Proceedings of the Nova Scotian Institute of Science (2023)
Volume 53, Part 1, pp. 59-81

ARBORETUM NOVA SCOTIA: TITUS SMITH JR.'S *OBSERVATIONS OF THE NATURE AND USES OF TREES*

RICHARD H. FIELD*

Saint Mary's University, Halifax, NS B3H 3C3

ABSTRACT

The focus of this essay is Smith's unpublished manuscript on the *Observations of the Nature and Uses of Trees* that he attached to the final report of his 1801-1802 colonial surveys tabled by the treasurer Mr. Michael Wallace in the Nova Scotia House of Assembly on 9 March 1802. The existence and importance of this unpublished manuscript was noted on 26 June 1866 at the Field Meeting of the Nova Scotian Institute of Science held at Ashbourne. Smith uses common names and Linnaeus's taxonomic system of classification to identify and describe the distribution, habitats, and European and Indigenous uses of specific tree wood, bark, leaves, and fruit.

INTRODUCTION

Over two hundred years ago in 1802, Titus Smith Jr. [1768-1850] returned from his government sponsored journeys into the relatively unknown interior of Nova Scotia (Field 2020: 351-361) captivated by the lure of the deep Acadian forest (Loo & Ives 2003: 462-463). The majesty of a variety of imposing trees, and his encounters with multitudes of plants, birds, insects, mammals, and reptiles living between the forest canopy and the forest floor in a thriving ecosystem grounded his insights about the relationship between humanity and the environment, and inspired his Theory of Ecological Succession (Gorham 1955: 116-119). Thirty-three years later, on the evening of 14 January 1835, when Smith presented his most important lecture to the members of the Halifax Mechanics' Institute on the "Natural History of Nova Scotia," he was still in awe of the colony's forests (Field 2019: 118-123). "For, rough and rude as our forests appear, they form a portion of the 'garden of God.' In all their various productions, there is nothing superfluous or out of place. The student of natural history in America possesses one advantage over the inhabitants of

* Author to whom correspondence should be addressed at A00002239@outlook.com

its mother country. He has under his eye tracts where the works of nature have not been disturbed by man" (Smith 1835: 642).

THE ACADIAN FOREST

Smith, however, was not the first explorer/naturalist to extoll the majesty of the Acadian landscape. Sailing along the sandy-red coastline of Prince Edward Island during his first voyage in 1534, Jacques Cartier [1491-1557] drew attention to vegetation and animal life that was surprisingly similar to that of France. By his third voyage in 1542, he was absolutely demonstrative about the richness of the soil that produced vines heavy with grapes and mulberries, while the oaks, cedars, and beeches he found fairer than those in Europe (Cook 1993: 22-23).

Less then a hundred years later, the grandeur of the Acadian forest and the natural bounty and richness of its soil also deeply impressed Richard Guthry. In the summer of 1629, the Scots established two colonies in Nova Scotia, the first on Cape Breton Island, which the French destroyed a month later (Nicholls 2005: 109-123), and the second at Port Royal, which reverted to French control under the terms of the 1632 Treaty of Saint-Germain that re-established their claim to Acadia. Providing for the first time reliable documentation about a previously obscure colonial enterprise, the manuscript firmly established the importance of the New Scotland Colony at Port Royal during the first decades of the seventeenth century (Griffiths & Reid 1992). Unfortunately, historical information about the author is frustratingly unknown, although Guthry's baptism of a boy in Newfoundland tantalizingly points to a life in the clergy. Guthry felt obliged to begin his narrative by thanking an unnamed benefactor. "It pleased your honour at my departure from England to lay a charge upon me, to writt a particular relation of our Voyage at Sea and of the nature and condition both of people and Country" (Griffiths & Reid 1992: 500).

Guthry successfully accomplished this request by providing personal observations and descriptions about the geography, natural history, and Indigenous peoples of the region. He also commented on the magnificence of the woodland landscape surrounding Port Royal. "Fruitfull vallies adorned and enriched with trees of all sorts, as goodly oakes, high firres, tale beich and birch of incredible bignes, plaine trees, Elme, the woods are full of laurall store of ewe, and a great

variety of fruit trees" (Griffiths & Reid 1992: 503). Like Cartier, he also remarked on the richness of the soil and recognized wild herbs, and roses similar to those cultivated in England. At Port Royal he stated, "The land is most fertile: for I myself caused dige and hedge a garden platt of sixty foot in length and thirty in breed, and sowed onions, cabbage, turneps, carrets, sorrel, parsneps, Radishe, pise, and some barley to make a tryall, and to our admiration we had them above ground, some in tuo, some in three, some in four dayes, though it was a dry Season, not having rained a moneth, and being the latter end of August" (Griffiths & Reid 1992: 504).

Guthry used Eden like language common to other explorers who described the forested landscapes from Acadia to Quebec. For example, while at Quebec, Pierre-François-Xavier de Charlevoix [1682-1762] remarked that "Nothing is more magnificent to the Sight; the Trees lose themselves in the clouds; and there is such a prodigious Variety of Species" (de Charlevoix 1766). Throughout the document, like Smith, Guthry echoed Francis Bacon's [1561-1626] opinion that nature is a storehouse of raw material benevolently bestowed by God on humankind during creation. Guthry expressed in his buoyant writing style that through God's grace the fertile land produced "… a rich crope of whatsoever we trust to the earth" (Griffiths & Reid 1992: 504).

THE NATURALIST'S FIELD JOURNAL

One would have thought that by the end of the eighteenth century the enchanting allure of Nova Scotia's Acadian forest would have faded, and that the knowledge about the natural history and resources of the woodland interior was more or less known, but that was not the case. Surprisingly, by 1800, the inland waterways, and lakes, forests, rivers, and mountains of Nova Scotia still remained largely unexplored by Europeans until Lieutenant Governor Wentworth [1737-1820] commissioned Titus Smith Jr. to survey the interior parts of the colony [Nova Scotia became a province in 1867].

In a letter dated 2 May 1801 [Appendix 3], Wentworth outlined instructions for Smith to conduct surveys of the Eastern and Western interior parts of the colony and to communicate his findings in the form of a journal. Wentworth's orders to Smith were explicit. "Your principal object in this survey will be to visit the

most unfrequented parts, particularly the banks and borders of the different rivers, lakes, and swamps, and the richest uplands, for the purpose of discovering such spots as are best calculated for producing hemp and furnishing other naval stores" (Lawson 1972: 209). In addition, Wentworth instructed Smith to evaluate the soil, portray the landscape, determine the species, size, and quality of timber, and estimate the number of acres suitable for cultivation. Smith also was to record topographic details and correct local place-names on the poorly drawn existing colonial map. Two factors prompted the government to finance these journeys. First, the geography and natural history of the interior was mostly unknown. Secondly, following the loss of the American colonies, the Admiralty looked to Nova Scotia to find new sources of naval supplies and questioned Wentworth about ascertaining the ready accessibility of mast-grade pine, deck timbers, wood suitable for ship's knees, and appropriate sites for growing hemp used in manufacturing canvas and rope (Gwyn 2001: 5,8,13).

Smith accomplished his commission as Wentworth requested by communicating his findings in journals. Just as the documentation attached to botanical specimens found in historical herbariums identify the collection of plant species in space and time, so do the field journals of naturalists. The journal is a primary source that makes fieldwork empirical through quantitative measurement and qualitative analysis. Smith's two original leather-bound journals from his 1801 and 1802 Eastern and Western surveys of the interior of the colony, measure 4 x 6 inches and 3 x 7 inches respectively (Field 2020: 361-362). Both journals, which would have fit neatly into Smith's breast or back pocket, are not specific to these journeys, but were also used to record observations related to other fieldwork. For example, the notebook of his Eastern Tour covers a period of 35 years, from 1801 to 1836. Noteworthy is Smith's sometimes-shaky handwriting emphasizing the first-person narrative of his note taking. Importantly, Smith often augmented his initial observations with annotations in the page margins of his journals, and recorded his personal observations and reflections on colonial society, giving accounts ranging from the farms and communities he encountered, to the plight of the Mi'kmaq.

As Cathryn Carson pointed out, "… the field notebook or journal, sits at the crossroads of literary subjectivity and methodological objectivity, re-marking an interaction of the humanities and science" (Carson 2007: 6). Thus, using primary historical sources such as field

journals in ecological studies can create various degrees of complexity (Tappeiner *et al.* 2020: 2318). They can be compromised by the training of their authors, undermined by contrasting tendencies towards generality versus particularity, mismatched in the scale and precision of data collection, damaged or incomplete, or hampered by differing spatial and temporal frames of reference, particularly before 1800 (Pooley 2013: 1481).

Szabó and Hédl elaborate "… most differences stem from miscommunication between ecologists and historians and are less substantial than is usually assumed. Cooperation can be achieved by focusing on the features that ecology and history have in common and through understanding and acceptance of differing points of view. We argue that historical ecological research can only be conducted at extents for which sources in both disciplines have comparable resolutions" (Szabó & Hédl 2011:680). For Pooley, "… this lack of ecological data is really an opportunity for ecologists to gain from history" (Pooley 2013: 1481, Szabó & Hédl 2011: 685). Pooley's point is well taken. Problems arise when the relationship between the two disciplines is too broadly framed. Very specific historical sources, such as species lists, journals, diaries, illustrations, collections of flora and fauna, and correspondence have proven invaluable in which Smith's observations recorded over 200 years ago about the nature and uses of Nova Scotia's forest reserves is a case in point.

FOREST COMPOSITION

As Smith traversed the interior of mainland Nova Scotia "… with an eye out for good pine, Smith classed the lands he saw by the value of their timber as "burn" or "barren," both of which he estimated at over a million acres" (Leeming 2012: 54). Smith described the "barren" tracts of land as the principle source of our brooks and rivers, as the solid rock of which they are comprised are incapable of absorbing the water like the earth, noting that some parts of the barrens that appear to be loose broken stone, commonly have solid rock a few feet below the surface, and the barren valleys of loose broken stone, which have water within them three or four feet from the surface, frequently have a thick growth of Spruce and Fir, 30 or 40 feet high (Smith 1835: 652-658, Hawboldt 1955).

However, when discussing the "burns" caused by nature or by the deliberate torching of the woodlands by humans, Smith was clearly concerned about the role that colonists played in initiating these blazes:

> "The great influx of inhabitants in 1783, produced in the course of a few years, a complete change in the appearance of the forest. A great number of new settlements were formed. The fires necessary for clearing the land were communicated to the spruce thickets, and spread frequently as far as they extended. The profusion of herbage which followed the fire, for a time furnished a pasture for cattle. This failed in three or four years. The next dry season the fire was rekindled, for the purpose of renewing it, which it would do in a less degree. Raspberries, French willow, and other vegetables would appear upon part of the ground, but of inferior growth. The roots of the spruces and balsam fir spread horizontally, and take but slight hold of the ground. Being loosened by the sinking of the turf, they are overthrown by every wind, and furnish fuel for successive fires, which are usually rekindled every dry season by design or negligence till…the ground becomes so much exhausted, that it only produces a growth of healthy shrubs" (Smith 1835: 651).

It was during these colonial surveys for Wentworth that Smith began to record in his journals changes he observed in the landscape caused by profound natural or human disturbances, which is expressed in his classification of the land as "burn" or "barren." Some of these very formative ideas, which eventually became the basis of his Theory of Ecological Succession (Gorham 1955: 116-119, Smith 1835: 645-657), are also found in his comments about the habitats of the trees he discussed in his manuscript on the *Observations of the Nature and Uses of Trees* [Appendix 1]. For example, in entry 2 [White Pine/*Pinus strobus* L.] he noted, "It grows naturally in every kind of barren soil, whether wet or dry. It is to be found in all rocky barrens, but it is there so short and scrubbed as to be of no value. The best pine is to be found on a sandy soil, which is not very rocky, or very near the sides of lakes." While in entry 11 [White Birch/*Betula papyrifera* Britt.], he stated "This tree always forms the principal part of such forests as grow up when the original growth of Timber has been destroyed by fire provided the soil is not extremely barren."

When Smith arrived in Nova Scotia with other Loyalists escaping the American Revolution in 1783, he was only 15 years old. Eighteen years later, he was journeying through the interior of the colony for Wentworth. Thus, as early as 1801, Smith began to understand that nature was not a closed system and that disruptions to ecological communities, whether caused by natural or human events, resulted in new associations between species. The point here is that it took Smith over three decades to formally present his ideas about recurring changes in nature, which he did on 14 January 1835, in the second of two public lectures before the Halifax Mechanics' Institute [1831-1862]. This landmark presentation delineating the natural and human forces behind the process of plant dispersal and succession was subsequently published in the December issue of London's *The Magazine of Natural History* as "Conclusions on the results of the Vegetation of Nova Scotia and on vegetation in general, and on man in general, of certain Natural and Artificial Causes deemed to actuate and Affect them" (Smith 1835: 641). The very title itself lays out Smith's continuing concerns about how disruptions to the natural environment impacted species composition. For example, with regard to forest communities, "Smith remarked that the hardwoods, dominated by beech, occur mainly on the hills, where also the best soils are found. His explanation is that the frequent fires in the lowlands allow nutritive products of organic decay to escape into the air, whence they are blown to the hilltops where the hardwoods absorb them. Probably the burning did have an effect through keeping the communities at an early stage of seral development; and of course the impeded drainage of the lowland causes much of it to be covered with spruce and larch bog …" (Gorham 1955: 120).

For Smith, human caused fires were the most important instigator of these changes, first by destroying the existing symbiotic relationship between species, which often created "barren" land, or by renewing it to provide conditions for a new palette of species to flourish, particularly after the spring rains swept down across the fire-blackened earth turning it a light green. This same conclusion was also reached in the *Nova Scotia State of the Forest Report 2016*, which stated that, "… most fires are caused by humans and the greatest number occur in spring" (Nova Scotia Natural Resources 2016: 1). Smith elaborated on this process. "The naked black surface is now exposed to the sun, and the process of putrefaction commences in earnest, affecting the

turf as well as the roots of the vegetables which have been killed by the fire. The increased temperature of this natural hotbed brings into action the vegetative powers of seeds which had lain dormant for centuries; raspberries spring up in abundance, together with red-berried elder, birdcherry, sumach, prickly aralia, and evergreen fumitory" (Smith 1835: 646). However, Smith also pointed out that "… from the time that a growth of young wood, springs up, till the forest has reached its full size, the ground that it covers is becoming everyday more fertile; but when the wood is destroyed, and prevented from returning … it is for many years constantly becoming more barren …." (Smith 1835: 642).

While Smith did comment on other natural disturbances such as the "blowdowns" he witnessed north of St. Margaret's Bay when miles of trees were blown over during the great storm of 25 September 1798 (Taylor *et al.* 2020: 390), he was more vexed by the extensive damage caused by wildfires to forest ecosystems. On 09 July 1801, one day after leaving on his Western Tour towards St. Margaret's Bay on the foot-way from Dutch Village, he wrote in his journal, "For about 3 Miles from the Bay, the timber has been destroyed by fire; above that, it is chiefly spruce, hemlock, and pine with very little hardwood in some places" (Hawboldt 1955). On 15 July near Gold River, he wrote, "… the land after we passed the first river has had the timber destroyed by fire, probably 30 or 40 years ago, and is covered with a young growth (Hawboldt 1955). Finally, reaching Shelburne on 01 August he remarked "… many of the Hills near Shelburne would produce good Pine were it not that Fires are so frequent that it does not get time to grow" (Hawboldt 1955). Smith was also informed about a massive fire that occurred in 1720, which destroyed over 150,000 hectares of forest in Queens and Lunenburg counties (Taylor 2020: 390-392).

It is therefore not surprising that similar devastating fires were also recorded in the historical records of other explorers and settlers. Nicolas Deny [1598-1688], who arrived at present day La Have in 1632, reported in his *Description and Natural History of the Coasts of North America (Acadia)* published in 1672, "… that sometimes from spring to autumn, thunder strikes in the woods can cause fires that last three to four weeks unless rain falls, which can burn 10 to 15 leagues [50 to 75 km] of country" (Taylor *et al.* 2020: 390, Deny 1672). In 1800, Simeon Perkins [1735-1812], who settled in Liverpool in 1762, as part of the New England Planter migration to Nova Scotia, recorded in his

diary a fire south of Lake Rossignol that burned an estimated 175,000 hectares (Taylor *et al.* 2020: 392). As Leeming noted, "Smith's reports, emphasizing the large acreage of potential forest wealth lost to fire, is the first clear documentary link between the state's involvement in the scientific measurement of available resources, the regulation and promotion of their use, and the prevention of wastage through fire" (Leeming 2012: 54). Consequently, Nova Scotia's woodlands have undergone a long history of clear-cutting, timber harvests, human and naturally caused fires, and the introduction of non-indigenous invasive species that have all altered the age and historic composition of Nova Scotia's forests (Taylor *et al.* 2020: 390).

As a result, "… Nova Scotia's forests today are, on average, younger, and more fragmented, and the trees of smaller stature than recorded in the comments by Smith. There is also an altered tree species composition" (Taylor *et al.* 2020: 390). All this is evident from Smith's information on the primary tree species of the colony. For example, Beech is suggested by Smith as one of the species dominating the hardwood forest of Nova Scotia, which "… forms the greater part of the Woods in our best land …" [Appendix 1, entry 13]. More recent inventories suggest Beech forms a much smaller component of the forest, now superseded by Sugar Maple and Yellow Birch (Townsend 2004). This decline in the proportion of Beech may be due to the impact of the invasive alien Beech Bark Disease which has devastated Beech in many areas (Farrar 1995). Another species devastated by an alien fungal disease is the American Elm affected by Dutch Elm Disease (Farrar 1995). However, Smith indicates even then Elm was rare. Recently, it was not found in any of the 3,250 random plots placed in Nova Scotia forests (Townsend 2004). Overall the composition of the forest has changed since Smith's inventory, probably, in large part, the result of tree harvesting over the last 200 years. The principle species listed by Smith include white and red pine, hemlock and sugar maple. Today, Balsam fir, Red Maple and Red Spruce are the most dominant species in Nova Scotia (Townsend 2004). The long history of tree harvesting since Smith's report is likely the most significant cause of the dominance of Red Maple and Balsam Fir because these species frequently dominate cut areas, post harvest, in Nova Scotia (Stewart and Quigley 2000). With a changing climate, continued exploitation of timber and the introduction of new alien pests [e.g. Emerald Ash Borer and Hemlock Wholly Adelgid], the future structure and

composition of Nova Scotia forests is uncertain. Smith's study provides one benchmark with which to measure future changes to the forest of Nova Scotia (Cameron R. (2023, pers. comm.).[1]

SMITH'S OBSERVATIONS OF THE NATURE AND USES OF TREES

At the previously mentioned Nova Scotian Institute of Science meeting on 26 June 1866, the President J. Mathew Jones noted in his introductory remarks not only the significance of Smith's manuscript, but also the fact that he worked on it while conducting his government journeys. "Being employed in different provincial surveys in the interior he had ample opportunity of pursuing his favourite study, and made such good use of his time while in the forests of these expeditions, that he was enabled to write a concise history in manuscript of Nova Scotia Forest Trees and Shrubs, which contains much valuable information" (Jones 1867: 149-150), Field 2020: 354-361).[2]

In Smith's never before published *Observations of the Nature an Uses of Trees* [Appendix 1], Smith describes the distribution, habitats, and European and Indigenous uses of specific tree wood, bark, leaves, and fruit, which also included a separate *List of Trees* [Appendix 2] that was previously published by Andrew H. Clark (1954: 308-310) and Evile Gorham (1955: 122-123). Smith's Latin designations are based on his ownership of Linnaeus's *System Naturae* [1758], which was gifted to him by Governor Wentworth, and according to Harry Piers, marked "… the commencement of scientific taxonomical botany in Nova Scotia" (Piers 1938: 22-23).

Please note that except in a few instances for clarification purposes, Smith's spelling, grammar, and sentence structure have been maintained.

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[1] I want to thank Dr. Robert Cameron for providing helpful information on changes in forest composition since the inventories carried out by Smith.

[2] Also, my sincere thanks to Grace McNutt for the transcriptions of Smith's original documents.

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APPENDIX ONE

Observations of the Nature and Uses of Trees

1. Larch, Hackmatac or Juniper

This is the strongest and most durable timber among the trees of the Pine kind, which we have, but it does not grow to a large size being seldom more than a foot diameter. It is seldom used for any purposes except making fencing poles; for which it answers better than any other timber but the poles should not be too small, for the sap which is usually about an inch thick, decays very soon. It grew naturally in very barren places, either upon very poor, dry gravel, upon rocks or in cold mossy swamps.

2. White Pine

This tree is the tallest of any that grew in our records, although it does not come near the height of White Pine of New Hampshire and some other parts

of the American states: here we consider it to be a large pine, which is 3 feet diameter and 60 feet high to the branches. I have seen a few trees which were 4 feet diameter. The timber is generally shakier (full of small cracks) than it is in the States: owing probably to the high winds which bend the trees backwards and forwards, and the situation of the trees, which most commonly grew by the sides of lakes, where they are much exposed to the Winds.

The use of the tree is well known, oars are chiefly made from it as are also shingles, building timber, masts, yards, etc. There is no timber we have so easily worked. It grows naturally in every kind of barren soil, whether wet or dry. It is to be found in all rocky barrens, but it is there so short and scrubbed as to be of no value. The best pine is to be found on a sandy soil, which is not very rocky or very near the sides of lakes.

3. Yellow Pine

This is frequently called Pitch Pine, but I do not think there is any real pitch pine in the Colony. This is a better tree for mast timber than the white pine of this country when large enough as it is usually straight which is seldom the case with white pine and it has no branches till near the top. A tree 2 feet diameter is generally 60 feet high to the branches. It grows in the same soil as white pine but is much more scarce.

4. Hemlock

This is one of our largest trees: it is commonly from 2 to 3 feet diameter, and 60 or 70 feet high. It has the figure of the White Pine as the trunk diminishes very little till it reaches the branches, which usually begin about 40 feet from the ground. This tree is remarkably shakey which prevents it from being much used for plank or boards, or even for building timber. It is used for Wharf logs and all our laths are made from it. The most valuable part of it is the bark which is very good for tanning leather. The wood is used for fuel by the bakers but crackles to much to burn in an open fire. It grows most commonly in gravelly soils, which are poor, but better than the soil of pines. It grows also, but more rarely upon a clayey soil, which is sometimes very good.

5. Balsam Fir

This is not a large tree being seldom more than 15 inches' diameter. It is very straight and tall and forms a very regular cone by means of its branches. The wood decays very soon if exposed to weather. It is much used for fencing small tubs and buckets as it is very light. It is also much used for fencing poles and pickets, as it is more frequently found of a proper size for these uses than any other kind of wood. The balsam is contained in their white membranaceus bladders which lie in the substance of the bark very near the outside. It abounds most in those trees which are thrifty and grow the fastest provided they are shaded. That balsam is best which is collected from the tops of very young trees, being much more valuable and pungent than that which is found upon old ones. It is a good remedy for pains in the breast, internal bruises, and the rheumatism which is the consequence of hard drinking.

The bark of very young trees is mucilaginous a decoction of this is often useful in the gravel and in most cases where directions are needed. It is of great use in long continued coughs, which threaten a consumption, and may be given in safety where the balsam itself cannot on account of fever. The balsam is applied to fresh wounds, but it frequently does harm causing inflammation. The Indians make a kind of Poultice of it by scraping and pealing the bark of very young trees into a mucilage, which is a very good application to fresh wounds: fir grows in almost every kind of soil, but thrives best in that which is moist and rich.

6. White Spruce

This is a large tree much resembling the red spruce: it is however a hard wood and a stronger timber. It is never used for making small beer as it has a disagreeable smell and taste. It grows on poor gravelly land and is not plenty in any place that I have seen.

7. Red Spruce

This is the tallest tree we have except the White Pine. It is commonly straight. The top takes the figure of a cone. It is much used for building timber, mast timber, and boards, and sometimes for shingles: it is stronger than white pine for many but the boards are much inferior to Pine for many purpose, as they decay much sooner if exposed to the weather, are very hard to plane, and very subject to warp and shrink.

It is more plenty than pine and consequently more used for mast and building timber. It grows in dry gravelly land in general which is neither very fertile nor very barren.

8. Black Spruce

This is probably a variety of the red spruce, occasioned by the difference of the soil. It grew in the most barren places, on rock, in wet mossy swamps, and on very barren land or gravel. The wood is harder than that of Red Spruce, owing to its slow growth for every kind of soft wood is harder in the part where the grains or years growth join and consequently the timber is firmest in those trees which grow the slowest as this hard part is of nearly the same thickness whether the grains is thicker or thin. The leaves are a trifle larger than those of Red Spruce and have a little difference in their taste. The use of this for making beer is well known, the Red Spruce is sometimes also used in beer but is said to give it a pungent quality. I imagine that this is owing to turpentine, which is much more commonly sticking to the branches of the Red than the black spruce. The black spruce when large enough the timber is much inferior to the red for the grain always twists very much, and it is almost always very knotty, the branches growing nearly the whole length of the tree.

The roots of both the red and the black spruce do not strike into the ground, but spread horizontally, covered only by the turf and moss which always overspreads such land as spruce grows on.

9. Mountain Pine

I have never seen this tree, except on the tops of high hills of Rock where it is very short and scrubbed, that I cannot judge what size it might grow to in suitable soil. It is very scarce; its leaves are not more than half the length of those of White Pine. The cones (Strobili) which contain the seed differ remarkably from those of other pines being nearly as hard as bone.

10. Black or Yellow Birch

This differs a little from the Black Birch of New York being a stronger kind of timber, and the bark of the young seedling trees being always yellow here whilst at New York it is black. This difference may be occasioned by the difference of climate as ours agrees with the black birch of Linnaeus. This is large tree frequently 3 feet diameter. The bark is sometimes used for tanning leather, but is not accounted equal for this purpose than that of Hemlock. It is much used for ship building both for timber and Plank and it is said to be less liable to damage from worms than Oak, on account of the better gum which it contains. It is also much used by Cabinet makers for household furniture. Bedsteads said to be made from the heart of birch are said to be free from bugs. The hoops used by the Coopers at Halifax are made from Yellow Birch as are all cartwheels. This tree is almost always to be found on good land and often on a very poor soil it enriches the land where it grows. If the soil be poor, it frequently sends of horizontal roots to the distance of over 60 feet.

11. White Birch

This tree always forms the principal part of such forests as grow up when the original growth of Timber has been destroyed by fire provided the soil is not extremely barren. The outer bark is an article of great consequence to the Indians: if it contains a kind of resin which renders it incorruptible in the Weather and impenetrable to Water. Their canoes are made by covering a slight frame of their laths with the bark. They choose for this purpose, that which is sound and near 1/8 of an inch thick. They then sew the different pieces together, with the roots of Spruce or Larch split in halves and cover the seams with Spruce resin. These canoes are lighter than could be made from any other materials and are easily carried from one lake to another. The Indians also frequently cover their camps with this bark and some few have tents made of it by sewing a number of pieces together which they carry with them in their canoes. They always have at their camps a clumsy vessel made of birch bark to fetch water in, with it also they very neatly make bowls to put their soup in, baskets and boxes ornamented with the quills of the Porcupine dyed of various colors – As it burns with a fierce flame they use it for flambeaus to spear Salmon, Lobster and other fish which they catch by night. The wood itself is the worst fuel we have, and it is not-much used for any other purpose except Charcoal for which it answers very well.

12. Dwarf Birch

This is only a small shrub. It grows on mosey bogs.

13. Beech

This forms the greater part of the Woods in our best land, what is called hardwood land being generally chiefly covered with beech, with a small proportion of birch and maple. It forms our principal fuel. Our new cleared land fences are commonly made from the logs but they soon decay: if they are split into rails, they will continue good for three times as long as whole logs. Sleds are commonly made of this wood, and it is sometimes used for barrel staves, but it is not as yet much worked for any other purpose. Hogs are fattened with the nuts in those seasons in which they are plenty: but as far as I have observed they are blasted about half the year.

14. Sugar Rock Maple

This tree when it has its full growth is from 2 to 3 feet diameter. It abounds principally in the Eastern part of the Colony. The land is always very good where this tree is frequent. It grows chiefly in moist grounds near small brooks and upon intervals. It is very frequent upon Limestone land.

The sap or Juices which yields the sugar will run from the tree if cut or wounded in any warm day after middle of December. It will run at that season very slowly and continues to increase in quantity till the middle of April which is about the time that it ceased to flow when the weather becomes so warm as to swell the buds of the trees and loosen the bark. The season for making sugar is commonly between the middle of March and the middle of April. The sap runs only in warm days which are preceded by a frosty night. If the weather should continue warm, the sap will seldom run for more than 24 hours it then stops, and does not run again till there comes another frosty night. The sap is best in the beginning of the season: it then yields the most and the best sugar. The very last sap is commonly fit only to make molasses. At the beginning of the season 4 gallons' wine measure will yield a pound sugar: at the close it will require 5 or 6 of the same quantity. Such trees as are left in cleared land will yield more sugar from the same quantity of sap, but they do not produce as much sap as those which stand in the woods. There is no kind of work which requires more constant attention than making Maple sugar, as the running of the sap depends so much on the changes of the weather. For this reason, the greater part of those who attempt to make it do not manufacture the third part which they might with a little care and attention. The trees ought to be tapped with a chisel or an augur as they will them continue good for a long time but when tapped with an axe as is common by the ease they are much sooner exhausted. It is a good season in which the trees yield 600 pounds of sugar each on an average.

The wood of the tree is very hard and solid, it is superior for fuel to Beech or Birch: it is very frequently curled, the grain running in the small waves, and sometimes but more rarely becomes what is called Birds eyed by having the substance of the wood full of very small knots. The curled or birds eyed Maple makes very handsome furniture. Hard maple is frequently used for felloes for cart wheels, but it decays very soon when exposed to the weather.

15. Flowering of White Maple

This tree grows upon almost every kind of soil; it thrives most near the water. It is covered with red flowers very early in the Spring before the leaves appear and the leaves generally change to red on the approach of Autumn. It is harder than the soft Maple at New York; but it is much inferior to it for timber, as the grain twists very much. It is sometimes used by Chairmakers to turn: but they commonly prefer Yellow birch. It makes good fuel when dry, but very indifferent when green.

16. Moose-wood Maple

This is a small tree, very rarely more than 4 inches' diameter; it is not used for any other purpose that I know of except for fencing stakes: it is of very quick growth and the wood is very soft and brittle. Its twigs are the principal Winter food of the moose where they can find it (for it does not often grow on very barren land). It is in most plenty near small brooks, in stony Hemlock land.

17. Dwarf Maple

This is not above half the size of the last mentioned species. It is very troublesome bush upon new cleared land, as it grows very fast, is not easily destroyed.

18. Elm

This tree is very rare except on the Intervals in the Eastern part of the Colony: there it grows to a large size, often 3 or 4 feet diameter it is a firm solid kind of wood, the bark is very tough and strong and is used to make ropes and chair buttons. The ashes of any given quantity of Elm will often yield more potash than the ashes of four times as much beech or birch.

19. Horn-beam

This tree grows only upon good land especially intervals, it is seldom of a large size, it is the hardest and strongest wood we have: it is much heavier than water and will sink in a swift stream. It is the best timber for Axe helves, rake teeth, etc.

20. Black Pigeon Cherry

This tree is very rare except upon intervals. It is not so large in this Colony as in the United States further southward where it is after used to make tables, as it has nearly the color of Mahogany. In Nova Scotia it is seldom more than 16 inches' diameter. The fruit is small growing in long bunches, it is when fully ripe pretty good to eat and is accounted very good to put into Spirits.

21. Red Cherry

This tree is seldom more than 16 inches big. It commonly springs up on dry stony land, after a fire. The fruit is small and very sour.

22. Choak Cherry

This is only a bush, being seldom more than big [diameter]. It is common upon interval by the sides of brooks on rich moist upland. It has long branches of fruit rather longer than that of either of the other two species, but is scarcely eatable, having a disagreeable astringent taste.

23. White Cedar

This tree grows in no place that I know of except in the Valley of Annapolis River, and there it is not plenty. It is not the same tree which is called White Cedar in the Southern States, although there is no great difference in the timber. It is excellent for Shingles, tubs and buckets, being very durable and not so apt to imbibe water as white pine. The same quality makes it good for building ships or boats, but it is so scarce in this Colony as to be no consequence.

24. Trembling and White Poplar

These trees differ but little from each other: they always grow upon land that had been burnt over along with the White birch. They are tall but seldom more than 16 inches' diameter. The Wood is soft and light and is used to make trays, it is sometimes sawed into boards, it is springy and very bad to saw, it makes but poor fuel for common use, yet it is very good for Charcoal.

25. Mountain Ash or Fowlers Service

This is a small tree, very rarely 6 inches' diameter, it grows most frequently on very poor land, the bark of this has very nearly the same taste as that of the cherry tree. It is the favourite food of the beaver and I believe it is the natural breeding place of the insects which destroy some many apple trees near Halifax by covering the branches with small nests which resemble lice, having frequently observed the bark of this tree covered by them, in places which were 20 miles from any settlement.

26. Wild Indian Pear

This is a species of Medlar (Mespilius). It seldom exceeds 6 inches' diameter. It grows most commonly on barren land, near to water, it is a remarkable flowering tree, and bears very good fruit about the size of cherries, it is however very frequently blasted, the wood is very hard and smooth and is sometimes used for axe helves.

27. Oak

We have but one species of this tree, that I have seen: it resembles the Red Oak in the States, but is harder and stronger. It grows chiefly on poor land, the best I have seen was upon very sandy intervals. It is more durable when exposed to the Weather than any other kind of hardwood we have. It is used for Plank and Timber for ships, for staves for fish barrels, cartwheels and many other purposes. It is scattered over every part of the colony, but that which is of a size as to be valuable is mostly in the Eastern District.

28. White Ash

This is a very tall tree and very strong (except when it grows in cold swamps where it is soft and brittle). It usually grows on rich land and by the sides of brooks. It is the most suitable timber to make handles for tools, ploughs, carriage wheels, and for many other purposes. When green it is better fuel than any other wood we have.

29. Black Ash

This grows only in swamps which, though rich, are sometimes so wet as to require draining to produce grass. The Canada flour barrels are made from this tree, but I have never seen any "great" quantity of it, of a size fir for staves in this colony. It is here used to make baskets: to fit it for this purpose it is beaten with a maul which separates the grains or years growth. It makes very bad fuel when green.

APPENDIX TWO

List of Trees

The Common and Scientific names provided by Smith are shown in columns one and two. The numbers in brackets after the common names note the trees discussed by Smith in his *Observations of the Nature and Uses of Trees*. Number 24 is repeated twice because two species (trembling and white poplar) are discussed under that entry. The list also includes other species not discussed, possibly because Smith lacked substantial information about their nature and uses. The modern scientific nomenclature for each tree is given in the third column based on the Nova Scotia Natural Resources (2007) *Tree Identification Guide for Common Native Trees of Nova Scotia*, and Clark and Gorham's scientific designations (Clark 1954:308-309, Gorham 1955:122-123).

Smith's Common Names	**Smith's Scientific Names**	**Modern Scientific Names**
Larch, Hackmatac, or Juniper (1)	*Pinus Larix.*	*Larix laricina* (Du Roi) K. Koch.
White Pine (2)	*Pinus Strobus.*	*Pinus strobus* L.
Yellow Pine (3)	*Pinus Silvestria.*	*Pinus resinosa* Ait.
Hemlock (4)	*Pinus.*	*Tsuga canadensis* (L.) Carr.
Balsam Fir (5)	*Pinus Balsamifera.*	*Abies balsamea* (L.) Mill.
White Spruce (6)	*Pinus.*	*Picea glauca* (Moench) Voss.
Red Spruce (7)	*Pinus.*	*Picea rubens* Sarg.
Black Spruce (8)	*Pinus.*	*Picea mariana* (Mill.) BSP

Table cont'd

Smith's Common Names	Smith's Scientific Names	Modern Scientific Names
Mountain Pine (9)	*Pinus Pinea.*	*Pinus banksiana* Lamb.
Black or Yellow Birch (10)	*Bitula Nigra.*	*Betula alleghaniensis* Britt.
White Birch (11)	*Bitula Alba.*	*Betula papyrifera* Britt.
Dwarf Birch (12)	*Bitula Nana.*	*Betula populifolia* Marsh.
Beech (13)	*Fagus Silvatica.*	*Fagus grandifolia* Ehrh.
Sugar Rock, curled, or Birdseye Maple (14)	*Acer saccharinum.*	*Acer saccharum* Marsh.
Red Flowering or White Maple (15)	*Acer Rubrum.*	*Acer rubrum* L.
Moose-wood Maple (16)	*Acer.*	*Acer pensylvanicum* L.
Dwarf Maple (17)	*Acer Mana.*	*Acer spicatum* Lam.
Elm (18)	*Ulmus Americana.*	*Ulmus americana* L.
Hornbeam (19)	*Carpinus Ostria.*	*Ostrya virginiana* (Mill) K. Koch.
Black or Pigeon Cherry (20)	*Prunus.*	*Prunus serotina* Ehrh.
Red Cherry (21)	*Prunus Avisim.*	*Prunus pensylvanica* L. f.
Choak Cherry (22)	*Prunus Virginica.*	*Prunus virginiana* L.
White Cedar (23)	*Thaja occidentala.*	*Thuja occidentalis* L.
Trembling Poplar (24)	*Populus tremula.*	*Populus tremuloides* Michx.
White Poplar (24)	*Populus Alba.*	*Populus grandidentata* Michx.
Mountain Ash or Fowlers Service (25)	*Sorbus Aucuparia.*	*Sorbus americana* Marsh.
Wild or Indian Pear (26)	*Mespilus.*	*Amelanchier canadensis* Medic.
Oak (27)	*Quercus rubea.*	*Quercus rubra* L. Michx.f.
White Ash (28)	*Fraxinus Americana.*	*Fraxinus americana* L.
Black Ash (29)	*Fraxinus.*	*Fraxinus nigra* L.
Shrub Maple	*Acer.*	*Acer ginnala* Maxim
Alder	*Alnus.*	*Alnus alnobetula*(Ehrh.) K. Koch
Balsam Poplar	*Populus Balsamifera.*	*Populus balsamifera* L.
Button Wood or Sycamore	*Platanus Occidentalis.*	*Platanus Occidentalis* L.
Lyme Tree	*Tilia.*	*Tilia americana* L.
Thorn	*Crataegus Crus Galli.*	*Crataegus crus-galli* L.

APPENDIX THREE

Letter from Wentworth to Smith

Wentworth's complete unedited letter to Smith (Wentworth 1801) is enlightening because beyond searching for timber and other resources to fulfill the Admiralty's needs, his instructions to Smith indicate just how little the government knew about the geography and natural history of the interior of the colony. After all, at the same time Smith was trekking through mainland Nova Scotia, Alexander von Humboldt [1769-1859] and Aimé Bonpland [1773-1858] were in the third year of their five-year expedition exploring South America [1799-1804], and in 1804, Thomas Jefferson [1743-1826] was preparing to send Captain Meriwether Lewis [1774-1809] and Lieutenant William Clark [1770-1838] westward through the continental divide to the Pacific coast to expand and redefine the new nations geographical and political identity.

Unfortunately, the identity of Mr. Carter remains unknown. Wentworth mentions him as Smith's paid companion (11 shilling eight pence for Smith, eight shilling for Carter), but never gives a first name, or military rank.

"To Mr. Titus Smith, Jr.,

Sir: Government having expressed a desire that means should be adopted in this province, to encourage the growth of Hemp; at the recommendation of a committee appointed for this purpose, I have thought it proper to accept your offer, jointly with Mr. Carter, to make a survey of so much of the peninsula of Nova Scotia as can be accomplished within the periods herein limited, and you will take the following instructions as your guide.

1st. You will consider your engagement to expire at the end of fifty days, reckoning from the day from which you set off, unless renewed by our express order, in writing from myself or the secretary of the province; for which service you shall receive eleven shillings and eight pence, Halifax currency, each day for yourself, and eight shillings each day for Mr. Carter, during your actual services, in full for your pay and every contingency. You will contrive to be so situated on or a little before the fiftieth day, as to hear from me or the secretary of the province.

2nd. Your principal object in this survey will be, to visit the most unfrequented parts, particularly the banks and borders of the different rivers, lakes, and swamps, and the richest uplands, for the purpose of discovering such spots as are best calculated for producing hemp and furnishing other naval stores. You will make your remarks on the soil, the situation of the lands, and the species, quality and size of timber; the quantity of each sort also, and the facility with which it can be removed to market. The thickness and length of mast timber you will attend to in an especial manner; and in every place, which you shall deem calculated for these purposes, you will, as near as possible, estimate the quantity of acres, the possibility and means of rendering them fit for cultivation, either by banks, drains or otherwise.

3rd. You will receive from the Surveyor-General such a map of the Province as our present knowledge of the country can furnish; you will endeavour, as far as lies in your power, to correct any errors in it, and on your return you will deliver to me the same with another containing these corrections and the route which you shall have gone distinctly placed on it.

4th. You will in the first instance, go to the eastward of the harbour to the spot from whence issue the heads of the Rivers Stewiacke, Musquodoboit, and Saint Mary, and wherever else, in consequence of the information you may receive, you may be led to suppose the objects of your inquiries are to be found. Having examined the eastern side of the province, from the Shubenacadie, the Dartmouth Lakes, and the harbour of Halifax, you will proceed to the western side and examine the lands about the River Saint Croix, and the land of St. Margaret's Bay and thence along the northern side of Chester, Lunenburg, Liverpool, Shelburne, and Argyle, as far as Yarmouth, and the heads of those waters which empty themselves into the Atlantic. You will endeavour to examine Lake Rossignol, and will consider it to be a very principle object of your tour. You will trace those rivers, as far as anything desirable is to be obtained from such an investigation, towards their mouths, which empty themselves into the River Annapolis or the Basin at Minas; and if within your power, without losing much time, you will examine the mountains which run parallel to the Bay of Fundy, to the southward of the Annapolis River. The last object of your searches will be the

inland country situated between Bramshag and Bay Verte in the N.E. and the Basin of Minas in the S.W.

5th. What is expressed in the second and fourth articles of these instructions, you will consider as your principle objects; but if in the course of your travels you should meet with any objects in natural history, or find any inducements of importance, the investigation of which is evidently for the benefit of the public, you will use your discretion, provided they do not occasion any essential delay or in any respect draw you away from the main objects of your research, which must not on any account be sacrificed or even impeded.

6th. You will not omit to give me every information in your power by the fourth day of June next, after which you will forward your intelligence by every favourable opportunity. In order to facilitate the present design, I have given directions to the secretary of the Province to deliver you a circular letter, directed to all magistrates and other persons throughout the province, to afford you all the assistance in their power; but you will take care not to require anything from them which shall occasion an additional expense from the government.

7th. Your communications will be in the form of a journal, with reference to notes at the end, which will contain the detail. You will always make use of names used by the present inhabitants, and refer to a table of Indian and French names and terms, with a view of correcting the arbitrary names of late years introduced in the maps of the province.

J. Wentworth.
Halifax, Nova Scotia, May 2nd, 1801".