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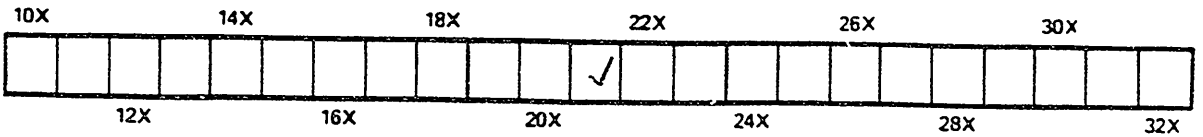

Nos. 4, & 5. 1885. Apr. & May.

THE Canadian Science MONTHLY.

DEVOTED TO THE INTEREST OF

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A. J. PINEO, KENTVILLE, N.S.

CONTNTS OF THS NUMBER.

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Canadian Science Monthly.

VOL. III. KENTVILLE, N.S., APRIL & MAY, 1885, NOS. 4 & 5.

A NEW FRESH-WATER SPONGE FROM NOVA SCOTIA.

The following description of this interesting discovery was given by Mr. E. Potts before the Philadelphia Academy of Natural Sciences, at its meetings of Febr. 24th, and was published in the "Proceedings" of that society.

HETEROMEYENIA PICTOVENSIS, n. sp.

Sponge light green, even when dry, massive, encrusting; texture very compact; Spicules non-fasciculated, persistent; surface mostly smooth.

Gemmules very scarce, spherical, crust thick.

Skeleton spicules cylindrical, short, robust, rounded or abruptly terminated; entirely spined, spines conical at the centre of the spicule, elsewhere generally curving *forward*, or towards each extremity. Rounded terminations of spicules covered with short spines, though frequently a single large spine or acute termination is seen at one or both extremities.

Dermal spicules absent or undiscovered.

Birotulates of the longer class surrounding the gemmules, rather numerous, one-half longer than the others; shafts conspicuously fusiform or largest at the centre, where are frequently found one or more long spines. Their rotules consist of three to six irregularly placed rays, recurved at the extremities.

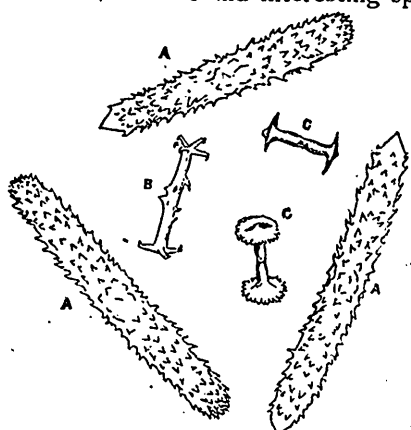
Birotulates of the shorter class abundant and compactly placed around the gemmule; shafts mostly smooth, though sometimes bearing a single spine, irregularly cylindrical, but rapidly widening to support the rotules, which are large, umbonate, nearly flat, and finely lacinulate at their margins; occasionally bearing spines.

Measurements.—Skeleton spicules 0·0075 inch long, by 0·00075 inch thick; length of long birotulates 0·0021 inch; of short birotulates 0·0012 inch; diameter of disc of latter 0·0009 inch.

Habitat.—On submerged wood, etc.

Locality.—Collected only by or for Mr. A. H. McKay, B. A. B. Sc., of Pictou, Nova Scotia, from several lakes upon the watershed of that region.

This beautiful and interesting sponge was first discovered by Mr. McKay, during the summer of 1884. At that time its novelty as indicated by its unusually robust, entirely spined skeleton spicules was easily recognized, but the absence of gemmules at that season precluded the determination of its generic relations, and it has continued unnamed. During the last week of December, however, a further search was rewarded by the finding of other "specimens upon sticks pulled up through a break made in the ice," and amongst these a few, and but a few gemmulæ have now been discovered.



A, A, A. Skeleton spicules: B, Long birotulate: C, C, Short do, Magnified 250 diameters

These suffice to place it clearly within the genus *Heteromeyenia*, near *H. Ryderii*, while the peculiarities of its birotulates distinguish it from that of any other species.

Mr. Potts called attention to its green and apparently living and growing condition, during midwinter, in that northern latitude, as indicating that like *Spongilla aspinosa*, of the New Jersey swamps, this species also is an "evergreen," continuing its life in the normal state throughout the year, and for this reason not needing to form "protected gemmules" in such abundance as do other species.

At the suggestion of Mr. McKay, to whose enthusiastic search we owe its discovery, the local specific *Pictovensis* has gladly been given to this species.

NEW FRESH WATER SPONGES FROM NOVA SCOTIA.

The following description of a new Nova Scotia Fresh water sponge is given by H. J. Carter, F. R. S., etc., of England in the January number of the 'Annals and Magazine of Natural History,' London. Referring to a specimen sent him by Principal MacKay of Pictou Academy, he says, "until just now that I have had occasion to examine it more particularly, I thought it had been *Spongilla fragilis*, var. *segregata*. However, it turns out to be very different; and being *new*, I herewith append its description under the name of

SPONGILLA MACKAYI

Sessile, spreading, charged with little subglobular bodies like large statoblasts, about 1-12th inch, skeletal spicule acerate, slightly curved and sharp-pointed; more or less thickly spined, averaging 50 by 2 1-2—6000ths inch in its greatest diameters; accompanied abundantly by a minute birotulate flesh-spicule precisely like that of *Meyenia Everetti* that is 3 to 4-6000ths inch long, with very thin smooth shaft about four times longer than the diameter of the rotule which is 1-6000ths inch, toothed, with the teeth recurved. Statoblast globular, consisting of a thick chitinous coat filled with the usual germinal matter, from which is very slightly prolonged an everted trumpet-shaped aperture; bearing slight traces externally of microcell-structure and the polygonal tissue; making one of twenty such which are arranged as to form a subglobular body of the size mentioned; situated around a central cavity with their apertures inwards; the whole supported by statoblast spicules of various sizes, which, intercrossing each other, form a nest-like globular capsule in which the outer parts of the statoblast are fixed and covered; apparently (for the specimen is dry) deficient at one point, which leads to the central cavity. Statoblast-spicules acerate, sharp-pointed, like the skeletal spicules, but becoming much shorter and more coarsely spined as they approach the chitinous coats of the statoblasts, where they may be reduced to at least 27-6000ths inch in length, although often increased to 4-6000ths inch in thickness, and their spines, which are very irregular in size and situation, often as long as the spicule is broad. Size of specimen about 1-6th inch high and 2 inches in horizontal diameter.

Hab. Fresh water.

Loc. Mackay's Lake, Pictou Co., Nova Scotia.

Obs. The most remarkable point presented by this species is that its flesh-spicule should be identical with that of *Meyenia Everetti*, whose statoblast is covered with a thick crust of long and large birotules, denticulated, with recurved teeth like those of *Meyenia Bailayi*, etc., showing that this kind of flesh-spicule may be present in totally different species of freshwater sponges, unless it should be owing to the presence and proximity of *M. Everetti*, which, as above stated, grows in the same lake. It is remarkable too, that the spiculation of *Spongilla Mackayi*, both skeletal and flesh, should be almost identical with those which I have described and illustrated, of the freshwater sponge spicules so abundant in the diluvial deposits of the Altmuhl Valley in Bavaria ('Annals,' Nov. 1883, Vol XII. p 329 etc., Pl XIV. fig. 18, a, b, g, h, i.)

[Mr. Mackay writes, that Mr. E. Potts, of Philadelphia named the same sponge *S. iglooiformis*. But Carter's is the first published description. ED. C. S. M.]

THE CHAMBERED NAUTILUS.

This is the ship of pearl, which, poets feign,
Sails the unshadowed main,—
The venturous bark that flings
On the sweet summer wind its purpled wings.
In gulfs enchanted, where the siren sings,
And choral reefs lie bare, [hair.
Where the cold sea-maids rise to sun their streaming

Its web of living gauze no more unfurl
Wrecked is the ship of pearl!
And every chambered cell,
Where its dim dream-life was wont to dwell,
As the frail tenant shaped his growing shell,
Before thee lies revealed,—
Its irised ceiling rent, its sunless crypt unsealed.

Year after year beheld the silent toil
That spread his lustrous coil;
Still as the spiral grew,
He left the past years dwelling for the new,
Stole with soft step its shining archway through,
Built up its idle door, [no more.
Stretched in his last found home, and knew the old

Thanks for the heavenly message brought by thee,
Child of the wandering sea,
Cast from her lap, forlorn!
From thy dead lips a clearer note is born
Than ever triton blew from wreathed horn!
While on my ear it rings, [that sings :—
Through the deep caves of thought I hear a voice

Bu'ld thee more stately mansions, O my soul,
As the swift seasons roll!
Leave thy low-vaulted past!
Let each new temple, nobler than the last
Shut thee from heaven with a dome more vast,
Till thou at length art free,
Leaving thine out-grown shell by life's unresting sea.
—OLIVER WENDELL HOLMES.

ALCHEMY.

Prepared by a student of Acadia College, Wolfville, as a class exercise.

A number of scientists and philosophers of considerable note have advanced, and to some extent propagated the theory that man, the lord of the universe, has genealogically descended, and at the same time morally, physically and intellectually ascended by a process of regular gradation from an origin most humble. As to the truth or absurdity of this proposition we shall not attempt a discussion. But that a constant order and progression from a feeble beginning to a greater and wider strength is observed in all created things which by the law of their being are not immutable is a fact universally admitted because it has found illusrtation on every page of life Perhaps no better illustration is possible than that which follows the observation of the working of human mind and its hard struggle after truth. It has ever been the case that first searchings into deep, mysterious and hidden truths, which only by patient study and long experience can be brought into the light of complete revelation, have been uncertain and mistaken. It is our present purpose to speak briefly of the first slow, and to our superior wisdom, almost ridiculous efforts of the human mind, as

it existed centuries ago, towards the discovery of those pre-existent laws which govern the department of all matter of which the earth is composed, and towards the knowledge of its properties. We shall speak merely of Alchemy, the forerunner of Chemistry, without tracing, as it could be traced, the progress of the science out of the regions of superstition and ignorance into the realm of wisdom and light.

The word alchemy is supposed to be derived from the Arabic particle *al*, equivalent to the English 'the,'' and a Coptic root *Khems*, signifying what is obscure or hidden. The science, if by such a name the blind inquiries of the alchemists can be called was known as the occult, the hidden, because it had for its principal aim the discovery of the secret art of the transmutation of all the baser metals into gold, the finding or preparation of a universal medicine, and of a universal solvent.

Concerning the date of the rise of Alchemy there has been much dispute, some carrying its origin so far back among the mists of time as to assert that Moses possessed considerable knowledge of the art because he dissolved the golden calf. Of this point the limits of our paper will not admit discussion. There is, however, good reason to believe that Alchemy originated in Arabia not much prior to the eighth century, a time when Arabic learning had great influence on European culture.

The question of the greatest interest to us is :—What was the cause or origin of the alchemical belief? How could one man, much less thousands of men of subtlest intellects delude themselves with the belief of the possibility of transmuting one kind of matter into another, crude lead, mercury, or tin, into weighty, lustrous gold. The growth of the idea is not difficult to trace. In the earliest period of Greek philosophy there was a marked tendency to make one element or principle fundamental and to evolve the other elements and the world from it. Thus Thales of Miletus who lived in the sixth century B. C., affirmed that water was the first principle of things. On the other hand, Anaximenes regarded fire as the primal element, Herakleitos fire, Pheukides earth and some philosophers grouped two elements together. But the oldest physical theory of which we have any knowledge and the one from which, as we shall show, the alchemical belief arose, is the theory that regarded the world as composed of earth, air, fire, and water

We must here remember that these four elements are not to be understood too literally, in the sense in which we speak of the sixty-five elements of chemistry, but rather principles or types of qualities than actual elements. This four element theory existed before the fifteenth century B. C., and was adopted in India, Egypt and Greece at a very early date. Empedokles introduced the idea into Greece in the 5th century B. C. He held the idea of four distinct elements, earth, air, fire and water, not capable of passing one into another, but forming all things by their intermixture. From the modification and enlargement of this idea by Aristotle, (385–322 B. C.,) the most voluminous writer on science among the ancients, directly sprang the alchemical belief. This famous philosopher held that the four elements are mutually convertible, and he assigned two qualities to each. Thus he said :—

Fire is hot and dry,
Air is hot and moist,
Water is cold and moist,
Earth is cold and dry.

In each of these one quality is dominant. Thus fire is more hot than dry, air more moist than hot, water more cold than moist, and earth more dry than cold. If the dry of fire be vanquished by the moist of water, air will result ; if the hot of air be vanquished by the cold of earth water will result ; if the moist of water be vanquished by the dry of fire, earth will result. These views of Aristotle were accepted without question by the Alchemists. They reasoned, and we must admit plausibly ,— if fire becomes air, air water, and water earth, why may not one kind of substance formed from these elements be changed into another kind of substance of somewhat the same nature, and certainly more similar than air and water, or water and earth ? Why may not lead, compounded of these elements in certain proportions, be changed into gold, compounded of these elements in certain other proportions. Falser modes of reasoning than this may be met with even in the present enlightened nineteenth century. Let but the ancient Greek theory of the transmutation of the elements be once literally accepted, and the Alchemical belief in transmutation follows naturally ; it is as we have shown, but a practical application of the general proposition.

It would be instructive to inquire into some of the immediate causes of the mistakes into which the Alchemists fell, but time forbids. We will consider merely the connection of alchemy with chemistry, and any benefit the nobler and truer science may have derived from the other.

Alchemy has been called the sickly and imaginative infancy through which modern chemistry had to pass before it attained its majority, that is, before it became a positive science. Though this in the main expresses the true relation between the two sciences, or rather between the two stages of the one science, it must not be forgotten that alchemy and chemistry—understanding by the former the futile attempts to make gold, and by the latter legitimate inquiry into the nature of different kinds of matter—existed side by side in the same age, often in the same person. While existing thus, however, only in spasmodic fits, unpursued with any regularity or intelligence, chemistry cannot be said to have existed as a well-defined science. Modern science can be said to date from three discoveries, (1) that of Copernicus, the effect of which was to expel the astrologers from the society of the astronomers, (2) that of Tourcelli and Pascal of the weight of the atmosphere, which was the foundation of physics, (3) that of Lavoisier, of oxygen. Before these three grand stages in the progress of science, the reign of astrology, magic, and alchemy was universal and almost uncontested.

Lastly, were the confused, uncertain gropings of the ancients amidst the overwhelming night of superstition and ignorance of any avail? If they themselves never reached the light, did they give to others an impetus in the right direction? We think they did, and in substantiation of this belief can quote no better authority than Lord Francis Bacon, who in his "De Augmentis Scientiarum" says; "Alchemy may be compared to the man who told his sons that he had left them gold, buried somewhere in his vineyard; where they by digging found no gold, but by turning up the mould about the roots of the vines, procured a plentiful vintage. So the search and endeavors to make gold have brought many useful inventions and instructive experiments to light."

NOVA SCOTIAN GEOLOGY.

REV. D. HONEYMAN, D. C. L.

Truro & I. C. R.

We propose to take a trip on the Intercolonial Railway to the middle of the Cobequid Mountains.

EXPLANATION.

As we will have occasion to examine rocks *in situ* similar to those which have furnished boulders for the Truro drift, 1. I would notice an *error in my last paper*. "Quartz (syenitic)" should read " Quarty-Syenite." This is a name that has been introduced into Petrography to designate Syenite similar to that of Cleopatra's Needle. This was wont to be regarded as Typical Syenite, and Syenite was then considered to consist of the three minerals, Quartz, Feldspar and Hornblende. We have many rocks in the Cobequids and Drift Boulders which consist of Feldspar and Hornblende. In these cases the Feldspar is common *Potash* Feldspar, or Orthoclase. These are not Syenites according to the old view as quartz is wanting. Diorites also consist of Feldspar and Hornblende. This Feldspar is *Soda* Feldspar or Oligoclase. Here was a practical difficulty in nomenclature. The rocks in question were not Syenites, neither were they Diorites, which name is to be given to them. Dana has suggested the distinctive names, Syenite for the rock composed of common Feldspar and Hornblende, Quartz–Syenite for the rock containing quartz.

2. Diorites (granitoid) are thus distinguished from Diorites which are *macroscopically homogeneous* and require the Microscope and Polariscope to reveal their mineral constitution. The granitoid diorites *may be* metamorphic rock, the others igneous and intrusive.

Now for our trip on the I. C. R.

From Truro onward to Folly River Bridge we traverse the Triassic and Pleistocene formations. The former are seen exposed by numerous sections in railway cuttings. We have done very

little *crossing* meanwhile, we have been going along the *strike* of the strata.

The best section we have observed is at Folly River Bridge,

We now traverse what was once called the "Grecian Bend." Before reaching Londonderry station we have a fine section of red Conglomerate. This is the lowest member of the Triassic series of strata. We regard this as an "ancient sea beach" formed by the seas of the Triassic Period. At the station we have passed into the Carboniferous formation; some would call it the Permo-carboniferous. In the one case there is considered to be, what is called, a "break in succession", the Permian Formation being supposed to be absent. In the latter case the succession is considered to be regular. The order, *descending*, is Triassic, Permian, Carboniferous. We now pass through the coal measures which include the "De Bert Coal Field" which lies to the east of the I. C. R. The sections are of sandstones, clays, etc. Near the end of the "bend" we have sections of the Lower Carboniferous Conglomerates. Here we have another "ancient sea beach" which was washed by the seas of the Lower Carboniferous Period.

Passing into the mountains we enter upon sections of metamorphic slates, etc. This is the formation that includes the new deposits of Londonderry mines. If the geological succession be regular this is a Devonian formation as it precedes the Carboniferous. It was once referred to this age. Subsequently it was considered to be of Upper Silurian age. Heretofore there has been no positive evidence found in order to determine its age. Analogical evidence has alone been available. Mr. Ells of the geological survey says that he has found true Devonian Fossils in the eastern extension of these rocks at Riverdale. If such be their character we may have to revert to the old opinion that the formation is of Devonian age. *In the meantime* we regard it as Upper Silurian with the Devonian absent. We therefore regard *Devonian Time* as unrepresented. Ascending into the mountain we go along Folly River and come to Folly Lake. We have now reached the *highest elevation* in the I. C. R., *topographically*, and we have descended to the *lowest position*, *geologically*. Since we left the Si-

lurian, we have entered the "Archaean," or "Pre-Cambian" according to the new geological map of the Dominion of Canada 1884. Between the Siberian and this there is an enormous "break in succession" and length of geological time *unrepresented.*

The Archaean consists of Gneisses, Syenites, Diorites Porphyrites etc.

FORMATIONS EXAMINED: Pleistocene (11), Triassic (7), Carboniferous (5), Silurian (3), Archaean (1).

We now pass over westward to the

LONDONDERRY IRON MINES.

We continue in the Archaean until we reach the bridge north of the works. Before coming to the bridge we observe in the drain on our right side a beautiful series of gneissic rocks. In these *magnetite* occurs in grains giving the rock a banded aspect. Below the bridge we enter the metamorphic Silurian containing the iron deposits. At the works was or is a thick bed of *Ankerite*, one of the iron ores. The other ores lie west at Martins Brook and east of the I. C. R. etc. At the Roman Catholic Chapel we come to the Lower Carboniferous Conglomerate. Descending into Great Village River we see a fine section of the other rocks of the Carboniferous formation. A small seam of coal is reported as seen in this section. R. G. McLelan presented to our museum a sandstone slab from his quarry, on the river, having several "reptilian foot prints". Succeeding we observe, before we reach Great Village, fine sections of the Triassic formation consisting of Conglomerates and Sandstones, etc.

Descending topographically we have been ascending geologically; we have recrossed the same formations that we traversed on the I. C. R. between Truro and Folly Lake. We may therefore consider ourselves geologically in Truro.

By way of variety I purpose in my next paper to look at the Triassic and pre-Triassic geology of Kentville and Wolfville, the present and past homes of the CANADIAN SCIENCE MONTHLY.

MUSKOKA.

PAPER I.

BY JOHN B. SPURR.

There is something so romantic in the word Muskoka that it is seldom spoken without imparting to the hearer the conception of a wild and indigent country in which the towering trees of the primeval forest still hold aloof their heads, only to bow to the wield of the woodman's axe as the country becomes cleared. Its chief characteristics are known to everybody. The rock with which its name is so inseparably connected, is deemed sufficient to daunt the most sanguine expectations of the would be adventurer and the descriptions given to the outside world are such that it is now only settled by those who, with a strong arm and a resolute will, are determined by dint of hard work to make a comfortable home for themselves and their families.

The physical features and general aspect of the country at once attract the attention of the visitor and leave him without a doubt as to whether he is there or not, once he has passed the threshold of its pale. He does not ask any one if this really is Muskoka for his eyes would tell him the truth even if he received a negative answer and he is assured with a full conviction that if they ever deceived him before there is no optical illusion now.

The numerous lakes with which this rocky country is interspersed are an attractive addition to the sublimity of the scenery rendering the artist his very ideal of picturesque beauty. The Cedars gracefully spreading out their arms to reach the water, give a rugged outline yet artistic appearance to the scene, while the towering pines above them cast their long shadows into the lake below as if it were a mirror in which they were admiring their own beauty and stateliness.

The artist and naturalist are both lovers of nature; there is then something analogous in their views. The difference may be briefly stated as this, one takes the scene as it presents it-

self to the eye upon his canvas while the other merely retains it in memory and passes on from the wide scope of the picture itself to observe the unity and relation of its component parts to one another not noticed in the picture. This work of the artist however is a lasting representation of the scene which will bring back the remembrance of the pleasant times he has spent when sitting in his room, though far away from the original. Here there is a beginning on the part of the naturalist for he is unable to illustrate his words in as concise a manner, yet he is not devoid of all illustration for by his collected specimens and speech he can give as graphic a description to his hearers as is conveyed by a view, for how often are the best of pictures passed with the remark "Oh its very nice" when the artistic skill is overlooked and in reality there is little beauty seen. The mind must be trained in art and nature or the true effect as given by the artist cannot be appreciated. It is not necessary to understand art to appreciate nature but it is necessary to understand nature to make a faithful representation of it in art, for what looks more ludicrous to a trained eye than a butterfly at rest with the underside of its wings as bright a colour as the upper surface when it is known by observation of the species that there is no resemblance.

Let us now revert our attention to the thoughts of the naturalist. Not only does he see the wildness of the scenery, but his inqusitive mind goes further requiring to know what caused this upheavel or from whence and how did this rock come here. It may be asserted that it was here in the beginning or again it may be attributed to an earthquake. Statement or supposition are satisfactory to some people but the naturalist requires more than these, there must be reason to substantiate what has been averred. The problem is before him and it remains to be solved.

One section of country being rock and another arable requires explaining, and by his reasoning powers he comes to a conclusion the correctness of which depends greatly on experience. Yet that may be delusive. One thing however is certain, he has the spirit of a naturalist endeavoring through the intellect to arrive at a philosophical end. Putting aside the idea of it always being thus and led by the knowledge of there being no volcanoes near, he arrives at the

conclusion that an earthquake is nearer the truth of the solution than anything else. At a glance he can tell he is dealing with igneous rocks. He knows that frost, water and other chemical agencies are at work disintegrating its constituents and from the slow progress they have made infers that the action must have been recent when compared with the antiquity of the world. The action of fire is as plain as that on coke or lava which has been submerged in water, and become cooled thereby; one part displays the glittering particles of its heterogeneous composition while the other is devoid of all brilliancy and presents a full red appearance almost perforated with holes. It is computed that these granites have received their crystaline formation and become solidified subterraneously while other igneous rocks, like lava from volcanos, have been cooled either by the atmosphere or by being precipitated into water. It may be conjectured then that Muskoka received its present nature from a subterraneous force which elevated the rock some of which was scattered widespread apart from the great bulk and forming separate rocks. Some of it must have been in close communion with heat and then subjected to the modifying power of air or water as its almost porous nature could not be accounted for otherwise. This condition of the rock being of rare occurence we may suppose that the greater part has been heaved up in its present condition while some which has been in a state of fusion and directly connected with the fire has become porous by the escape of gases on exposure to the atmosphere.

The question as to when it came there can only receive a speculative answer. A statement received from an navvy--though perhaps not one of the best authorites—may throw some light on the question. It was asscrted that the information was deduced from the Indians who avered that the tradition of this eruption had been handed down to them from their forefathers, when it is said that Muskoka was a flourishing country at the time this devastation came and completely annihilated some of the tribes leaving very few of others. Soil is the incoherent particles or disintegrated rock and as there is a preponderance of rock we may deduce the inference that sufficient time has not elapsed to further the production of soil and that Muskoka received its present shape sometime during the last 6000 years.

INCUBATION OF INFECTIOUS DISEASE.

Vacher divides the various periods which elapse between the reception of infection into the body and the first manifest symptoms of the disease, into *five* sections, as follows: 1. *Shortest*—one to four days—Cholera (malignant) Charbon, plague, catarrh, and dissecting fever. 2. *Short*—two to six days—Scarlet fever, diptheria, dengue, idiopathic erysipelas, yellow fever, pyemia, influenza, pertussis, glanders, farcy, croup, puerperal fever. 3. *Medium*—five to eight days—relapsing fevers, gonorrhœa, vaccinia, inoculated small pox. 4. *Long*—ten to fifteen days—natural small pox, varicella, measles, rotheln, typhus fever, typhoid fever, mumps, malarial fever. 5. *Longest*—forty days or more—syphilis, and hydrophobia.

Small pox cases to be infectious in 56 days after appearance of evaption, modified small pox in 35 days; chicken pox in 17 days; measles in 27 days; rotheln in 14 days; scarlet fever in 49 days; diptheria 28 days; erysipelas in 36 days; typhus in 21 days; typhoid in 28 days and mumps in 21 days.

The Sanitary Journal.

THE GROWTH OF GALLS.

The ink we use to-day, or much of the best of it," said a well-known chemist of this city, "is an animal production, or, to be more correct, the result of the work of an animal. Insects as the cynipidæ, hymenoptera, cocidomyudæ and diptera puncture certain plants with their ovipositors for the purpose of depositing eggs, and in some way they cause an abnormal growth of the wood so that the larvæ are in time surrounded by a round ball of wood, out of which the perfect insect finally makes its way. These galls, or those of certain insects, constitute the principal ingredient of certain inks. In our common black ink Chinese galls and tincture of iron form the principal parts. Sometimes logwood is used, but each dealer has his own secret and, of course, claims to make the best ink.

"Galls are generally known by common names and their nature is little suspected by their finders. Many are known as oak apples and currant

berries and in some countries so beautiful are they that they are strung on wire and used in ornamental work of various kinds. The so-called Dead Sea apple is nothing more than a gall, produced by Cynips insano, and here are some that in California were called flea seeds. The person that sent them to me insisted that there was something supernatural about them. He brought them in a wooden box padded with cotton, to prevent them, he said, from being dashed to pieces, as they leaped about in the most astonishing manner. Some of them were what are called 'devil beans'. They are minute seeds, triangular in shape, and when placed upon the table they commenced to roll about and leap into the air in the most remarkable way. I cut one open, however, and soon showed the skeptic the motive power, which was a fat, light colored lepidopterous larva that when a moth, is known as Carpocapsa dehaisiana. It was the struggles of this grub that made the seed jump.

"The most curious seeds were those of the tree known as Brincador. They are about as large as those of the mustard, and when they fall from the tree they keep up a continual hopping upon the ground, so that you would assuredly think that innumerable sand-hoppers were jumping about. But the secret is that each little seed contains the larva of a small dark-hued Cynips salatorius. I have observed this myself, and the noise of the leaping seeds sounds like the pattering of rain upon the leaves, and they can hop a distance of several inches.

" The subject of galls is an important one aside from the fact that ink is obtained from them, as they are used as medicine in various ways. In India the Somali woman tattoo themselves with gall juice, and the blaster, dyer, etc., if they only knew it, are generally indebted to the material labors of the most insignificant insects. The importance of the gall business can be seen from this list, and these all go to the ink trade, and it only gives those that are imported into England yearly: Germany sends 100 tons, valued at $75,000; Turkey about 320 tons, valued at $200,000; Egypt, 08 tons; China, 70, Bombay, 100. In China thousands of persons get a living out of the gall business. They are known as woopei tsze and are produced by an aphis on an anacardiaceous tree. The galls are generally collected before winter, just previous to the first frost, and are generally submitted to steam, to kill the inclosed insect, and dried and then shipped by the pound or hundred weight."—*Philadelphia Times*.

STARCH IN LEAVES.

Sachs now demonstrates on a number of plants that the starch formed in the leaves during the day may disappear completely during the night and that the leaves shown to be full of starch in the evening may be quite empty of starch the next morning. This depends upon the temperature and health of the plant, but occurs normally during the summer in plants growing in the open air * * * * * * * *

The experimental proof is very simple. A leaf is halved longitudinally at night, after a fine, sunny day, and the excised half is shown to be filled with starch by the iodine test described. The remaining half is tested early next morning, and shows at once if any material diminution has occurred during the night. A simple and obvious modification of this experiment gives an idea of the quantity of starch formed between sunrise and sunset. The half leaf tested before sunrise shows no trace of starch; the other half left on the plant during the day is found to be more and more filled with starch during the afternoon. * * * * * *

Differences in the weight of the leaves and in the intensity of the color produced by the iodine test as well as some other observations, lead to a better understanding of a fact already known generally, viz: that the starch disappears from the leaves in the form of glucoses, which travel by way of the vascular bundles into the stems, and thus pass to the places where they are used up in growth.

Leaves used as fodder, etc, must differ in nutritive value to a very great extent if their starchy contents vary so largely during the day and night; it thus becomes of primary importance whether such leaves are gathered in the morning or the evening, in cold or warm weather, etc. The same applies to *tobacco* and *tea*, etc. It must make a vast difference to the smoker whether his tobacco abounds in carbohydrates or is relatively richer in the alkaloids. It appears that tobacco is habitually cropped in the morning in some countries, a fact which suggests what experience has already shown, that a difference in the quality exists; it will be interesting to inquire further into these matters.—*H. Marshall Ward in Nature. XXIX*, 554; *(from Bot. Gazette.)*

DEATH RATES.

In Montreal 1883.

Of French Nationality	37	deaths	per	1000	population.	
" Irish "	28	"	"	"	"	
" English "	18	"	"	"	"	
" Scotch "	16	"	"	"	"	

In Ottawa, 1883.

Of French Nationality	33	deaths	"	"	"
" Irish "	25	"	"	"	"
" English "	23	"	"	"	"
" Scotch "	16	"	"	"	"

In Toronto.

" French "	19	"	"	"	"
" Irish "	24	"	"	"	"
" English "	23	"	"	"	"
" Scotch "	16	"	"	"	"

In the *six* cities, Montreal, Toronto, Hamilton, Halifax, Ottawa and St. John all summed together, the rates stood as follows:

French	36	deaths	in	1000
Irish	25	"	"	"
English	21	"	"	"
Scotch	16	"	"	"
Roman Catholics	33	"	"	"
Church of England	23	"	"	"
Methodists	19	"	"	"
Presbyterians, less than	16	"	"	"

Among Roman Catholics the rates were in Montreal, 35; Ottawa 37 ; Toronto 26 ; Hamilton 24 ; and Halifax 21.

NOTES AND COMMENTS.

Eskimo fishing dams 1,000 years old are reported at Diggs Island.

The membership of the Entomological Society of Ontario numbers over five hundred.

The alligator has fifty two vertebrae, 9 cervical, 11 dorsal, 4 lumbar, 2 sacral, and 26 caudal.

172,863 tons of coal were exported to the United States in 1883 from the Cretaceous Coal fields of British Columbia.

According to Dr. Bell's observation, the Polar Bear feeds on grass whenever he can find sufficient pasturing ground.

Baltimore Oriole, *Icterus Baltimore*, is found at York Factory. And our fair Yellow Warbler, *Dendraeca æstiva*, gets there too.

Rev. T. W. Fyles, Quebec divides Butterflies, according to their flight, into those which are Kite-like, as *Papilio*, Bat-like, as *Attacus*, Bird-like as *Sphinges*.

$40,000,000 worth of gold was exported from British Columbia in the fifteen years previous to 1884. Nearly every stream in that rare country rolls over sands of gold.

Raised beaches are everywhere seen around the sterile shores of Hudson Bay and Straits to a height of 300 or 400 feet, and the sea is said to be subsiding at the rate of seven feet in a century.

The caterpillar of *Sphinx quadricornis* feeds upon the elm. It is the exact color of the shaded ribbed leaves of that tree. As the season advances the leaves sere, and *S. quadricornis* assumes a rusty brown hue also.

A new kind of fish says the Macon (Ga.) *Telegraph*, has been found in the waters of the Suwanee River, a few miles from Lawrenceville. They seem to be a cross between the salmon and shad, and are said to be very fine in flavor.

Some of the finest deposits of ore for making Bessemer steel in the world are in Hastings County, Ontario, but the extensive manufacturers of the United States are forced to import their ores for this purpose from Spain, owing to the influence of conflicting tariffs.

A new mineral is being mined at San Antonio, a few miles from Todos Santos Bay, Cal., to which the name of Antonite has been given. It is used for ornamental purposes, in imitating moire antique silk, etc.—*West American Scientist.*

Mr. R. W. Ells, M. A. of the Dominion Geol. Survey spent a part of last summer on P. E. Island endeavouring to settle the boundary between the Permian and Triassic, but left the matter as undetermined as he found it. There is evidently not room in the minor Province for broad geological distinctions.

M. Foye, a French astronomer, maintains that the earth is older than the sun. He says all the planets, from Mercury to Neptune, were formed first. The sun was a nebular mass far outside their orbits, and subsequently it passed over to the centre of the planetary system and collected there as the grand luminary which we know.

W. H. Harrington, Ottawa, describes 48 species of beetles infesting the hickory. One of the most curious of these is the *Oncideres cingulatus*, which deposits its eggs in punctures in the bark of small twigs, and then girdles the twig by gnawing a ring of bark off just below where the eggs are deposited. This kills the twig so that it falls, and the larvæ feed on the dead wood.

About a quarter of a mile from the Seaside House and about sixteen miles from Astoria, Oregon, there is a deposit of clam shells which is probably the largest of the kind in the United States. The shells cover an area of over four acres, and are in places ten feet in depth. Over one thousand loads have been hauled away to make roads, with scarcely a perceptible diminution of the immense deposit.

Considerable interest has been aroused by the statement of a Belfast (Me.) man that he had seen sea gulls on a pond in Dakota Mr. William W. Castle writes to the Belfast *Journal*, in which the statement originally appeared, that the birds were undoubtedly the young of *Larus Argentatus* or *Larus Delawarensis*, which were probably on their southward migration. The section to the north of where they were found is wet and is a breeding place for water fowl, and members of the *Laridae*, or gull family, are very numerous in its small lakes and rivers.

A bottle, to which a large bunch of bivalves had grown, was fished up recently by a Baltimore oysterman. Inside the bottle was a fish too large to get out of its mouth. It is supposed that the fish went into the bottle, and either liked its quarters so well that it tarried too long, or before it could find its way out had grown so large as to nearly fill the bottle. The bottled fish will be sent to the Smithsonian Institution.

Dr. R. Bell says:—During the ice period, the top of the vast range of Labrador stood above the ice and was not glaciated. This range is 6,000 feet high in the northern part. In the southern parts the hills have been planed to a height of 1600 feet by glacial action. As a rule, the glaciers moved toward the coast—in the south towards the Gulf of St. Lawrence, in the east towards the Atlantic. On the Island of Newfoundland the glaciation appears to have been from the centre towards the sea on all sides.

(And what about the great continental glacier which left the Grand Banks as a momento of its terminal moraine?)

Some interesting discoveries have been made in Florida by Prof Lawrence Johnson of the United States Geological Survey. Just south of Alachua county line he found several specimens and skeletons of animals which relatively belong to a not far distant period. In piles and somewhat mixed, there were the remains of a mastodon, two or three specimens of the rhinoceros, a large stag, a camel, fully as large as the Arabian camel, but in structure more allied to the llama; also a tapir very much like the South American tapir, which lives in swampy places; two teeth of some carnivorous animal allied to the tiger and panther; one set of teeth and bones of a hippopotamus, several crocodiles or alligators, and innumerable other bones not identified. Apparently the territory south of Alachua was at one time a large fresh water lake.

599 deaths occured in England from poisoning in 1882. 288 of these were suicides. The remaining 311 were from accident or negligence and are classified as follows: 85 from opium, laudanum and morphia; 78 by lead compounds; 34 by the four stronger acids hydrochloric, nitric, sulphuric, and carbolic; 14 by chloral; 11 by phosphorus; 9 by arsenic; 6 by chlorodyne: 4 by chloroform; and 4 by soothing syrup.

The Italians have erected a meteorological station at Massowah on the Red Sea.

117 are studying Botany in the Pictou Academy, N.S., during the present summer.

A Miss DeBlois of Bridgetown, N.S. gathered this spring, a number of blossoms of the mayflower, *Epigea repeans*, perfectly double.

Nardosmia palmata, of the *Compositai* is one of the earliest flowering plants in Nova Scotia. It is not uncommon in Pictou Co., N. S.

Gallium has been isolated by an industrial process by Dr. L. Ehrlig. Its melting point is 87° Fah. and the globules in which it was obtained had a luster greater than mercury.

The works of Darwin are not allowed to be issued from the circulating libraries of Russia, and a recent imperial decree puts those of Agassiz, Huxley, Lubbock, Adam Smith, Lewes and Spencer on the same list.

The Dominion Government has appointed an honorary Entomologist under the Minister of Agriculture. A very valuable report has already been issued by this Entomologist, Mr. Fletcher, of Ottawa.

Professor Heilprin at the Philadelphia Academy of Natural Sciences Dec. 4th, 1884, showed specimens of rock from New York containing particles and masses of serpentine closely resembling the so-called *Eozoon Canadense*, yet with sufficient difference to show clearly that they were formed by mineral accretion. He held that these specimens were enough to prove the non-organic nature of Eozoon.

LITERARY NOTICES.

The JOURNAL OF MYCOLOGY, edited by W. A. Kellerman, Ph. D. of Manhattan, Kansas, is valuable to the Mycologist.

The Bulletin of the "TORREY BOTANICAL CLUB" for April opens with a valuable paper on New Species of Fungi, with plates, by Charles H. Peck, of the University of New York. A number of other new and interesting matters fill its pages as usual. The Bulletin has given publication to much valuable botanical news and discovery since its inauguration.

TIDINGS FROM NATURE is a capital little magazine for young amateur scientists and extremely cheap. The April no. is the 8th number. Monthly, only 40 cents a year. Published in Rutland, Vermont.

SYSTEMATIC MINERAL RECORD by Edward M. Shepard. A. M., Professor of Biology and Geology, Drury College, Springfield, M o.

A useful little book of 100 pages, furnishing a valuable assistance to the student of mineralogy. In the study of any department of science it is of the utmost importance that the student should record in a form convenient for ready reference the results of his observation. In the case of mineralogy a set of analytical tables like the RECORD is almost indispensable.

The Bulletin of the NATURAL HISTORY SOCIETY OF NEW BRUNSWICK, No. IV. is at hand and comes up to the standard of excellence hitherto maintained by the reports of this Society. Following are the chief articles :—Ethics of law,' by the President; 'Preliminary list of the plants of New Brunswick,' by Prof. James Fowler, M. A. : 'The geology of Fredericton,' by W. T. L. Reed ; 'The Invertebrates of Passamaquoddy Bay,' by W. F. Ganong, B. A. ; 'Recent discoveries in the St. John Group,' by G. F. Mathews, M. A.

The North American Review concludes its seventieth year with its June number. It never had so large a circulation, nor greater influence, nor a more brilliant staff of contributors. This number discusses seven topics of vital public interest by no less than fourteen eminent writers, not including the short contributions in "Comments." "Shall Silver be Demonetized?" is answered, pro and con, by three distinguished economists, Summer, Laughlin and Walker, representing Yale and Harvard Colleges, and the Massachusetts Institute of Technology. "The Tardiness of Justice" is discussed by Judge W. L. Learned, and "Prohibition in Politics" by Gail Hamilton; "The Swearing Habit', by E. P. Whipple, and "French Spoliation Claims" by Edward Everett. The policy of the Roman Catholic hierarchy toward our Public Schools is assailed in a learned essay by a new polemic, Mr. M. C. O'Byrne, of North Carolina, and defended by Bishop Keane, of Virginia, with equal erudition. It is a most interesting double presentation of an impending issue. "How shall Women Dress?" is answered by Charles Dudley Warner, Elizabeth Phelps, Dr. W.A. Hammond, Dr. Kate J. Jackson, and Mrs E. M. King, the English leader of the dress reform movement.

THE AMERICAN NATURALIST for June has come to hand. "The relations of Mind and Matter" are treated in a very readable style by Charles Morris. 'Kitchen Garden Esculents of American origin," is continued from the May number, as is also the "Notes on the Labrador Eskimo and their former range southward." Of interest even to the most faintly botanical reader is "How the Pitcher Plant gets its leaves." The "Adirondacks as the site of a national Park" is discussed by Fallon. Then comes what is at all times the most interesting and valuable portion to the general scientific world, the voluminous series of classified notes of all the natural sciences. This is a 'multum in parvo' of all the natural science doings in the world. Yearly subscription only $4 00. McCalla and Stavely Publishers, No. 237-6 Dock St. Philadelphia.

CORRESPONDENCE.

Butterflies of Prince Edward Island.

When to expect the following Butterflies.

Last season we observed:

Vanessa antiopa, April 23rd,
Cynthia cardui, June 17th,
Argyrinis aphrodite, June 28th,
Papilio asterias, July 1st,
Nymphalia Artimesia, August 7th,
Hipparchia alope, August 12th,
Hipparchia nephele, August 12th,
Cynthea Huntera, August 16th,
Pontia oleracea, June 10th,
Colias Philodice, June 20th,
Copper Skipper, July 10th,
Bordered Skipper, September 7th,

F. BAIN, P. E. Island.

There is a patch of *Andromeda polijolia* in a bog at Upper Clyde Shelburne County. Will some one kindly state if it is found in other parts of Nova Scotia, and oblige

JAS. ROSBOROUGH,

Shelburne, June 2nd, 1885.