

third—these cases are more rare—it forms a plane, or leaf, in the middle of the lode. Again, it will be mostly found in the slate “casing” of the vein, and not in the quartz itself. In most cases which have come under my notice, however, the gold is scattered throughout the thickness of the quartz and casing; and is sometimes quite invisible to the naked eye. Until very recently, it has almost invariably been found that quartz lodes became richer in gold as they descended. Facts have lately come under my notice which tend to show either that this rule does not apply to all lodes, or that at least it does not apply to all beyond a certain depth.

I would like to conclude with some remarks upon the theories, which have been offered to the world as to the origin of gold in quartz; but to do so with any justice to the subject at all, would extend this paper to unreasonable limits.* I will only now say, with some hesitation indeed, and with all deference to the opinions of the many learned men who have discussed the subject, that the quartz veins of Nova Scotia, on a careful examination of them, seem to me to present serious difficulties, to the adoption of the theory that gold was deposited there from aqueous solution; and also to the adoption of the opposing theory, that its presence there is the result of igneous action. I suspect, perhaps with improper incredulity—that the secret of the formation of auriferous quartz deposits, yet remains to be divulged.

ART. VI. NOTES ON THE WEATHER AT HALIFAX, NOVA SCOTIA,
DURING 1865. BY COLONEL MYERS.

[*Read Dec. 4, 1865.*]

THE cold of the winter of 1864–5, seems for the most part to have expended itself during the latter part of December, 1864; and January, 1855, began, and continued throughout, mild and serene. The mean temperature was 22°, one degree less than that recorded on the same month of the previous year.

High winds prevailed during February, but the weather generally fine and mild for that month. Mean temperature 24°, being 2° less than in 1864.

*Perhaps I may, in some future paper, recur to this branch of the subject, which must be by far the most interesting to the scientific mind; but it is the most perplexing to deal with.

March generally fine, with an almost entire absence of the stormy weather which frequently attends the vernal equinox. Mean temperature 34° , being 6° higher than in 1864.

April was for the most part calm and fine, with indications of an early spring. Mean temperature 40° , exceeding that in 1824, by 4° .

The rainy, foggy, and unsettled weather of May, caused a serious interruption to agricultural operations, compensated, however, to some extent by the impulse given to the grass crop by the warm moisture. Mean temperature 49° , one degree higher than in 1864.

In June the weather was very fine and calm; but frosts, which occurred in some parts of the Province, did much injury to fruit trees and gardens. Mean temperature 58° , one degree higher than in 1864.

July was also a very fine month, most favourable to hay-making, which, in the neighbourhood of Halifax, began about a fortnight earlier than usual; and generally through the country the crop was safely housed. Mean temperature 60° , being 2° below that in 1864.

August generally fine, with the exception of some unsettled foggy weather towards the end of the month. Mean temperature 63° , one degree below that in 1864.

September very fine throughout. The autumnal, like the vernal equinox, was remarkably free from gales of wind. Mean temperature 57° , one degree higher than in 1864.

October, much unsettled weather during this month, with some gales towards the end of it. Mean temperature 44° , being 2° below that of 1864.

November unsettled, with much rain. The month ended with a heavy gale from S.E. Mean temperature 39° , the same as last year.

December generally fine for the season. A sharp, though short, gale occurred on the 21st, when the barometer fell to 28.51; and the 22nd, 23rd, and 24th, were very cold days. Mean temperature 24° , being 3° lower than in 1864.

The highest temperature in the shade recorded during the year, was 85° , on the 3rd August; the lowest— 6° on 23rd December. The highest monthly range was 49° in May; the lowest 35° in July. The yearly range was 91° .

The hottest month was August: the coldest January. The mean temperature was the same as last year, viz : 43.

The highest reading of the barometer during the year was 30.35, on the 14th March; the lowest 28.51, on 21st December. The highest monthly range was 1.59 in December; the lowest .59 in July and September. The yearly range was 1.84. The mean for the year 29.65.

The annexed table (see appendix), gives the monthly and yearly means and range of the temperature, and atmospheric pressure for the years 1863, 1864 and 1865, deduced from three daily observations. The comparison of these three years, one with the other, exhibits a remarkable equability as well in the monthly, as in the annual results.

The most prevalent winds during the year were N.W. and S.W.; the least prevalent E.

Rain fell on 136 days; snow on 52; hail on 3; fog occurred on 60 days.

Auroræ Boreales were observed on 55 nights; solar halos on 5 days; lunar halos on 12 nights; thunder storms occurred on 4th March; 25th May; 29th July; and 23rd October. Lightning was seen, but thunder not heard, on 23rd June; and 1st September. Thunder was heard, but no lightning seen, on 9th and 17th May.

The latest snow in the Spring fell during the night of 6th, 7th May; and its earliest appearance in the autumn was observed on the forenoon of 21st October. July was the only month entirely free from frost.

The weather during the year was generally fine. The winter of 1864–5 was remarkably mild, and broke up early. A humid spring was succeeded by an extremely dry summer, occasioning indeed inconvenience in some localities, but favourable to the hay crop, which throughout the country was abundant and of excellent quality; nor does it appear that other crops suffered to any great extent from the dryness of the season.

Drought, with the temperature above the average, seems to have been, in the past two summers, the abnormal climatic condition of many parts, not only of the American, but also of the European Continent; followed this year by great atmospheric disturbance in

the North Atlantic, and, in this Province, by a winter of unusual severity.

The storms, which, in the autumn and early . . . of the winter, swept with such destructive violence over the Atlantic, did not visit Halifax, whose exemption during another year from any remarkably stormy weather, tends to support the hypothesis of the late Judge STEWART, that it is the centre of a storm circle. Another idea, broached by the President at our last meeting, in connection with Mr. Hurdis' paper on the recent storms on the English Coast, is worthy of consideration, viz: "That tropical hurricanes take the course of the Gulf stream, and, repelled from this coast by the cold barrier caused by the Arctic current, pass to the eastward of Halifax, and are thrown upon the western coasts of Europe." Yet supposing this to be the case, it remains to be accounted for, why gales, which prevail in many of the neighbouring countries, approaching, in our own Province, as near as Truro and Windsor, so seldom reach Halifax. It may be, that storms, travelling from the south along the eastern coast of America, pursue their course up the Bay of Fundy, and, leaving Halifax to the eastward, pass on to the Gulf of St. Lawrence; but all that can at present be said is mere conjecture, nor are we expected to arrive at any satisfactory solution of the many difficulties which surround a question of such importance to our maritime and fishing interests, till stations shall have been established in different parts of the country, from which reliable reports of the course and strength of the winds at each place may be received daily. Extracts from the log-books of vessels, which, on approaching this Port, encounter stormy weather, would be of valuable assistance in the investigation of this interesting subject. Let the cause, however, be what it may, there is the fact, that Halifax is rarely visited by destructive storms. Its noble harbour too affords a safe refuge from the tempests without, and an easy access, at all seasons, to a country possessing a climate as fine and healthy as any in the world, with abundant resources, in its minerals, fisheries, and agricultural capabilities, the development of which opens to the capitalist a productive field for operations, and to the enterprising and industrious of all classes, a fair prospect of independence and prosperity. That Nova Scotia affords advantages such as these, ought to be widely published abroad, for, once known.

they will hardly fail to attract the tide of European emigration towards the Province.

Among the Auroræ Boreales observed during the year, two of very singular appearance, which occurred in the month of February, seem worthy of particular notice.

On the night of the 21st February, a fine Auroral Arch was seen to span the northern sky, from east to west, at about fifteen degrees above the horizon. At 9 P. M. the eastern extremity of the arch began to double under the other part, till it assumed the form of an oval, with the circumference nearly completed. Occupying the space in the sky from which the arch had receded, there then appeared a dark mass, resembling a huge rock, having the distorted arch to the westward, while from its eastern side bright streamers shot forth. The whole shortly afterwards broke up into luminous patches which spread themselves over the sky, even beyond the zenith; a belt of light remaining on the northern horizon till midnight. The second of these remarkable appearances was on the 25th February, when at 10 P. M. an arch was observed in about the same position as that last described, studded on the upper surface with luminous balls, if I may so term them, each having a halo of bright rays, presenting altogether a most magnificent object. Streamers were at the same time floating over other parts of the heavens. The arch, after having apparently absorbed its curious appendages, remained gradually decreasing in brilliancy, till about midnight, when it disappeared.

The following periodic phenomena were observed for the most part, at the Dutch Village:—

March—11th, flocks of wild geese passed over Halifax; 26th, Mayflowers picked in the woods near the tower; 29th, butterfly seen, and house flies make their appearance, a honey bee flying about, and “water boatman,” beetle stirring in ponds; 30th, grass sprouting in meadows.

April—1st, a cowslip, unprotected during the winter in a garden, in bloom; young leaves of clover fully formed; 3rd, young ants lively under stones; 4th, “Camberwell beauty,” butterfly about; 8th, lilac in forward bud, and frogs pipe at night; 9th, water spider in ponds; 10th, frog spawn in ponds; 11th, honey-

suckle in bud; 14th, aspen bursting into flower; 16th, migratory thrush sings at early morning; 18th, a swallow seen by Mr. Gossip, at Hoosier's River. I am not aware that an earlier appearance in this Province has ever been recorded. 26th, haccmatac, withrod alder, and blue berry in bud; large copper butterfly about; 27th, small blue butterfly appears; 28th, Mayflowers abundant, ants busy about their hillocks; 29th, white violet in flower; garden currant, and wild rose bursting into leaf; 30th, meadow crow-foot well up, swallows appear.

May—2nd, dandelion in flower; 30th, withrod bursting into leaf; 4th, dock in full leaf; 5th, blue violet in flower, lily of valley in full leaf, hermit thrush sings, black flies appear; 6th, leaves of white birch unfolding; 11th, blackberry and elderberry in leaf; 12th, wild strawberry in bloom; 14th, spotted snake first seen, red maple leaves bursting out; 20th, mountain ash, white birch, beech, blackberry, red maple, and wild cherry in leaf; timothy grass, pigeon-berry, and moose bush in flower; 21st, azalea flowers just opening, blueberry and wild cherry in blossom, balm of Gilead poplar in leaf; American toad about; 26th, apple, pear, and plum trees begin to blossom, buttercup in flower; 28th, aspen in full leaf; 31st, "painted lady" butterfly about.

June—1st, swallow-tailed butterfly first observed; 10th, white weed in blossom; 11th, wild strawberries ripe; 13th, small copper butterfly about; 22nd, brown cockchafer very abundant.

July—18th, pigeon berry in fruit; 28th, wild raspberries ripe.

August—10th, blackberries ripe and abundant.

September—2nd, leaves of white birch turn yellow, and begin to fall; 3rd, several maples turn colour in the Dutch Village woods.

October—11th, maple leaves falling fast.

December—2nd, snow birds seen on the common.

Wild fruits of the field and forest, were extremely abundant in the autumn, especially blackberries and huckleberries.

Before bringing this paper to a close, I would briefly advert to the progress Meteorology is making in the world. In England, the "British Meteorological Society," an institution of not many years standing, publishes every quarter its proceedings, containing a large amount of information, useful and important, not only to the scientific, but to almost every class of society. The system of storm

signals too, has been brought to that state of perfection, that the indications they give of approaching gales are rarely incorrect. Yet it is difficult to persuade men, especially sailors long accustomed to rely upon their own judgement with regard to the weather, to place that confidence in this practical application of science which it deserves. How different might have been the fate of the hapless steamship "London," had the storm signals, hoisted at Plymouth, when she was leaving that Port, been attended to: but it was probably the undaunted courage of the captain, so conspicuous throughout the subsequent trying scenes, and too great reliance on the powers of the fine ship he commanded, which caused him to disregard the warning; the deplorable result of which carried desolation and woe to many a bereaved household, and a thrill of horror to the hearts of all who heard the piteous tale of the foundering of that vessel, with upwards of two hundred souls on board.

From the governments of almost all the great nations of Europe, this branch of science is obtaining the attention it merits; and in Russia especially, measures are being adopted for its application to the foretelling of approaching storms, for the use of sailors and agriculturists, on a scale commensurate with the vast extent of that Empire. On the seaboard and inland, upwards of one hundred meteorological observatories, furnished with complete sets of instruments, have already been established, from which communications by telegraph are received daily at a central station. Nor are operations confined to the land, but are carried on extensively at sea under the directions of the government. Arrangements are also in progress with France, Prussia, Italy, Austria, and Holland, for a gratuitous interchange of meteorological observations between these countries.

Nearer home, there is in the neighbouring Republic the Smithsonian Institute, doing a vast amount of good in developing this and other sciences, encouraged by, though, I believe, independent, in a pecuniary point of view, of the aid of the government.

But leaving these old and well established countries, we find the governments of many of our own colonies becoming alive to the advantages to be derived from the cultivation of science among their people: Australia and Canada, not to mention others, liberally assist all efforts to that end. In the latter are several observatories, each

of which, if I am correctly informed, receives a Provincial grant for its support.

With such examples before us, we may surely venture to hope, that Nova Scotia never backward in promoting whatever has a beneficial tendency, will not refuse to extend a helping hand to this Institute, whose publication of its transactions every year is diffusing, at home and abroad, much valuable information respecting the resources and capabilities of this fine Province, but whose endeavours to become of more extended practical utility, are paralysed by the want of the pecuniary means, requisite to enable it to carry out effectually the objects it has in view.

ART. VII. NOTES ON THE ECONOMIC MINERALOGY OF NOVA SCOTIA: PART III.; LIMESTONE AND MARBLE. BY PROF. HOW, D. C. L., *University of King's College, Windsor.*

(Read Feb. 6, 1866.)

LIMESTONES.—These are found in practically inexhaustible quantities in the Province, where there is estimated to be a thickness of thirteen thousand feet of the various strata comprising the carboniferous system, among which limestones are frequent, especially in the lower carboniferous beds, which in fact consist largely of them and measure six thousand feet in thickness. This system is developed almost exclusively to the north and north-east of the capital, in which part of the Province upwards of eighty beds of limestone are indicated in Dawson's geological map; the rest of Nova Scotia, including the whole western portion and the southern shore, has but two small patches of carboniferous rocks. The limestones have sometimes been thrown by metamorphic action into the crystalline state, and frequently converted under these circumstances into marble, so that many varieties of this material are met with. Geological details respecting this deposit are given in Dawson's *Acadian Geology*.

The economic value of the limestones will probably always be found in the making of lime for washes, mortar and cement, and for manuring, and in their use as fluxes in iron smelting, since the great abundance of excellent freestone will almost preclude their use as a building material except in rubble work and making foundations. As