

incredible; while the adjoining State of Pennsylvania, to say nothing of others, might sustain a still larger number without encroaching upon an acre of land now used for stock-rearing, or any other purpose connected with agriculture.”\*

Here, then, we have a modern precedent for an experiment which I am convinced would answer in the case of the moose, a still larger and more profitable animal than the wapiti. What an admirable opportunity for utilizing those barren wastes which surround us! Take for example that large triangular piece of waste country commencing at Dartmouth, extending along the shores of the Basin on one side, bounded by the Dartmouth lakes on the other, and skirted by the railroad from Bedford to Grand Lake as its base. With the exception of a few clearings on the shores of the Basin, the whole of this is a wilderness, containing some 13,000 acres of wild, undulating land, with here and there thick spruce swamps, mossy bogs, and barrens covered with a young growth of birch, poplar, and all the food on which the moose delights to subsist. That they have an especial liking for this small district may be gathered from the fact that I have never known it as not containing two or three of these animals. There is no reason why an experimental farm, conducted on the principle followed by Mr. Stratton, should not be able to breed and turn out into this district a very large number of moose, and in such a state of tameness that they would be induced to remain within enclosed portions of the wilderness, furnishing, in proper season, a profitable supply of flesh for the market.

To the cariboo, on the other hand, these suggestions will not be applicable, as this animal requires, as a primary condition of its existence, a large and uninterrupted field for periodical migration.

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ART. III. NOTICE OF THE OCCURRENCE OF HEATHER (*Calluna vulgaris*) AT ST. ANN'S BAY, CAPE BRETON ISLAND. BY GEO. LAWSON, PH. D., L. L. D., *Professor of Chemistry, Dalhousie College.*

[*Read December 5, 1864*]

It gives me much pleasure to bring under the notice of members of the Institute, information and specimens which will, I trust,

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\*In 1862. Mr. Stratton states that he had succeeded in raising thirty-seven elk. He had trained a pair to harness, and had sold them for \$1,000. Whilst, as an article of food he can now raise elk cheaper than sheep.

be sufficient to show that *Calluna vulgaris*, the common heather of Scotland, is a genuine native of our Province of Nova Scotia. When in Cape Breton Island in August last, I obtained information from L. Robertson, Esq., of North Sydney, which led me to make special enquiry at St. Ann's, in the County of Victoria. On reaching that place I found that the *Calluna* was growing in a bit of boggy land among stumps of spruce trees, on an uncleared part of Ulston Farm, belonging to John Robertson, Esq., President of the St. Ann's Agricultural Society, who proceeded with me to the spot, and informed me that he had known the plant to have existed there for about ten years. It was originally noticed by a highlander when mowing, who immediately ran to his master, exclaiming: "I have found heather!" Full enquiry was made on the spot as to the whole circumstances, and I could not ascertain any fact tending in the slightest degree to indicate that the *Calluna* had been planted at St. Ann's. On the contrary, I believe it to be a genuine native. There was only a small patch of it, not more than a yard across, and it had been pretty well eaten down by cattle. Mr. Robertson kindly promised to have a fence put round it to preserve it from farther injury. The "surroundings" of the heather at St. Ann's are most appropriate. Both the scenery and vegetation resemble those of the Scottish Highlands. The cloudberry (*Rubus chamæmorus*), sundew, and many other highland plants, were abundant on the neighbouring hills. The *Calluna* station is probably not more than one hundred feet above the sea level.

Within the last few years an animated controversy has been going on among both European and American botanists as to whether the *Calluna* is really indigenous to the American Continent or to adjacent Islands. This is in reality a matter of great interest in a strictly scientific point of view, for it has important bearings on the questions of distribution, age and origin of species, and therefore, a reference to the opinions expressed and facts adduced by others, may not be unacceptable as an appendix to my own observations.

The *Calluna* is very general throughout Europe, spreading over extensive tracts of land in Britain, to which it gives the name of "heaths," and over the Continent generally, (not by any means

confined to the North,)\* and eastward to the Ural Mountains. That is its eastern limit, for it is not known in Siberia, has been only erroneously reported from the interior of Northern Asia, and is not found in North West America. Humboldt,† after detailing the distribution of heaths and the relations of the North and South African species to those of Europe, remarks, in reference to *Calluna vulgaris*:

“The accurate knowledge which we now possess of the mean temperature of several parts of Northern Asia, as well as of the distribution of the annual temperature into the different seasons of the year, affords no sort of explanation of the cessation of heather to the east of the Ural Mountains. Joseph Hooker, in a note to his *Flora Antarctica*, has treated and contrasted with great sagacity and clearness two very different phenomena which the distribution of plants presents to us: on the one hand, ‘uniformity of surface accompanied by a similarity of vegetation;’ and on the other hand, ‘instances of a sudden change in the vegetation unaccompanied by any diversity of geological or other features.’ \* \* \* \* No less striking is the absence of *Calluna vulgaris*, and of all the species of *Erica* throughout all parts of the Continent of America, while the *Calluna* is found in the Azores and in Iceland. It has not hitherto been seen in Greenland, but was discovered a few years ago in Newfoundland.”

According to Professor Asa Gray, the earliest published announcement of *Calluna vulgaris* as an American plant, is that by Sir William Hooker, in the Index to his *Flora Boreali-Americana* (vol. ii. p. 280), issued in 1840, where it is stated that: “This should have been inserted at page 39, as an inhabitant of Newfoundland, on the authority of De la Pylaie.” Accordingly, in the seventh volume of De Candolle’s *Prodromus*, to the European habitat is added, “Etiam in Islandia et in Terra Nova Americae Borealis.” But Dr. Joseph Hooker, in his valuable paper on the *Distribution of Arctic Plants*,‡ observes, “*Calluna vulgaris*, L. is mentioned in De Candolle’s ‘*Prodromus*,’ on the authority of a specimen gathered by La Pylaie, as a native of Newfoundland; but I find no confirmation of this habitat, nor is it found in any part of the American Continent.”

Mr. Bentham had never seen an American specimen, and, remarks Prof. Gray, “he also overlooked the fact (to which Dr. Seemann has recently called attention) that Gisecke, in Brewster’s

\* I have specimens from Italy.

† *Aspects of Nature*. Sabine’s Translation. Vol. ii. pp. 144-147.

‡ *Linn. Trans.* vol. 23.

Encyclopædia, records it as a native of Greenland. No mention of it is made by Dr. Lang, in his enumeration of the known plants of Greenland, appended to Rink's Geographical and Statistical account of Greenland, published in 1857,—from which we may infer that the plant is perhaps as rare and local in Greenland as in Newfoundland, or even in Massachusetts!" In the *American Journal of Science* for September, 1861, Professor Gray announced the unexpected discovery, by Mr. Jackson Dawson, of a patch of heath in Tewksbury, Massachusetts; adding the remark, that: "It may have been introduced, unlikely as it seems; or we may have to rank this heath with *Scolopendrium officinarum*, *Subularia aquatica*, and *Marsilea quadrifolia*, as species of the Old World so sparingly represented in the New, that they are known only at single stations,—perhaps late-lingerers rather than new-comers." Mr. Rand, after exploring the locality, gave a detailed account of the case, and of the probabilities that the plant might be truly native, Professor Gray adding a note to say that the probability very much depended upon the confirmation of the Newfoundland habitat. As to that, Dr. Gray had been verbally informed, in January 1839, by the late David Don, that he possessed specimens of *Calluna* collected in Newfoundland by an explorer of that Island. The Tewksbury habitat was fully described to me and interesting details afforded by Professor Hitchcock, junr., with whom I was a fellow-passenger through Massachusetts in November of last year. Mr. C. J. Sprague took up the subject, and after searching in vain for any publication of Pylaie's containing mention of this heath in Newfoundland, and finding that no specimen was extant in Pylaie's herbarium, or elsewhere that he could trace, he took a sceptical view, and in the Proceedings of the Boston Natural History Society for February and for May, 1862, he argued plausibly from negative evidence, against the idea that any native heath had ever been found in Newfoundland or on the American Continent. However, in the *Natural History Review* for April, 1864, Mr. Hewett C. Watson supplied the following additional evidence of the existence of *Calluna* in Newfoundland:—

"Specimens of *Calluna vulgaris* from Newfoundland have very recently come into my hands under circumstances which seem to warrant its reception henceforth as a true native of that Island. At the late sale of the Linnæan

Society's Collections in London, in November, 1863, I bought a parcel of specimens, which was endorsed outside, 'A collection of dried plants from Newfoundland, collected by — McCormack, Esq., and presented to Mr. David Don.' The specimens were old, and greatly damaged by insects. Apparently, they had been left in the rough, as originally received from the collector; being in mingled layers between a scanty supply of paper, and almost all of them unlabelled. Among these specimens were two flowerless branches of the true *Calluna vulgaris*, about six inches long, quite identical with the common heath of our British moors. Fortunately, a label did accompany these two specimens, which runs thus: 'Head of St. Mary's Bay—Trepassey Bay, also very abundant. S. E. of Newfoundland considerable tracts of it.' The name *Erica vulgaris* has been added on the label in a different handwriting. All the other species in the parcel (or nearly all) have been recorded from Newfoundland, so that there appeared no cause for doubt respecting the *Calluna* itself. And, moreover, the collector had seemingly some idea that an especial interest would attach to the *Calluna*, since in this instance he gave its special locality, and also added two other localities on the label. But there is very likely some mistake in the name of the donor to Mr. Don. It is believed by Sir William Hooker that he was the same Mr. W. E. Cormack, whose name is frequently cited for Newfoundland plants in the *Flora Boreali-Americana*. This gentleman was a merchant in Newfoundland, to which he made several voyages. We should recollect that the *Calluna* advances to the extreme western limits (or out-liers) of Europe, in Iceland, Ireland, and the Azores. The step thence to Newfoundland and Massachusetts, though wide, is not an incredible one."

I hope that some gentleman in Newfoundland will be induced to take the trouble of instituting the necessary inquiries to elicit some more definite information as to the Newfoundland habitat. So many other shrubs have been mistaken for heather in Nova Scotia and other parts of the world, that it is necessary to accompany any observations with specimens from the locality.

The occurrence of this common European plant in such small quantities in isolated localities on the American Continent, is very instructive, and obviously points to a period when the heath was a widely-spread social plant in North America as it still is in Europe, where oft-recurring fires are yearly lessening its range. The late Professor Edward Forbes, Dr. Joseph Hooker and Mr. Darwin, all agree in advocating a southern migration of northern types "due to the cold epochs preceding and during the glacial," and since Dr. Hooker has shown that the Arctic flora is essentially a Scandinavian one, there is no difficulty in finding in this theory an explanation of the way in which *Calluna* might have reached the eastern coast of America. There are, however, other explanations. At last meeting of the Institute, our President ever active in the cause

of science, showed us an extremely interesting specimen of a bird that is apparently fast following the Dodo, and may soon become extinct, if not so already. In *Calluna* we have probably an example of a species on the verge of extinction as an American species, while maintaining a vigorous and abundant growth in Europe. If so, may not Europe be indebted to America for *Calluna*, and not America to Europe? But I must not open up so important a question as the origin and history of our species, while so little is known of the botany of the Maritime Provinces of British America.

In a letter from Professor Asa Gray, of Harvard, October 4, 1864, to whom I had sent a specimen of the *Calluna* from St. Ann's, he remarks: "I am much interested in the smallness of the amount of the plant in your station,—just as in that in this State,—confirming my view that it is now a mere remnant of what was once more diffused."

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ART. IV. NOTE ON LEMANIA VARIEGATA OF AGARDH. BY GEORGE LAWSON, L.L.D., Ph. D., *Professor of Chemistry and Natural History in the Queen's University of Canada.*

[Read December 5, 1864.]

THE correction of errors in science is a very slow process. In the first part of the second volume of Bishop Agardh's "Species Algarum," published in 1828, an alga said to have been found "in *fluviis Americae borealis*," was described under the name of *Lemania variegata*. Agardh's original description of the plant appears, however, to have been published in the Stockholm Transactions in 1814, to which I have no means of access at the present time. The specimen upon which the species was founded had been given to Agardh by Olaf Swartz, his first master in Algology, who obtained it from the collector, the Rev. Dr. Muhlenberg, of Lancaster, in Pennsylvania. Not having been met with by subsequent observers, *Lemania variegata* has been looked upon as a long-lost plant.

In a parcel of specimens of cryptogamic plants sent to me in August 1862, by Mr. John Macoun, of Belleville, Canada West, a

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\*Read before the Botanical Society of Edinburgh, 9th April, 1863.