to continue their studies under the direction of the Club.

While no definite daily task is assigned, it is earnestly recommended that the student devote to the work a regular portion of his time each day. It is thought that, for the average student, one hour a day will be ample for the accomplishing of the prescribed work. Many, however, may wish to devote to it more than this. The student should study with specimens before him. As many as possible of them he should collect for himself and afterwards add to his collection by exchanging with other members or by purchasing.

Any one finding himself unable to complete to his satisfaction the work of any year, within the year in which he begins said work, may lay it over till a subsequent year and resume it without extra charge, providing he shall signify to the Secretary his intention of doing so before December 1st of the year in

which he shall begin the work. In this way the student may, if it is advisable, spread the work over six years.

To meet the necessary expenses of the Club, student members are required to pay the small annual fee of 50 cents.

All surplus funds will be returned to the members in the form of prizes or specimens. No fees are required from life members.

Anyone desiring to unite with the Club may receive a certificate of membership and report blank by sending to the Secretary the first year's fee of 50 cents.

BOOKS.

To accomodate members the Secretary has made arrangements with the publishers of the prescribed books so that he is able to furnish these at wholesale rates. The prices are: Steel's "Fourteen Weeks" series, \$1.00 each; How Plants Grow, 95 cents; Macalister's Zoology, \$1.05; Astronomy Primer, 28 cents; Wonders of the Heavens, 13 cents; Geological Story Briefly Told, \$1.40; Library of Science, 13 cents per volume. Books will be sent postpaid at these prices to *Members of the Club* in Canada or United States. Those ordering from other parts of the Postal Union must add 5 per cent.

N. B.—The directors earnestly request all interested in the objects of this Association to co operate with them in extending the influence of the society.

Ages on ages after the poor clay in which the creative intellect was enshrined has mouldered back to its kindred dust, the truths which it has unfolded, moral or intellectual, are holding on their pathway of light and glory, awakening other minds to the same heavenly career.—*Edward Everett.*

HUMBOLDT

Library of Science.

Price 15 Cents Each Number.

The following numbers are all standard Books, and should be in the library of every student :

1. Light Science for Leisure Hours. By Rich. A. Proctor, F.R.A.S.
2. The Forms of Water in Clouds and Rivers, Ice and Glaciers. (19 illustrations.) By John Tyndall, F.R.S.
4. Man's Place in Nature (with numerous illustrations.) By Thos. H. Huxley, F.R.S.
5. Education, Intellectual, Moral and Physical. By Herbert Spencer.
6. Town Geology, with Appendix on Coral and Coral Reefs. By Rev. Chas. Kingsley.
7. The Conservation of Energy, (with numerous illustrations.) By Balfour Stewart, L.L.D.
8. The Study of Language, brought back to its true principals. By C. Marcel.
9. The Data of Ethics. By H. Spencer.
13. Mind and Body. The theories of their relations. By Alex. Bain, L.L.D.
14. The Wonders of the Heavens (32 illustrations.) By Camille Flammarion.
16. The Origin of Species. By Thos. H. Huxley, F.R.S.
18. Lessons in Electricity. (60 illustrations.) By John Tyndall, F.R.S.
20. The Romance of Astronomy. By R. Kalley Miller, M.A.
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