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Article abstract

This paper examines the published accounts of three British travellers, Patrick Campbell (fl. c. 1765-1823), Isaac Weld (1774-1856), and George Heriot (1759-1839), to North America in the late eighteenth century. Focusing specifically on the travellers' scientific approaches to the natural landscape, it argues that they drew on eighteenth-century European scientific developments, including empirical observation, the evolution and instability of matter, and systems of classification, to facilitate their understanding of unfamiliar phenomena. The travellers' scientific observations revealed both an intellectual interest in the origin of landforms and a utilitarian view of wildlife and natural resources. Attracted to the novel and curious, the travellers' scientific speculations merged with initial aesthetic responses, highlighting a preoccupation with the power, spontaneity and magnitude of nature.

Old World Conventions and New World Curiosities: North American Landscapes Through European Eyes

HELEN DEWAR

The study of eighteenth-century British travel narratives tends to focus on the travellers' emotional responses to the North American landscape, particularly their use of the aesthetics of the sublime and the picturesque.[1] Although such responses are important in revealing expectations and the degree of satisfaction with the scenery, they were often only initial reactions, succeeded by attempts to understand and make use of the scene's components. The development of various scientific trends in Europe during the century, from the discovery of nature's evolution to a classification system for flora and fauna, had a profound effect on lay travelers' approaches to, and observations of, nature. The examination of three British travelers' accounts of parts of North America in the 1790s can suggest the effects of eighteenth-century scientific trends on their perceptions, and the extent to which their ways of seeing were in fact European or British modes of perception. They were attracted to novel and curious natural phenomena; yet, the closeness of their reactions to contemporary trends demonstrate that Weld, Heriot, and Campbell fit the unfamiliar forms they encountered into a familiar European framework to facilitate their appreciation, control, and understanding of them. Moreover, comparing the scientific approach to the aesthetic and utilitarian reveals a preoccupation with particular characteristics of nature.

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1 See, for example, I.S. MacLaren, "The Influence of Eighteenth-Century British Landscape Aesthetics on Narrative and Pictorial Responses to the British North American North and West," (PhD diss., University of Western Ontario, 1983); Gerald E. Finley, *George Heriot: Postmaster-Painter of the Canadas* (Toronto: University of Toronto Press, 1983); Maria Tippett and Douglas Cole, *From Desolation to Splendour: Changing Perceptions of the British Columbia Landscape* (Toronto: Clarke, Irwin & Company, 1977); On the development of the picturesque and sublime aesthetics, see Malcolm Andrews, *The Search for the Picturesque: Landscape Aesthetics and Tourism in Britain, 1760-1800* (Stanford, California: Stanford University Press, 1989); Esther Moir, *The Discovery of Britain: The English Tourists* (London: Routledge & Kegan Paul, 1964); George B. Parks, "The Turn to the Romantic in the Travel Literature of the Eighteenth Century," *Modern Language Quarterly* 25 (1964), 22-33.

By the closing decades of the eighteenth century, the exploration of coastal and riverine North America had long been superseded by European settlement and development, particularly in the thirteen older British colonies in the south, by that time the recently formed United States. It was then that three British gentlemen, Patrick Campbell (fl. c. 1765-1823), Isaac Weld (1774-1856), and George Heriot (1759-1839), travelled through both the United States and the provinces of Canada, recording their observations and impressions of the settled and wild landscapes as well as of the settlers encountered. All three published accounts of their journeys a few years later.[2] Travelling within years of one another, these gentlemen regarded North America as a current or potential new home. They came from various social and educational backgrounds with different motivations for travel. Their common attraction to certain objects of scientific interest, however, provides a basis for the discussion of attitudes towards, and reactions to, unfamiliar natural landscapes and the systems of knowledge used to understand them.

The travelers undertook their voyages to North America at different stages of their lives, and under individually peculiar circumstances. Although little information is known about Patrick Campbell, apart from what can be learned in his travel account, he appears to have traveled to North America later in life. The earliest record of his activities is from the mid 1760s when he became head forester of the royal forest of Mamlorn in Scotland. As he himself stated in his travel account, he moved on to farming and trading, before earning a sufficient fortune to travel. Campbell visited New Brunswick, Upper and Lower Canada, the northeastern United States, and the Genesee Country in 1791 and 1792. His account, entitled *Travels in the interior inhabited parts of North America in the years 1791 and 1792*, was published in 1793.[3]

Weld, born into a family of Protestant ministers in 1774 in Dublin, was in his early twenties when he arrived in North America. His travels lasted roughly two years, from 1795 to 1797, a fairly long journey by contemporary standards. Travelling through much of Lower and Upper Canada as well as through many regions of the United States, including New York, Pennsylvania, Virginia, and Maryland, Weld was the only traveler who can be said to have truly visited "North America." Two years after his return to Britain, he published the account and accompanying sketches of his travels, *Travels through the States of North America and the Provinces of Upper and Lower Canada during the Years 1795, 1796, and 1797*, which met with considerable success. In addition to several

2 Both Weld and Campbell employed the convention of authorial modesty in their prefaces. They stated that initially they had no intention to publish their observations but were encouraged by their friends to do so on their return to Britain.

3 Paulette M. Chiasson, "Patrick Campbell," *Dictionary of Canadian Biography*, vol. 6 (Toronto: University of Toronto Press, 1974), 111-2.

editions in English, it was translated into French, German, and Dutch. The popularity of the account seems to have determined Weld's later career. In 1801, he was asked by the Lord Lieutenant of Ireland to submit a report on Irish emigration to the United States, and to suggest strategies to direct the migration to the Canadas instead. He also continued to travel, publishing accounts and producing sketches of various regions in Britain and Europe.[4]

Concerned with the poor social and economic conditions in Scotland and Ireland, Weld and Campbell stated similar purposes for their travels, to investigate areas in North America for possible future settlement. The focus and sensibility of their accounts, however, are strikingly different. Campbell preferred to move from settlement to settlement rather than venture into the unfrequented wilderness that so attracted Weld as well as Heriot. Campbell became personally acquainted with those who had established themselves in North America, including many socially prominent settlers. Covering a broader geographical area, Weld provided a compendium of information on all subjects of possible interest regarding the state of the continent, from government and religious institutions to the quality of house construction and agricultural productivity. Although both travelers were optimistic about the future prosperity of North America, neither returned to settle.

In contrast to Campbell and Weld, George Heriot had a career in Canada. Starting in London around 1783, he worked as a civilian clerk for the Board of Ordnance, and was then posted to Quebec in 1792. He was later appointed deputy postmaster general of British North America in 1799, a post he held until 1816. Heriot travelled extensively throughout the Canadian provinces in his capacity as deputy postmaster general. During these travels over a number of years, he sketched the landscape and recorded his observations of the scenery and settlements. In 1807, these notes were published in London as *Travels through the Canadas*. Following the St. Lawrence River and its tributaries from the ocean to its source in Lake Superior, his narrative, unlike Campbell's and Weld's, does not describe all of the regions of North America of which he had a firsthand knowledge. Together with his chosen route, Heriot's stated purpose, to describe a number of picturesque and sublime scenes encountered along the St. Lawrence, was quite specific, and followed in the tradition of William Gilpin, who produced guidebooks highlighting the picturesque views of parts of England. Heriot's interest in the aesthetic components

4 Weld's topographical sketches became quite well known, and two of his North American sketches appeared on an early nineteenth-century Liverpool-type pitcher. See "Unrecorded American Views on Two Liverpool-Type Earthenware Pitchers" by J. Jefferson Miller II, *Winterthur Portfolio* 4(1968) 109-117; G.M. Craig, "Isaac Weld," *Dictionary of Canadian Biography*, vol. 8 (Toronto: University of Toronto Press, 1974), 924-5; "Isaac Weld," *Dictionary of National Biography*, vol. 60 (London: Smith, Elder, & Co., 1899), 158-60.

of the landscape stemmed from his earlier training in painting and drawing at the Royal Military Academy in London.[5]

While each had his own specific interests and aims, the three travelers employed certain conventions. Their scientific approach to the landscape confirms the often-discussed paradox of eighteenth-century travel. At the same time as travelers enjoyed the wild and rugged scenes of untamed wilderness, whether in North America or closer to home in less populated areas of Wales, they also wanted to improve the landscape, recreating the familiar, cultivated landscapes of Europe.[6] Campbell's, Weld's, and Heriot's different uses of their scientific knowledge, depending on the objects before them, illustrate this paradox. Particularly drawn to natural formations such as mountains and waterfalls, they attempted to understand the phenomena's evolution. The travelers' interest in these forms did not generally extend to the possible extraction of any minerals they contained. The study of plant and animal life as well as other resources, by contrast, led to comparisons to phenomena in Europe and consideration of their potential exploitation. Despite these very different results of scientific study, both the intellectual and utilitarian approaches to scientific information highlighted common characteristics of nature to which all three travelers were attracted, namely its power, order, magnitude and abundance.

Interest in natural history and in acquiring a greater knowledge of natural phenomena had been growing since the Renaissance. This sixteenth-century revival centred on the belief that it was possible to understand the functioning of the cosmos and, most importantly, that all phenomena were hierarchically ordered in the "Great Chain of Being."[7] Such a concept of a natural order in Creation became an essential element in intellectual and scientific thought during the next two centuries. Building on this belief, a number of seventeenth-century mathematical and scientific discoveries created a firm foundation for new developments in the eighteenth century. Sir Isaac Newton's discovery of the law of gravity and other natural laws governing the universe helped both to confirm the presence of an overall mechanism, and to make the operations of nature penetrable and knowable to humans.

Aside from the use of mathematical tools, the principal method by which the universe could be uncovered was through close, firsthand observation. The importance of sensory perception as a means to the truth was stressed by John

5 Gerald E. Finley, "George Heriot," *Dictionary of Canadian Biography*, vol. 7 (Toronto: University of Toronto Press, 1974), 400-3; Finley, *George Heriot*.

6 Andrews, 3.

7 Amy R.W. Meyers, "Imposing Order on the Wilderness: Natural History Illustration and Landscape Portrayal," *Views and Visions: American Landscape before 1830*, ed. Edward J. Nygren and Bruce Robertson (Washington, D.C.: The Corcoran Gallery of Art, 1986), 111.

Locke and other proponents of empiricism. Such an approach to phenomena, while developed independently from Newton's discovery, did help to complement it, and became increasingly widespread. These two seventeenth-century developments, among others, contributed to changes in the understanding of humans' relationship to nature that continued into the next century.

In the eighteenth century, a number of important discoveries concerning the nature of matter helped to expand the field of study and stimulate further scientific interest in nature. The close examination of natural phenomena using a microscope indicated both their complexities and their age. While the microscope displayed the intricacies of natural organisms, it also revealed that nature's forms were unstable and constantly changing. The realization that nature was not immutable changed the way the universe was perceived and how phenomena were studied. As Barbara Maria Stafford argues, the universe was then seen as a process, a living system itself.[8] The perceived chaos of nature became evidence of nature's constant evolution within a supposedly ordered cosmos.

The evolution of nature engaged the attention of the eighteenth-century learned world, in which there was widespread interest in history and origins.[9] Based on the concept of evolution, thinkers studied natural history as a series of transformations, similar to the contemporary view of human history as a series of events or moments in time. To study such transformations, natural historians relied on the marks left on current formations as clues to their shapes in the past. Natural history was therefore particularly suited to the empirical approach to knowledge in which only visual evidence was collected. Scientists and naturalists turned to the study of fossils and petrifactions. The increasing exploration of other parts of the world confirmed the forceful and sudden nature of natural transformations, as explorers witnessed volcanic eruptions, the spontaneous creations of landforms in the middle of the ocean, and the seemingly arbitrary placement of heaps of stones on larger rocks.[10]

As exploration uncovered ever more unknown natural phenomena, the need for a system to organize and better understand (and perhaps control) nature became more pressing. In 1735, Carl Linné, more widely known by his Latin name, Linnaeus, published his *Systema Naturae*, outlining a system by which all flora could be identified and categorized. Although other frameworks had been proposed in the preceding century, none was as successful or as popular as the Swedish naturalist's classification system, the basic principles of

8 Barbara Maria Stafford, "Towards Romantic Landscape Perception: Illustrated Travels and the Rise of 'Singularity' as an Aesthetic Category," *Studies in Eighteenth-Century Culture* 10 (1981), 53-6.

9 Stafford, "Towards Romantic Landscape Perception," 54.

10 Ibid., 53.

which are still used today. Unlike earlier systems, the Linnaean system used clearly visible characteristics to classify wildlife, thus relying heavily on empirical observation. Using binomial nomenclature, plants were grouped into genera and then into species according to common reproductive traits. The system was first limited to plants, but was later applied to animals and minerals, and was designed to order all phenomena, including the exotica being discovered in the New World.

Such an immense endeavor required the participation of large numbers of people. Indeed, the system's main advantage was its simplicity, allowing laypeople to grasp the basics of classification and identify wildlife themselves. Travelers, in particular, were encouraged to adopt the system and add new species discovered on their travels to the growing list of known organisms. As Mary Louise Pratt argues, the widespread interest in natural phenomena sparked by the Linnaean system greatly increased the importance of science and natural history in all travels and in the resulting narratives.[11] More generally, all scientific developments, from the Newtonian laws of nature to the recognition of the instability of matter, influenced what travelers saw and how they described those landscapes. As the means of uncovering the divine plan of Creation, these seventeenth- and eighteenth-century advances ultimately directed travelers not only to appreciate nature's beauties and oddities, but also to understand them.

The concern with accuracy and truth produced by these scientific developments led to a shift in travelers' interests, from unnatural, sensational creatures such as monsters to curiosities found in nature itself. Campbell, Weld, and Heriot, travelling through the wilderness of North America, were particularly drawn to what they termed "natural curiosities," unique formations that provoked surprise and interest in the beholder. The taste for the strange and exotic dates back at least as far as the sixteenth century when artists and naturalists were instructed to draw and record all new and different phenomena encountered during a voyage to an unknown region. One artist was instructed in 1582 to "drawe to lief one of each kinde of thing that is strange to us in England … all strange birdes beastes fishes plantes hearbes Trees and fruictes."[12] Unlike this artist's patron, Campbell, Weld, and Heriot were less interested in new flora and fauna, and thus generally limited their descriptions of the curious to novel landforms.

The travelers' focus on particular formations illustrated the aesthetic of singularity, an aesthetic that, according to Stafford, developed in the eighteenth

11 Mary Louise Pratt, *Imperial Eyes: Travel Writing and Transculturation* (London: Routledge, 1992), 27.

12 Victoria Dickenson, *Drawn from Life: Science and Art in the Portrayal of the New World* (Toronto: University of Toronto Press, 1998), 50.

century from the scientific study of matter. The singular aesthetic involved the intense examination of an object, usually a "heap, piece, or fragment," and led the observer to ultimately know its essence.[13] The understanding of individual objects contributed, therefore, to the construction of the wider history of nature. Both Heriot and Campbell used the word "singular" in their descriptions of certain intriguing "mounds." Heriot described an iceberg seen off the coast of Newfoundland, and Campbell described a deposit of plaster of paris in New Brunswick. While the observation of one natural form usually provoked an emotional response in the travelers, it also led them to speculate on the properties of the object. Campbell described the plaster as "pyramidal" in shape, with several smaller pyramids in a cluster.[14] Heriot gave the dimensions of the iceberg and described the "rivulets of water" that constantly ran down its side (32). Both travelers also discussed the process by which these formations were perhaps created.

Most of the travelers' descriptions of natural curiosities, in fact, eventually led to speculations on the origins of the forms, and sometimes even to confident declarations of the causes. In describing the components of an intriguing scene, Campbell, Weld, and Heriot, while not arranging them pictorially as they did when appreciating a scene's aesthetic qualities, did order the features, emphasizing their relations to each other in space. Such an ordering facilitated speculation on how they might interact and, by extension, on the particular causes of the formations. Near the Island of Orleans on the St. Lawrence River, Heriot encountered a series of seven falls, which flowed from a ridge down to the base of a mountain. He postulated that "the principal and lower fall … has formerly flowed through another channel, in which it has been obstructed by

13 Stafford, "Towards Romantic Landscape Perception," 60-1; Stafford, *Voyage into Substance: Art, Science, Nature, and the Illustrated Travel Account, 1760-1840* (Cambridge, Massachusetts: The MIT Press, 1984), 284.

14 Patrick Campbell, *Travels in the interior inhabited parts of North America in the years 1791 and 1792; in which is given an account of the manners and customs of the Indians, and the present war between them and the foederal states, the mode of life and system of farming among the new settlers of both Canadas, New York, New England, New Brunswick, and Nova Scotia; interspersed with anecdotes of people, observations on the soil, natural productions, and political situation of these countries*, ed. Hugh Hornby Langton and William Francis Ganong (Toronto: The Champlain Society, 1937 [1793]), 272. To avoid excessive footnoting, the source will hereafter be cited parenthetically in the text. The same procedure will be followed for the other two travel accounts examined: *George Heriot, Travels through the Canadas; Containing a description of the picturesque scenery on some of the rivers and lakes; with an account of the productions, commerce, and inhabitants of those provinces. To which is subjoined a comparative view of the manners and customs of several of the Indian nations of North and South America* (Edmonton: M.G. Hurtig Ltd., 1971 [1807]); Isaac Weld, *Travels through the States of North America and the Provinces of Upper and Lower Canada During the Years 1795, 1796 and 1797*, two vols., 4th ed. (New York: Augustus M. Kelley Publishers, 1970 [1807; 1st Ed. 1799]).

fallen rocks…The ancient bed is plainly discoverable, by the deep ravines, worn, at different stages, on the side of the mountain, and by a valley near the lower fall" (91). Here, Heriot made connections between landforms, citing two in particular that supported the earlier presence of a third. By making connections between phenomena, Campbell, Weld, and Heriot engaged nature in a more active and critical way than by simply making observations. Indeed, an especially striking aspect of the travelers' descriptions of natural curiosities was their clear recognition (sometimes almost an assumption) that the scene had not always appeared as they then saw it. Heriot's evaluation of the former channel also shows how one form could prevent the continuance of another: the pile of rocks led to the new channel being formed. In attempting to explain the causes of particular formations, the travelers observed how natural phenomena *themselves* modified and impacted each other, unlike in their descriptions of completed or potential human modifications to natural landscapes.

The drastic transformation of natural forms as a result of the action of other natural forces affirmed the three travelers' belief in the power and grand scale of nature. Their view that evolution indicated the power of nature is evident in the types of explanations they proposed to account for the impressive scenery before them. They frequently attributed piles of broken rocks at the base of mountains to "great convulsions" or "inundations" of nature, thus highlighting the eighteenth-century understanding of matter's instability. Contemplating a scene near Kamourasca, Heriot observed that "the sulphureous springs found here, and the immense masses of broken rock, which appear to have been thrown together by some violent and uncommon effort of nature, afford grounds for supposing, that this part of the country has undergone material changes" (58). Apart from drawing on current formations to support past transformations, Heriot underscored nature's spontaneity, unpredictability, and fierceness. A "violent and uncommon effort" or a "convulsion" were extremely vague causes and served mainly to accentuate the sudden rather than gradual process of evolution, and the great power of natural forces. Indeed, the power of nature was, for Weld, most clearly expressed by the inability of humans to understand nature completely. Contrary to the general eighteenth-century confidence that nature's plan could be systematically revealed through observation and thus become entirely known, Weld often stated that it was impossible to know definitively the true causes of certain natural phenomena.[15] During his travels in Virginia, he described, and speculated on the formation of, the "Rockbridge:"

> It extends across a deep cleft in a mountain, which, by some great convulsion of nature, has been split asunder from top to bottom, and it seems to have

15 Stafford, *Voyage*, 287.

> been left there purposely to afford a passage from one side of the chasm to the other … That the two sides of the chasm were once united appears very evident, not only from projecting rocks on the one side corresponding with suitable cavities on the other, but also from the different strata of earth, sand, clay, &c. being exactly similar from top to bottom on both sides: but by what great agent they were separated, whether by fire or by water, remains hidden amongst those arcana of nature which we vainly endeavour to develope. (1: 221)

Weld inferred, through quite sophisticated observation, that the mountains were joined at an earlier point in time, but was unsure of the process by which they were separated. His observations on the identical rock strata on both sides and on the matching protrusions and gaps allowed him to verify the effects of the unknown causes. He was thus able to know some, but not all, of the history of the landforms. It is interesting to note, however, that he did limit the cause to either fire or water, believing these elements to be the two principal agents of change.

The ease with which Weld consigned the true cause to nature's "arcana" of secrets can be attributed to his strong belief in the empirical method of observation, by which conclusions were only drawn from visual clues. The formations here allowed only limited speculations. By contrast, when observing other landforms, where visible marks clearly pointed to a specific cause, Weld did not hesitate to name the agent. Such an empirical approach echoed Locke's belief in the human capacity to understand only some parts of the cosmos. Aside from a belief in nature's eternal mysteries, Weld indicated here a firm belief in a natural order. The idea that the bridge was "left to afford a passage" suggests that nature, despite its instability, had made provisions for other phenomena. Weld expressed the same concept when speculating on whether the Shenandoah and Potomac rivers had always flowed through the ridge of Blue Mountains. He wondered if "a break was left in it for the passage of the rivers," but ultimately concluded that it was impossible to know for certain (1: 241).

Unlike Weld, Heriot was more willing to make conjectures, sometimes based on relatively little observation, and at no time declared the causes of formations to be impenetrable to humans. In describing the "curious circumstance" of acres of snow-free land in the midst of deep snow-covered woods, Heriot suggested that the bare patches "may probably be occasioned by subterraneous heat, which approaching nearer to the surface of the ground, produces the effect which has been described" (39). Such an explanation was given with much less visual evidence than he and the other travelers normally cited. Heriot, nevertheless, felt confident enough to name a possible cause, even one that was not easily verifiable due to its underground position. While apparently believing that all matter could be explained, in most cases he adopted the same

empirical approach as Weld. During their journeys, the two travelers both speculated on the origins of a river running through a ridge of mountains, and reached quite different conclusions. Weld observed that if the Blue Ridge had been continuous, and therefore had trapped the Shenandoah and Potomac rivers, then the resulting body of water would have been largest at the point where they now passed through the mountains.

Heriot also speculated on the course of the St. Lawrence River and, like Weld, noted the similar rock strata on both sides. He observed a pile of rocks on a lower height of rock. While the two travelers were faced with very similar formations, Weld cautiously concluded that it could not be known whether the waters were once trapped. By contrast, Heriot argued that the river must have at one time "thrown itself down from near the summit" and, having loosened the rocks and soil, created the deep ravine in which it now flowed (158). Despite Heriot's tendency to declare confidently the causes of particular landforms, he did preface most explanations with the observation that "the circumstances afford probable grounds for conjecture," thus tempering his conclusions (158).

Campbell, like Heriot, was willing to suggest a cause for a peculiar formation, even though the evidence did not point unequivocally to a particular agent. Stating, as Weld often did, that the sight "defies conjecture," Campbell nevertheless attempted to explain the "curious mound" of plaster of paris he encountered near Sussex, New Brunswick: "it was occasioned by a volcanic eruption, from a neighbouring bank, thrown up in small particles … and lighted close to the place from whence it came, among large trees, which had been afterwards burnt at the conflagration that happened to the other woods in that corner of the country" (272). He then noted the burnt trees that were still in the vicinity. A rather unlikely explanation, its value lies in what it suggests about his perception of natural transformations: namely, they were sudden and dramatic. Also implicit here is the idea that the cause must have been as curious as the formation itself.[16]

When providing a detailed explanation of natural phenomena, the travelers usually perceived one or more natural elements as agents of change. Water, in particular, was deemed the cause of many worn and rugged rock faces and mountainsides. Both Weld and Heriot attributed curious or unique formations to the action of water. Along the Montmorency River, Heriot observed what were known as the "natural steps" cut into the riverbank (75-6). He suggested that they were gradually shaped by the increased flood of water each spring as a result of the snowmelt. The heightened force of the water dissolved the gypsum, which was mixed in with the lime-slated banks, thereby forming surprisingly regular steps. Heriot's description of water's role in their formation articulated two conflicting but central characteristics of nature. On the one

16 As the editor notes, the true cause of the formation was much more mundane: the mound was formed as a result of erosion.

hand, through its transformation of other phenomena, water represented nature's chaos and power. The resemblance of the resulting, skillfully crafted "steps" to a manmade structure, however, emphasized the order present in nature. The interaction between water and more solid forms such as rock was one of Heriot's principal preoccupations, in part due to his travel route along the St. Lawrence River and its tributaries.

Weld also observed the effects of water on solid rock, but in a very direct way, during his travels through the Blue Ridge along the Potomac River. While climbing the mountain, he was caught in a large rock fall, which, incidentally, he believed would result in the destruction of the entire mountain (1: 242). Weld suggested that heavy rainfall regularly washed away the soil, thereby loosening the rocks that formed the mountain. His surprise at his experience indicates his belief in the apparent solidity of the formation. The constant action of another element demonstrated the illusion of such a belief, and once more emphasized nature's inherent instability. Indeed, both travelers' descriptions highlighted the decaying effect of water.

While water's action on landforms altered them irreparably, the traces it left behind could also indicate its own evolution, particularly its changes in route. Weld evaluated the commonly-held hypothesis that the Falls of Niagara were originally further down the river at Queenstown but had gradually receded over the course of time. Based on close examination of the river's course and the surrounding landforms, Weld agreed with the theory, citing the rugged appearance of the river banks, the presence of scattered rocks, and the difference in the depth of the river above and below Queenstown. In contrast to the cause of the Rockbridge, here it was possible to identify the source of this "great disruption" of the landforms: the force of the water (2: 130). As further proof, waterlines appeared on the rocks above the present height of the river, suggesting that the riverbed used to be higher but, through the water's action, had worn away. Although his speculations focused on the changing position of the Falls, here Weld reinforced the image of water as the most powerful agent of change. Contrary to Heriot's description of the gradual formation of the natural steps, Weld emphasized the fierce and even destructive action of the water crashing over the falls and tearing away the rock. Here, the result was not an orderly structure but "rugged and broken" riverbanks. Moreover, in its very evolution, water represented the force and scale of nature. Describing its shape, Weld stated that the falls supposedly "projected in the middle" a century ago but now resembled a horseshoe (2: 131). The waterfall had, therefore, by wearing down the rocky precipice, fundamentally changed its own appearance.[17]

17 The travelers seldom encountered scenes in which a river had been transformed by rock. Only Heriot observed the change in course of the St. Lawrence River near Cape Tourment due to a pile of rocks in the former channel.

While interested in water's evolution over time, Weld and Heriot were also intrigued by the peculiar properties of certain bodies of water, reflecting the eighteenth-century interest in matter and its nature. Near Saratoga, New York, Weld encountered a number of mineral springs in a pyramid-shaped rock. In the largest spring, which was surrounded by petrifactions, the water boiled. Curious to know the hidden properties that caused the boiling, Weld adopted an especially scientific approach, describing a number of "curious experiments" and their results (1: 277). An animal placed in the crater would suffocate, while a lighted candle would go out. If the water was put into a bottle and shaken, the bottle would explode. Such experiments, although not extremely precise, did indicate that the water contained other elements. Interestingly, Weld, forever cautious and empirical, was the only traveler to suggest or describe experiments to better understand the landscape before him. While Weld was intrigued by water's hidden properties, Heriot took special note of its visible characteristics. He described the deep brown colour of the waters of the River Chippawa. Attributing the colour to the large amount of bark in the river, he observed that the waters did not mix with the "transparent" waters of the St. Lawrence River (167). Water and its properties seemed to be of particular interest to the travelers due to its motion, rapidity, and power to affect the most seemingly indestructible forms of nature.

Perhaps not surprisingly due to their interest in the potential of natural phenomena to effect change, Weld and Heriot drew connections between landforms and natural elements to explain the climate and weather patterns of North America. Their extensive scientific knowledge was demonstrated both by their discussion of the relationship between geographical position and climate, and by their application of recent scientific theories to explain peculiar weather patterns. In his detailed survey of the various climatic regions of the United States, Weld observed the general difference between the climates of mountainous areas and the lowlands, and stated that the summer heat was moderate in the former but too uncomfortable in the latter. Although here he did not speculate on the cause of the disparity, elsewhere Weld argued that mountains served as a protective barrier against cold winds, while allowing some air movement. He thus suggested that landforms could act as obstructions to, or modifiers of, other natural elements. By affecting the climate, some natural features could lengthen the growing season of a particular area. Heriot attributed the earlier grain harvest at Chicoutimi compared to Québec to the sea's moderating effect on the winter weather in the former region. A region was unique, therefore, according to its particular combination of phenomena.

Such observations confirmed the interconnections of the natural world that the travelers observed through the evolution of formations. A region's landforms also affected the air masses passing over it. In describing the winds from the northwest, northeast, southwest, and southeast, Weld attributed their different

characteristics to the land or water over which they travelled. This reasoning suggested that "the north-west wind, from coming over such an immense tract of land, must necessarily be dry; and coming from regions eternally covered with mounds of snow and ice, it must also be cold" (1: 254-55). Similarly, the wind from the southeast was warm due to its origin in the tropics, and damp from its passage over water. Preferring the northwest wind, Weld argued that the direction of the wind, like the position of landforms, fundamentally changed the temperature of the region. Adopting a scientific approach, he regretted having only a thermometer with which to measure the temperature, and not a hygrometer to measure the moisture. Only with the two devices could the effect of the air mass on the temperature be accurately established. His study of air masses went beyond the examination of the visible to consider the effects of invisible elements. Unlike speculations on the evolution of natural curiosities, an understanding of climatic factors had a practical side, helping to determine the choice of settlement and the suitability of the land for cultivation.

While Weld considered how moist and dry air was carried by the wind, Heriot attempted to explain the thick fog that was regularly found off the coast of Newfoundland by tracing the course of the gulf stream from Mexico. Apart from a knowledge of the water cycle, Heriot demonstrated considerable understanding of the latest European scientific theories. He applied Newton's laws of gravity and centrifugal forces to describe the route of the Gulf Stream:

> the system of philosophy introduced by Sir Isaac Newton, maintains that the combined attractive influence of the sun and moon, and the centrifugal force of the water arising from the diurnal motion of the earth around its axis, elevate that liquid element at the equator to a much greater height than at the poles … this immense collection of waters, impelled by its own gravitation, by the attraction of the earth, and by the force of the winds operating with those causes, moves onwards in a western direction… (17)

Rather than use empirical observation to explain the fog, Heriot drew on contemporary scientific theory. This explanation further attests not only to the quality of his education, but also to his confidence in humans' ability to understand nature. Echoing Weld's explanation for the different characteristics of the winds, Heriot argued that the stream was warm due to its origin in the tropics. Upon encountering the cold air around Newfoundland, "a vapour will necessarily arise from [the waters], which is condensed, and frequently covers these situations with a moist and thick air" (18). Heriot's explanation, therefore, reinforced the interaction of natural elements to produce a curious result.

While the travelers' study of the climates of various regions indicated a sophisticated understanding of the processes of evaporation and condensation, and the movement of air masses, it also reflected their particularly eighteenth-century, European attitudes towards unfamiliar landscapes and peoples. In his

description of the indigenous inhabitants of North America, Heriot reflected the belief in the connection between the climate and the character of the inhabitants developed by eighteenth-century thinkers such as Georges Buffon and Cornelius de Pauw. While he did not suggest that the climate degenerated new settlers, he saw little chance for "improvement" among the native peoples: "their passions exhibit a resemblance to the vast inequalities of the climates to which their bodies are exposed. Like the elements, they are either lulled to stilness [sic], or roused into unrelenting fury" (xxiii). The idea that extremes in weather patterns were unhealthy was based on the temperate nature of the British climate. Weld too revealed his familiarity with the moderate British climate through his astonishment at the great fluctuations in temperature and the rapid changes in the weather that were especially common in Philadelphia. Along the Potomac River, he described a particularly volatile day in which a hot morning was superseded by a thunderstorm, with high winds and hail, before again settling into a warm, calm evening. Similar to his fascination with the foreign nature of the scenery, the fluctuations in temperature, which he assiduously recorded over a twenty-four hour period, were attractive due to their novelty and curiosity. In the midst of the rugged North American wilderness, such extremes seemed to complement the general wild and grand scale of nature. Despite his scientific interest, however, Weld appears to have preferred, as did other Britons, a more stable, temperate climate in which to live.[18] The curious and novel, therefore, could also serve to reinforce a traveler's preference for familiar conditions or formations.

While Heriot was alone in proposing what would be regarded today as a dubious connection between climate and the character of the inhabitants, all three travelers observed the visible effect of climate on the physique of North American wildlife. Applying some of the basic techniques of the Linnaean classification system, Campbell, Weld, and Heriot drew comparisons to animals in Europe, thereby placing the unknown wildlife into a familiar framework. Close empirical examination led the travelers to conclude that North American wildlife was generally smaller than in Europe but, due to the colder climate, boasted a thicker coat of fur or feathers. Campbell, after his encounter with three raccoons, described this unfamiliar species as fat and like the badger, but with a "longer and more bushy tail" (145).

Using a similar method, Weld described the most common birds in North America. Particularly intrigued by the mockingbird, he described it as similar to the English thrush in size and colour. Weld's description of this bird reinforced his belief in the superiority of a moderate climate. Declaring its song to be the most beautiful of all the birds on the continent, he attributed this talent to the temperate climate – neither too hot in summer nor too cold in winter – of

18 MacLaren, 83.

the mockingbird's native Virginia. Weld's overall opinion of North American birds, however, suggests they had different qualities than their European counterparts: "It is a remark, however, made by Catesby, and which appears to be a very just one, that the birds in America are much inferior to those in Europe in the melody of their notes, but that they are superior in point of plumage" (1: 195). Implicit in these observations was the influence on wildlife of the continents' different climates. Weld also revealed here a knowledge of ornithological literature through his reference to Mark Catesby, the author of *The Natural History of Carolina, Florida and the Bahama Islands* published in two volumes between 1731 and 1748. As with Heriot's application of Newton's natural laws, Weld's knowledge of Catesby's work provided a framework for his own firsthand observations and speculations.

While Weld described the similarities between birds in North America and Europe, his comparisons seem to have been designed mainly to highlight the differences. Many birds in the New World were called by the same names as those in Europe because of a certain physical resemblance. Observing, however, that there were frequently significant differences between birds of the same name, Weld raised an increasingly common criticism of all classification systems that tried to order all phenomena encountered throughout the world, and of the Linnaean system in particular: each animal's individual traits, determined in part by the region's climate, were ignored when grouped with other wildlife. Indeed, many historians refer to Linnaeus' system as an artificial rather than a natural ordering of phenomena.[19] By classifying organisms based on their similarities to each other, instead of according to their habitat, naturalists imposed an unnatural mental schema on the landscape. The isolation of wildlife from their environment was highlighted by the general eighteenth-century method of sketching plants and animals.[20] Drawn onto a plain, white background, organisms were sketched from a variety of angles to facilitate their identification, but their interaction with their environment was not depicted.

By including in his wildlife descriptions both comparisons with species in Europe and specific connections between the plant or animal and its surroundings, Weld departed from conventional methods of classification. His method also reflected the growing awareness of the importance of an organism's specific environment that developed at the end of the eighteenth and beginning of the nineteenth centuries, gradually changing the nature of the sketch. Describing the mosquito, similar to the English gnat both in appearance and in its method of reproduction, Weld observed that "at those parts of the lake … which are most exposed, and where the water is oftenest agitated, no such thing as a mosquito is ever seen; neither are they ever found along a large and rapid

19 Dickenson, 185; Meyers, 118; Pratt, 31.

20 Meyers, 117, 120-1.

river, where the shores are lofty and dry; but in the neighbourhood of marshes, low grounds, and stagnant waters, they always abound" (1: 286). The environmental conditions thus helped to explain the very presence of a particular organism. Moreover, the connection between phenomena and their environment could aid other travelers not only in the identification of wildlife, but also in finding (or in this case avoiding) particular species. Detailed descriptions like Weld's, therefore, functioned as guides to a region's flora and fauna.

Apart from the climate of the surroundings, Weld linked the presence of some animals in a particular region to the plant life found there. In his description of the various snakes found in America, he observed that the poisonous rattlesnakes and copperheads were found in areas where plants used to cure their bites were also found: "It is a remarkable instance of the bounty of Providence, that in all those parts of the country where these venomous reptiles abound, those herbs which are the most certain antidote to the poison are found in the greatest plenty" (1: 203). The propinquity of the snake and the remedy for its bite underscored the relationships between different phenomena. Moreover, it implied that a certain balance was struck between various organisms and was, therefore, further proof for Weld that nature had an overall structure.

While Weld, Heriot, and Campbell did apply some principles of the Linnaean classification system to their descriptions of wildlife, the notable absence of one, namely detailed sketches of the wildlife, is a further indication of their primary interests in nature. Since the establishment of the Linnaean system, the sketch became increasingly important as a means of conveying the particular traits of an organism and eventually gained a higher stature than verbal description.[21] During their travels, Weld and Heriot made several sketches, but depicted only natural scenery. The absence of wildlife sketches is not surprising in part because their sketches revealed the landscape painting tradition, in which the aesthetic qualities of a scene were the primary focus. The travelers' evident preoccupation with the novel and the curious also suggests that such an unselective and all-encompassing approach as the Linnaean system of classification would not have been particularly appealing. Moreover, Heriot argued that Canada did not provide an especially rich landscape for the meticulous naturalist because it had fewer types of specimens than other parts of the world (35).

The travelers' scientific interest in plant and animal life had definite limitations. While Weld, Heriot, and Campbell were attracted to exotic wildlife, the strange appearance of the animals encountered did not fundamentally change their attitudes towards them. They viewed the birds and animals of North America from the same perspective as those in Europe, as game for hunting and

21 Dickenson, 145-6.

sport. Descriptions of wildlife consequently began with comparisons based on appearance and habitat, and ended, somewhat incongruously, with the number killed or their delicious taste. The perception of wildlife as game was reinforced by the travelers' interest in various Indian methods of hunting. Campbell was particularly fascinated by such methods, including how to catch otter in winter (131). Arriving at a lake, the Indian covered up all save a few holes in the ice. Waiting at the open holes for the otters to come up for air, the hunter sprinkled some snow on the water to discern the movement of an approaching otter. According to Campbell, this was an extremely efficient method. The travelers' perception of wildlife as game made them equally interested in new ways of hunting as in the unique characteristics of the animals found.

The desire to use and benefit from nature's resources encouraged the application of scientific knowledge. While naturalists did not disrupt phenomena, the information they collected was used, as Pratt argues, to further their countries' expansionist goals.[22] The systematic identification of unknown phenomena led to better methods for the exploitation of natural resources. Although Weld, Heriot, and Campbell did not describe the types of minerals found in the rock formations they examined, their interest in wildlife, for consumption as well as comparison, and in other resources indicates their practical use of scientific information. As a former forester in Scotland, Campbell drew on his extensive knowledge of botany to determine which regions would be the most productive for agriculture. He regularly listed the types of trees he found, including white and red oak, maple, birch, beech, hemlock, and pine. From the tree growth, Campbell inferred the condition of the soil, thus enabling him to predict the quality of the land for cultivation and, by extension, the general suitability of the area for future settlement. Connections between phenomena, therefore, helped not only to explain current conditions but also to suggest ways in which the land could be improved.

While their studies of natural phenomena revealed varying degrees of scientific knowledge and method, all three travelers demonstrated a particular interest in measurement and quantification. Their descriptions of lakes, rivers, and mountains frequently included the objects' dimensions. Although it is not always evident where their information originated, Campbell, Weld, and Heriot did not generally take the measurements themselves, because they lacked the necessary scientific instruments. During his visit to Niagara Falls, Campbell transcribed a chart of the various heights of the falls that he obtained from a local resident, the figures originally having been recorded by geographers of the United States government. Campbell "supposes [the information] to be exact" (152). The travelers' attitudes towards secondhand sources reveal their

22 Pratt, 18, 30, 34.

concern about the accuracy of the measurements and of information in general. Weld, in his discussion of the probable height of the highest peaks of the Blue Ridge, the Peaks of Otter, was more critical than Campbell of the information he had been given. In his Notes on Virginia, Thomas Jefferson suggested that the height was approximately four thousand feet,

> but it must be observed, that Mr. Jefferson does not say that he measured the height himself; on the contrary, he acknowledges that the height of the mountains in America has never yet been ascertained with any degree of exactness … Positively to assert that this peak is not so high, without having measured it in any manner, would be absurd; as I did not measure it, I do not therefore pretend to contradict Mr. Jefferson. (1: 212-13)

Not satisfied with estimates, Weld wished to have an exact measurement of the mountain. The simple acts of examining phenomena visually and comparing them to other similar forms was apparently no longer acceptable here. Weld did, however, proceed to compare the peak to the three thousand five hundred foot high peak of Snowden in Wales, suggesting that the former appeared much smaller because it rose from a higher plateau. Apart from an interest in scientific accuracy, Weld's skepticism was indicative of a general desire on the part of the travelers to appear credible and honest, only providing information that could be trusted or verified.

In light of their belief in empirical observation, the travelers' reliance on secondhand information may seem surprising. Weld, the traveler most concerned with firsthand experience, did, however, conduct a few experiments of his own and, on occasion, measured temperature, using a thermometer. Visiting the "natural curiosity" of Maddison's Cave in Virginia, Weld recorded the temperature of the various "rooms," and discovered that it differed depending on the moisture of the air (1: 225-29). Weld also encountered a pond at the end of one of the caverns, which allowed him to conduct an experiment to determine its dimensions. After describing a previous, unsuccessful attempt by a group of men to launch a canoe there, Weld fired his pistol and waited to hear it hit the opposite wall. While such an imprecise method seemed to contradict his earlier critique of Jefferson's estimate of the height of the Peaks of Otter, Weld believed here that only a vague idea of the dimensions was possible: "how far this pool extends it is impossible to say" (1: 227). By contrast, the height of the mountain could indeed be accurately determined. Weld's experience in the cave, therefore, reinforced his belief in the limits of the human mind to know all of nature's truths.

The travelers' concern with accurate measurements, and information in general, underlay their scientific approach to various phenomena. Whether they were comparing an animal to one in Europe or speculating on the origins of a rock formation, Weld, Heriot, and Campbell based their conclusions on

close, firsthand observation. Initial interest in phenomena was provoked by their novelty and peculiarity. The use of some elements of contemporary scientific trends helped the travelers to order new phenomena into a familiar framework. The growing interest in nature's evolution and the resulting recognition of its instability led the travelers to speculate about the origins of mountains and waterways. They also drew on certain components of the Linnaean classification system to identify wildlife. The three travelers' approaches to nature highlighted the interactions between phenomena, from the effects of water's movement over rock to the use of tree growth as an indicator of soil fertility. This preoccupation with connections led Weld in particular to depart from the Linnaean model in his description of wildlife. Going beyond a physical description of the animal, Weld highlighted particular environmental features to explain its presence in a region. While scientific knowledge helped them to understand unfamiliar wildlife and landscapes, the travelers' own beliefs in the interrelatedness of nature's elements affected what scientific trends they actually adopted.

The different uses of scientific knowledge depending on the phenomena studied reflect the travelers' ambiguous dual approach to North America's wildness. Weld's, Heriot's, and Campbell's speculations on the origins of landforms and waterways demonstrated a fascination with nature's own forms and the changes effected in nature itself. Indeed, the examination of the three travel accounts from a scientific perspective reveals the complementary nature of speculation on a formation's evolution and appreciation of the scene's aesthetic value. Both forms of appreciation highlighted nature's power and grand scale. The sight of the Rockbridge caused Weld not only to exclaim in awe and wonder, but also to attempt to identify the force that had led to such a transformation. The travelers' interests in science and in aesthetic categories thus merged in their contemplation of the rugged and vast forms of nature.

In contrast to landforms, the scientific study of plant and animal life often extended to their use by humans. Descriptions of animals included efficient methods of hunting them, while certain tree types indicated ideal locations for future settlement. The two different uses of scientific knowledge, for understanding and exploitation, did accentuate common characteristics of nature. The travelers were attracted to the magnitude of the landforms and to the abundance of resources and game. The propinquity of particular plants and animals, demonstrating the provisions nature made for organisms, and the existence of neatly formed natural steps reflected the order present in nature, even as the evolution of matter over time suggested instability. While the degree of interest in formations and wildlife differed among the travelers, the features illuminated by the study of both types of phenomena suggest that Weld, Heriot, and Campbell shared a common perception of nature itself.