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No. 5. May.

ACADIAN SCIENTIST.

Published in the Interests of the Acadian Science Club.

A. J. PINEO, EDITOR.

SUBSCRIPTION 35 CENTS PER ANNUM.

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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 enobling study of Nature's works. All efforts used to make the connection of students with the Club pleasant and profitable.

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The Acadian Scientist.

Published in the Interests of the Acadian Science Club.

VOL. I. WOLFVILLE, N. S., MAY, 1883. No. V.

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IT is not work that kills the brain-laborer but worry, and anxiety, and neglect of proper exercise and lack of pure air. From the worry and mental strain and impure air of the school-room the teacher too frequently hurries home to his books and preparation for the succeeding day's work; or, if he takes a walk of a mile it is taken in a listless manner and lacks the spirit and enjoyment that would make it of the greatest benefit. So it is no marvel that every year teachers are retreating from the ranks broken in health and spirit. If after the work of the school-room is over the teacher would spend the remainder of the day in some employment or recreation that would keep him out of doors and give him enjoyment as well as physical exercise, he would find that his professional work would be performed more successfully and yet with less effort. We can think of no better plan for the tired, over-worried teacher than the cultivation of an interest in the study of natural history. His after-school rambles through field or forest or by the sea-shore would then not be purposeless but full of absorbing pleasure, while at the same time he would be gaining a knowledge of facts and an acquaintance with nature that would not only minister to future enjoyment but also be of valuable service in the daily work of the school-room.

THE SOCIETY OF NATURALISTS OF THE EASTERN UNITED STATES is a new scientific society organized at Springfield, Mass., April 10 and 11. It is the intention to hold yearly meetings for the purpose of discussing questions of common interest bearing upon the actual work of the members. Such are: methods of museum and laboratory work, systems of instruction in various departments of Natural Science, and the true relation of this subject to the curricula of preparatory schools, and other questions connected with the theory and practice of Natural Science. Professor A. Hyatt, of the Massachusetts Institute of Technology, was chosen President. Professors H. N. Martin, of John Hopkins' University, and A. S. Packard, Jr., of Brown University, Vice-Presidents; and Professor S. F. Clarke, of Williams' College, Secretary. The Society has twenty-seven members representing the leading colleges of New England.

ON behalf of the ACADIAN SCIENCE CLUB we desire to call the attention of authors and publishers of scientific literature to the fact that we are endeavoring to build up a library of such a character. It is the intention to have bound, in as far as possible, all unbound papers and magazines donated to the Club, or obtained in any other way. The library will be for the exclusive use of members of the Club. Due credit will be given though our columns for all contributions.

READ our new premium offer on 3rd page of cover.

[For the SCIENTIST.]

AN EXCURSION TO BLOMIDON.

(Concluding part.)

And now let us briefly review the history of this interesting range as it is read from the rocky archives. It must have been many thousands, aye, probably millions of years ago, that saw the birth of this promontory and the whole ridge of which it is the eastern extremity. For untold centuries the waters of Fundy Bay had been flowing over its present site, over the valley of the Cornwallis and Annapolis rivers, now smiling in its harvest beauty, and beating upon the northern slope of the South Mountains. The detritus formed by the wearing away of those old Silurian hills as well as of the other shores of this inland sea was deposited, at least in part, along the line of the present North Mountains. This accumulation continued for centuries until the beds of sandstone became of considerable thickness. Then came the fiery ordeal. At various successive points along a line parallel to the present range volcanic action began. The lava flood poured forth and overflowed the sandstone. Successive overflows followed at intervals, and finally the whole southern edge of the formation was slowly raised above the waters giving the beds a northerly dip under the Bay. The craters of those volcanic fires never appeared above the surface or, appearing, sank again beneath the waves and were worn away by the strong Bay tide. As the beds dipped under the Bay to the north that side was somewhat protected from the action of the waves by the hard igneous rock, while the tides that daily flowed backward and forward through the valley within, washing against the southern edge of the ridge, wore away the soft sandstone at its base more rapidly leaving a more abrupt slope. Afterwards, as the rising continued throughout the whole formation, the valley became slowly elevated above the water, as it now is. Then came a period of intense cold through Canada and northern portions of the United States, freezing the rivers and seas and covering this part of the continent with a thick mantle of snow and ice. The southward moving of portions of this great ice sheet in the form of glaciers, caused by the greater accumulation of the ice formation towards the north, is evidenced by the scratches observable on the rocks over which they passed, and the occurrence of boulders, smoothed and rounded in their transit, many miles from their native beds. By this agency hugh blocks of trap were taken up and transported from Blomidon across the entire breadth of the Province, while they were scattered in the greatest profusion throughout the Cornwallis valley and over the opposite ridge. As the climate of arctic rigor gave place to a milder temperature the ice mantle retreated northward and Nova Scotia come to enjoy conditions similar to those at present existing.

After adding fresh fuel to the smouldering fire, we wrapped ourselves in our blankets and were soon oblivious of all surroundings. When we awoke next morning "Sol" was several degrees above the eastern horizon. After breakfast a council was called to decide upon the direction that should be taken. Each of the more prominent members submitted a programme and it was at length unanimousiy decided that the forenoon should be spent in the vicinity of the camp. Subjects to be studied: 1st, Botany. 2nd, The science and art of procuring a brace of partridges for dinner. Perhaps the latter was the weightier consideration. The forenoon passed

pleasantly, one incident occurring worthy of mention. When returning to camp with a plump young partridge, (we had to be content with one) we discovered a fat, lazy porcupine taking his morning nap upon the limb of a tree directly before us and presenting a tempting shot. I deliberately fired; but not a motion gave sign that the little leaden messengers had fulfilled their mission. I was too much astonished to fire again. "How could I have missed it?" Presently the animal raised its head as if just awaking, moved it slowly from side to side, slid off of the limb and fell with a heavy thud to the ground. Taking our booty we proceeded to camp, and in less than two hours the skin of said porcupine had been removed, covered internally with arsenic, and carefully rolled up to be at some future day stuffed out to its natural shape and dimensions and made to simulate, in as far as possible, the living animal when first we saw it.

After dinner we descended the slope and continued our search for minerals. As we proceeded the slope again became steep and rugged, and hundreds of feet above could be seen a perpendicular cliff of columnar trap from the top of which a gentle slope stretched away to the summit of the ridge. We soon found scattered over the beach in abundance water-worn specimens of the beautiful purple *amethyst*. The presence of these indicated that their source was above; and the course of a land-slide that had fallen, probably during the preceding spring, could be distinctly traced for a distance. With no inconsiderable labor we ascended and after long and careful search among the amygdaloid near the base of the basaltic cliff we succeeded in finding a rich seam of amethyst upon which our hammers and chisels made music for a few hours. Then as the seam became nearly exhausted and the shades of evening began to gather around us, we filled our satchels and baskets with our booty and descended. Depositing our specimens at the foot of the cliff we ascended to our camp. After lighting our fires and partaking of our evening meal we wrapped ourselves in our blankets and were soon fast asleep.

Next morning we were up betimes. The rising sun was just flooding the mountain side with his golden glory when we descended to continue our exploration. A little beyond the point that we had reached the day before we came to a land-slide that had fallen in the spring and had not yet been removed by the waves. This afforded us good specimens of *heulandite*, a handsome mineral occurring in rhombodial prisms of white, red, or brown color. Here we found only the white and brown varieties. We continued our search some five miles from our camp but as that point of Blomidon over which we travelled is not very rich in minerals we did not succeed in obtaining a large variety. In addition to the heulandite, we secured some fine *agates*, *chalcedony*, *jasper*, and good specimens of *acadialite*, a variety of chabazite peculiar to Nova coti a. With these we returned to camp before nightfall.

According to programme next day was to be devoted to the collecting of marine invertebrates of the coast; so the early morning found us on the beach taking advantage of the low state of the tide which here rises and falls some fifty feet or more. In the little pools near low water we found specimens of the pretty *Pecten Islandicus* or scallop; and there also, upon a stratum of "new red" which appeared from under the overlying trap debris, we secured a few specimens of *Fusus tornatus*. In many places the sandstone was observed to be perforated

with smooth round holes from an inch in diameter to much smaller. Use of chisel and hammer upon the yielding rock enabled us to reach the bottom of the holes and unearth the inmates—bivalves with rasp-like shells, bearing the mild and euphonious name of *petricula pholadiformis*. A little higher up, as we were compelled to retreat before the advancing tide, we came to the habitat of *crepidula fornicetac*, *plana* and *tectura testudinalis*, or the common limpet. Large specimens of *buccinum undatum* were found adhering to the slimy rocks, while here and there a water-worn shell of the same species or of fusus could be seen moving over the bottom of a little pool at a rate quite unaccountable till its active little tenant was discovered to be a hermit crab that had taken possession of the little house vacated by its molluscan builder. Still higher were obtained *littorina litoria*, *l. palliata*, *perpura lapillus* in several varieties, and the common mussel—*mytilus edulis*.

(To be continued.)

For the SCIENTIST.]

NATURAL HISTORY LESSONS.

I.

As a rule in presenting lessons on natural history the aim should be to educate, *i. e.*, draw out, the young and growing mind of the pupil rather than to simply interest or amuse. So in every case when objects are used to illustrate such lessons (which cannot be truly and efficiently taught without them) the pupils should be required to observe, take notes, and afterward present a written description of the specimens used. This ensures carefulness of observation and the facility for ready and accurate description. In many instances the best form in which this description could be presented would be that of an essay, giving the characteristics, distribution, uses, etc., the teacher having added such information as the pupils could not otherwise readily obtain. Pupils at once recognise such work as something altogether different from the ordinary desultory "composition writing" and undertake it willingly and even with eagerness. The offering of prizes in specimens serves to make the work still more interesting.

A few lessons on granite and its constituent minerals serve as an excellent beginning of a series on rocks and minerals. Some knowledge of the subject is of course pre-supposed on the part of the teacher. This knowledge may be quite elementary, provided that it is accompanied by a practical acquaintance with the minerals themselves, and the teacher still be able to present efficiently and in a scientific manner, simple lessons upon the common minerals and ores of his country. The teacher will find in Dana's Manual an excellent and indispensible reference book. The subject should be treated in four lessons:

First, *Quartz*. As many varieties as possible should be shown, such as, milky, smoky, rose, and ferruginous quartz, flint, jasper, chalcedony, quartz crystals, clear and amethystine. These should be labeled and the pupils required to note characteristics. Subsequently those specimens, with labels removed, or duplicates should be placed before the pupils and they asked to identify them from memory or by the aid of their written descriptions. The essay embodying observations on the specimens, notes given by the teacher, and any further information that the pupil might be able to obtain, should be treated in the same way as

an ordinary composition, the pupil being required to rewrite it, corrected, in a book kept for the purpose.

Second, *Feldspar.* Specimens needed are, orthoclose, albite, labradorite, Amazon stone and kaolin. These should be presented, examined and described as in the case of quartz.

Third, *Mica and Hornblende.* Specimens required are muscovite or common mica, mica schist, tremolite, actinolite, hornblende and asbestus. This forms a very interesting lesson. The uses of these, especially of mica and asbestus can be dilated upon and perhaps some fabric shown manufactured from the latter. In this as in each of the other cases some of the specimens might be dispensed with and the lesson still prove a success, or more might be added with advantage.

In the fourth lesson the rock *granite* should be considered. If the pupils have learned thoroughly the preceding lessons they should be able to recognise the component minerals in any specimen of granite in which they are well defined. Examples of both common granite and syenite should be placed before the pupils who should now be able to distinguish between them.

[For the SCIENTIST.]

FLORAL FORMULÆ.

BY A. H. MCKAY, A. B., B. Sc.

Progress in every science involves the use of formulæ, for the expression of complex truths in concise forms, which in turn can then be used to arrive at still higher generalizations. Sachs of Wurzburg and Grisebach of Gottingen have used formulæ in botany to show at a glance the structure of a flower. We bring before our readers a system fundamentally Grisebach's, but better adapted to the type fonts of our printers, and much more concise than Sachs'.

As brevity is essential in the few short columns of the SCIENTIST, we shall indicate merely the principle and a few of its details in the present number. A complete flower is made up of *four floral whorls* or circles of floral leaves. First, the calyx, usually green, the separate leaves of which are termed sepals. Second, the corolla, usually colored, made up of petals. Third, the andrœcium, consisting of stamens. And fourth, the gynœcium or pistil composed of carpels. All these are genetically leaves, but modified in form and function. The function of the calyx is to protect the delicate inner whorls; of the corolla, to lure by color and odor fertilizing agencies; of the stamen, to prepare in its strangely contracted leaf-blade the fertilizing pollen; of the carpel, to form a cavity by its inrolled blade from which and in which the seed may be developed.

The floral formula must therefore be made up of four numbers indicating the number of leaves in each floral whorl, which we shall separate by combinations of the *period* and *comma* to which conventional significations shall be attached. Thus *two periods* . . = free, no adhesion. *One period*, = adhesion of contiguous whorls. *Colon*, = adhesion very pronounced. *Comma*, = adhesion of 1st and 3rd or 2nd and 4th whorls. *Two commas* ,, = adhesion 1st and 4th. Parenthesis, thus ( ) = complete cohesion of the component parts of a whorl. ( )' = partial cohesion—lobed. ( )" =cohesion at the base. For instance, in Buttercup $\hat{f} = 5 \,..\, 5 \,..\, \infty \,..\, \infty$ indicates, five distinct petals free from other parts; an indefinite number of free stamens; and an indefinite number of free carpels each of which forms a single achenium. In Mayflower, *epigæa repens*, $\hat{f} = (5)'' \,..\, (5)' \,..$ 10 . . (5) indicates five sepals slightly gamosepalous, five-lobed gamopetalous corolla not inserted on the calyx but with it on the receptacle, ten separate stamens inserted on the receptacle, a pistil composed of five carpels forming a five celled and five lobed pod in fruit. In this example the double periods show that there is no adhesion between the four floral parts. In the Plum or Cherry blossom, $\hat{f} = (5)' \,.\, 5 \,,\, \infty \,..\, (2)$ means, five sepals

joined at their bases, five distinct petals adhering to (inserted into) the calyx, a number of stamens inserted *into the calyx* (the tail of the comma indicating adhesion to the whorl beyond the nearest), two carpels completely united into a single ovary and style. (2)' for carpels would mean, ovary single, style double, (2)" would indicate, not only two styles but a partial separation of the two carpels yet however united at the base. Two circles of sepals, petals or stamens, etc., five in each circle, if alternating might by expressed 5x5, if decussating 5÷5. If the parts have not a cyclic arrangement the angle of divergence can be expressed in the usual manner. For instance in the *Linaceæ* the sepals have the *quincuncial* arrangement, the angle of divergence between each sepal being 144°—that is, the five sepals rise at regular angular distances while going twice round the axis. ∴ *ff* of *Linaceæ* = 5 a 2-5 .. 5 .. 5 .. (5) = five distinct sepals, arrangement two-fifths, etc. It can easily be seen that the structure of a flower may by an extension of this system be represented with a great degree of fullness in a very small space, and in the clearest manner possible for purposes of comparison.

We give the following as simple exercises for young botanists on plants flowering in May :—

Violets & Pansies.....ff = 5 .. 5 .. 5 .. (3).
Strawberry.....ff = (5+5) .. 5, ∞ .. ∞.
Gold Thread.. ff = 3 to 7 .. 5 to 7 .. 15 to 25 .. 3 to 7.
Painted Trillium.....ff = 3 & 3 .. 6 .. (3).

This latter being a monocotyledon the distinction between calyx and corolla is not so marked as in the dicotyledons. 3 & 3 therefore indicate respectively the sepaloid and petaloid portions of the perianth.

Botanical Notes.

Now is the time to commence the study of the flowering plants. Analyse by dissection the flower of every species as it blooms. If a description is too long for your notes, jot down its floral formula, and find its place in the flora in your manual. The only way to know anything about a natural science is to study from nature. Books are not substitutes —only guides.

This is the only time in which to study leaves in *vernation* and many flowers in *æstivation*. Seek the budding plant or tree and observe the unfolding leaf. Note carefully the way in which the young leaf is folded in its winter cradle—whether conduplicate, reduplicate, plicate, circinnate, convolute, revolute, etc. Each species conforms always strictly to some definite manner of packing in the bud.

C. E. Bessy, in the "American Naturalist" estimates, that the annual loss to the United States from parasitic fungi such as molds, smuts, mildews, rusts, rots, etc., aggregates "at the very lowest estimate allowable, from fifty to one hundred millions of dollars." He thinks it is the duty of the Government to appoint a scientific commission to investigate these vegetable parasites.

Zoology.

Second year students of the Club are about this time becoming interested in the study of zoology. As the prescribed text-book—an excellent little manual—is small, the student will have ample time for practical work. He should make a general collection of such animals illustrating the different classes described in the text-book as may come within his reach. Those living near the sea enjoy exceptional advantages in the study of invertebrates as the shore offers a fruitful field for collecting forms of marine life, but those living inland can also find an abundance of material, by careful search.

As the protozoa are so minute as to require the aid of a good microscope in their efficient study the beginner will not be able to carry on very extensive research in that department. A few of the larger species may however, be collected from the leaves and stems of submerged plants in pools and dit-

ches, and from stones and shells near low water, and their habits studied by placing them in a vessel of water.

The study of living specimens of Radiates will be practicable to only those living near the sea-shore, but much can be learned from the examination of preserved specimens, such as star-fish, sea-urchins and corals. Examples of the two former can be found on almost every shore.

In the case of mollusks specimens may be found everywhere, the sea-shore furnishing the greatest variety and abundance. Several species may be found in almost every lake and river, while careful search among leaves and roots and rubbish, in old walls and garden walks, will reveal numerous species of land shells.

During the summer months directions for collecting and preserving zoological specimens will be given in the "Scientist." Next month directions will be given for collecting and preserving shells.

GENERAL DIRECTIONS FOR COLLECTING MARINE ANIMALS.—Where the retreat of the tide is sufficient, the sea-shore always affords the best field for the collector, and the specimens generally increase in number and interest in propoition as we approximate to low-water-mark. Nevertheless the whole area should be searched, as each species has its peculiar range, and many forms can live only where they are exposed in the air for the greater part of the time each day. The ground may be either muddy, sandy, weedy, gravelly, stony or rocky, and the animals inhabiting each kind of ground will be found more or less peculiar to it, and rarely to occur on the others. Sand and mud are, however so similar in character that their denizens are nearly the same, though some prefer the clearer waters which flow over sand, to the turbid tide which deposits mud. But few specimens will be found on the surface of such ground, although the little pools lying on it should be scooped with the dip net for shrimps, etc., but it is only by the spade that its true riches can be devoloped. By digging in spots indicated by small holes, a great number of worms, boring crustaceans, and bivalves may always be found.

Weedy ground is so called from the abundance of eel-grass and sea-weed which covers it. These weeds should be examined carefully for small shells and crustaceans; perhaps the best method of doing this being to wash quantities of the weed in a bucket of water and examine the sediment.

Gravelly ground is not generally very rich in animals life, but will repay an examination, as small crabs are fond of lurking among the pebbles.

Stony ground is by far the richest of all. Wherever there are stones, particularly flat ones, about large enough to afford a moderate degree of exercise to a common sized man in turning them over, there the zoologist can never fail to fill his basket and bottles; for beneath these stones myriads of rare and beautiful species retire for moisture and protection during the retreat of the tide. *Rocky ground* should be searched chiefly in the pools and crevices.

Littoral or sea-shore investigations should be carried on not only in the bays, harbors, and creeks, but on the ocean beach, in each locality, to get at a true idea of its fauna, as the respective animals will be found different.—*Smithsonian Directions.*

W. W. BAILEY reports to the *American Naturalist* the finding of a spider's web with guys or supports 15ft. long, and web proper 3ft. in circumference.

NOTES.

The oldest tree in the world, as far as anyone knows, is the Bo tree, of the sacred city of Annarapoora, in Burmah. It was planted 288, B.C., and is therefore now over 2,170 years old. The King Oak in Windsor Forest, England, is 1,000 years old.

An expedition with Baron Nordenskiold at its head will be sent out by Dr. Oscar Dickson, to explore the interior of Greenland. Baron Nordenskiold is confident that in the interior of this ice-covered land an oasis exists, and believes that he can reach it. It is hoped, also, to obtain some traces of the lost Norse colonies, last heard from at the end of the fourteenth century. Their very location is matter of dispute.

LITERARY NOTICES.

REPORTS OF FRUIT GROWERS ASSOCIATION AND ENTOMOLOGICAL SOCIETY OF ONTARIO are at hand. These are comprised in a bound volume containing some 370 pages filled with valuable information on the culture and propagation of fruits and vegetables and also of forest trees. A well illustrated article on *Insects Affecting Forest Trees*, presented by William Saunders, Esq, the able and enthusiastic President of the Entomological Society, is of especial value. So also are the *Popular Papers on Entomology* in the Society's report.

NOTES ON THE UMONIDÆ FOUND IN THE VICINITY OF OTTAWA, ONT. By F. R. Leatchford, B.A. In this valuable paper, reprinted from the transactions of the Ottawa Field Naturalists' Club, nearly all the bivalves of Canadian lakes and rivers are described. Among them is one new species Unio borealis —A. F. Gray, first noticed by Mr. Leatchford.

THE May number of the "American Naturalist" has come to hand, as usual full of the most interesting matter. "Pampum and and Its History" and the Naturalists' Brazillian Expedition" will be enjoyable reading for the popular as well as the scientific reader. With the review of "Penhallow's Vegetable Histology" we can hardly agree in every point. We have been disappointed in it. The items of Natural Science News under their various heads are numerous and valuable, and so condensed that to give a summary of them of them would require a wholesale reproduction.

Publications Received for the Club Library.

Five copies NOVA SCOTIA GEOLOGY. By Rev. D. Honeyman, D.C.L., F.R.S.C., Curator of the Provincial Museum. From the Author.

Current numbers SCIENCE OBSERVER, (Astronomical.) From Boston Scientific Society.

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 per line.

California Marine Shells and Echinodenus for sale and exchange. Will exchange for Marine Shells from any part of the world. List of species and terms sent free on application. G. W. MICHAEL, JR.,
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Named L. S. Fossils and Land Shells in exchange for Minerals, Archæological specimens, U. S. "Continental" and Colonial money, and books in the A S. C. Course. Actinolite, Agates, Amethyst, Beryl, Fluor spar, Quartz crystals, Rose quartz and Tourmaline especially desired.
W. H. BEAN,
Lebanon, Warren Co., O.

I have on hand quite a large collection of the Colorado Beetle in alcohol which I made last summer in Maine I will send specimens to localities where the pest has not yet appeared on receipt of stamps to cover postage.
Editor ACADIAN SCIENTIST.