

ENLIGHTENED TIMES

John Muir (1838-1914) is known as the father of the modern conservation movement due -in large part- to his ability to share vivid accounts of his explorations of wildernesses with a wide and varied audience.

His engaging and authoritative writing style enabled him to inspire a large readership to appreciate the wonders of nature and galvanise them to support campaigns for its protection.

To understand how he brought such integrity and gravity to his writing, we must consider Muir as a polymath who resisted narrow specialisation but was also able to engage with challenging concepts on a very practical and creative level.

Muir absorbed the influences of many of the key scientific minds of the post Enlightenment era including naturalist, biologist and geologist **Charles Darwin** (1809-1882). In 1859 when Muir was on the cusp of escaping the influence of his pious father and the toil of farm labour, Darwin published his seminal work: *On the Origin of Species by Means of Natural Selection*. Echoing Darwin and showing a distinctly geological perspective on the age of the Universe Muir wrote in his journal:

“This star, this star, our own good earth, made many a successful journey around the heavens ere man was made, and whole kingdoms of creatures enjoyed existence and returned to dust ere man appeared to claim them.” John Muir




Charles Darwin,
Maule and Polyblank



Geology

-the study of the history and composition of the Earth-

was a central passion in Muir's life. Its foundations of empirical observation and logical interpretation chimed with his inquisitive character.



Half a century before Muir's birth in Dunbar, a key Scottish Enlightenment figure- **James Hutton** (1726-1797)- explored the coastline just 12 miles away, at Siccar Point. His analysis of the rock formations which became known as an 'Unconformity' allowed him to assert that the true age of the Earth was much greater than popularly accepted at the time. These foundations of geological enquiry would allow Muir to expand the territory of his own mind and aided his own later studies.

Portrait of James Hutton painted by Sir Henry Raeburn before 1797

*Siccar Point
Image courtesy of Angus D. Miller*





Dunbar Castle Ruins

BOYHOOD DAYS

Muir's boyhood playgrounds in Dunbar -the coastline and castle ruins- presented him with the perfect training ground for his future of geological exploration. Indeed, he reminisced in his memoirs that:



Coast scene near Dunbar. Watercolour painted in 1847 by John Ruskin (1819-1900)

"We took chances that no cautious mountaineer would try. That I did not fall and finish my rock-scrambling in those adventurous boyhood days seems now a reasonable wonder."

The town sits on a North Sea promontory with sculpted sandstone, weathered over time and interspersed with igneous rock forms. During the time between 420 and 300 million years ago - known as the Devonian and Carboniferous periods - this part of the Earth's crust sat close to the Equator. The region was characterised by vast desert plains and volcanic eruptions.

The resulting formations such as the basalt columns at Dunbar Harbour and the channels below the cliffs presented a rich source of fodder for Muir's fertile imagination:

"We enjoyed bathing with other boys as we wandered along the shore, careful, however, not to get into a pool that had an invisible boy-devouring monster at the bottom of it. Such pools, miniature maelstroms were called 'sookin-in-goats' and were known to most of us."

Source: Sierra Club, John Muir Exhibit, The Story of My Boyhood and Youth, Muir, John (1913).

Columnar Basalt



A TIME OF LEARNING

In 1849 eleven-year-old John Muir emigrated to the United States. This was the year of the Gold Rush when tens of thousands flocked West. Such frenzy demonstrated the common understanding that geological knowledge could lead to great fortunes in the booming mining industry. Despite this, Muir's father decided that they'd settle in the fledgling state of Wisconsin where fertile glacial deposits made for verdant and manageable farmland.

Many of the tasks in clearing and cultivating it fell to the young Muir, whose formal education ceased when he left Scotland. One such task nearly ended his life. His father had instructed him to dig a 90ft. well through the fine-grained sandstone on the farm. With a heavy hammer and mason's chisels he bored down for months. One morning he was overcome with choke damp - *carbonic acid gas* - which had built up at the bottom of the well over night. Upon being discovered he was promptly rescued and revived.



Jeanne Carr



Ezra Slocum Carr

A neighbour and fellow Scot called William Duncan visited soon after. As a stonemason and miner, Duncan showed them how to avoid such an incident in the future. He would come to be a positive influence on the young Muir, lending him books and encouraging his inventive experiments. He embodied the intellectually curious working man and Muir's respect for this would be reinforced by his exposure to a wide range of Scottish authors of humble origin. This included self-taught geologist and writer **Hugh Miller (1802-1856)**. Miller's supremacy in the field of geology helped shape Muir's ambitions and he would come to hero worship Miller, naming a glacier after him on a later Alaskan expedition.

Hugh Miller
(1802-1856)

Geologist and Author

Public domain: National Galleries
Scotland FlickrCommons.



With the fire of intellectual curiosity rekindled, when Muir saw a chance to enrol at the University of Wisconsin at the age of twenty-three, he grasped it. He studied under **Ezra Carr (1819-1894)** who was professor of Natural Sciences. With Carr's tutelage, geology emerged as a key subject that held great fascination and resonance to Muir. Collecting geological specimens and displaying them in his accommodation room in the North Hall on the University grounds, he gained an insight into how the fields of science intersected. He would go on to

study and correspond with a range of influential geologists of the age - including many Scots such as; **Sir James Douglas (1761-1832)**, **Robert Dick (1811-1866)**, **Andrew Cowper Lawson (b. Anstruther 1861-1952)** and **Thomas Davidson (1817-1885)** to name just a few. Carr's wife **Jeanne (1825-1903)**, an accomplished academic in her own right, acted as a mentor for Muir and would be his sounding board and champion for years to come. Her personal introductions to luminaries of the age would prove to be highly significant to Muir's own development.

THE AGE OF ENCHANTMENT

As well as an academic interest in geology, mountaineering became another way in which Muir engaged with the matter of the Earth. As his memoirs show, from an early age, climbing provided him with a great sense of empowerment and confidence:

Climbing

also allowed him to experience Nature in its rawest form and satisfied his need for adventure. In this pursuit, he often put himself in great physical danger as he disapproved of the use of rope and other supporting tools- climbing simply with hob-nailed boots. He learned by necessity to become highly literate in reading geological formations and in discerning their composition and histories.

"I was so proud of my skills as a climber that when I first heard of hell from a servant girl who loved to tell its horrors and warn us that if we did anything wrong that we would be cast into it, I always insisted that I could climb out of it. I imagined it was only a sooty pit with stone walls like those of the castle and felt sure there must be chinks and cracks in the masonry for fingers and toes".

Source: Sierra Club, John Muir Exhibit, The Story of My Boyhood and Youth, Muir, John (1913).

As Muir entered the Yosemite Valley at the age of thirty in 1868 he was awestruck and enchanted by his surroundings with its sheer granite walls and dramatic waterfalls.

One of the first people he met in the Sierra Nevada was Galen Clark (1814-1910)- whom he later described as *"the best mountaineer I ever met"*. Clark provided Muir with friendly guidance and support as he oriented himself. As the first official 'Guardian of the Grant' which was signed into law by President Abraham Lincoln, Clark acted as a template for how Muir might lead the remaining years of his life. Helping to write the pioneering legislation which ceded the valley to the state of California for its preservation. Clark epitomised the dichotomy of an individual devoted to both the solitary exploration of nature and the need to teach others of its wonders and fragility.



The Climb Up Half Dome,
Yosemite National Park



Galen Clark on
Glacier Point in
Yosemite National Park ca. 1900

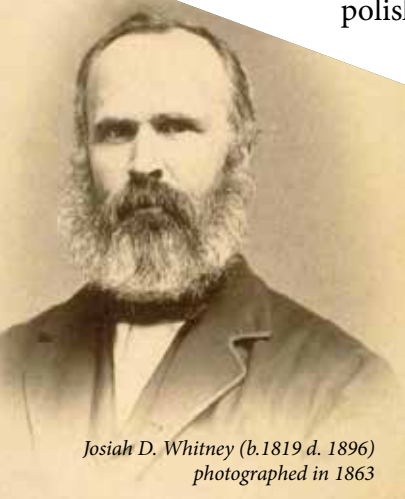
A PERIOD OF CONTROVERSY

After his first visit to the Yosemite Valley, Muir returned the following year with the intention of remaining for a longer period. He chose employment that allowed him free time to explore its features and gain a greater depth of understanding as to how it came to be formed.



Sketch by John Muir of Half Dome Showing Direction of Glacier Flow] John Muir Papers, Holt-Atherton Special Collections, University of the Pacific Library. ©1984 Muir-Hanna Trust

Sketching the landscape and drawing diagrams of his theory he came to assert that it was slow grinding glacial action that had gouged out the steep valley floor and polished the granite domes.



Josiah D. Whitney (b.1819 d. 1896) photographed in 1863

Upon hearing of Muir's counter argument, Whitney mocked him as an "ignoramus" and "mere shepherd" questioning his legitimacy in challenging a man of his stature.

Such

an assertion put Muir directly at odds with the pre-eminent authority on Yosemite, California state geologist Josiah D. Whitney (1819-1896). He had previously published a widely accepted report which claimed that the valley floor had fallen in due to a cataclysmic event such as an earthquake.

An insulted and frustrated Muir then felt compelled to carry out more detailed research to support his case and employed the assistance of Galen Clark and geologist, naturalist and university professor Joseph LeConte (1823-1901). LeConte was one of the first professional geologists to support his theory. The three men placed markers into the ice at the greatest heights of the Yosemite by Mount Maclure and Mount Lyell (both named after the top geologists of their day). By comparing careful measurements of the gaps between those markers on repeat visits, they were able to present further evidence in support of Muir's theory.

Soon the clash had generated interest from further afield with significant figures rallying in Muir's defence. A key intervention came from influential Harvard University professor of zoology and geology Louis Agassiz (1807-1873). He enthusiastically endorsed what Muir had written about the Yosemite glaciers stating:

"Here is the first man who has any adequate conception of glacial action... Muir is studying to greater purpose and with greater results than anyone else has done"

HORRORS!!
Appalling Times!
EARTHQUAKES
Awful Loss of Life!
25 Persons Killed!
Earth Opens!
HOUSES PROSTRATED
LONE PINE!
ITS TERRIBLE CONDITION
MOST HEART-RENDING SCENES!
Miraculous Escapes!
Individual Heroism!

Conclusively in March 1872, an earthquake of an estimated magnitude of 7.4 hit the Yosemite region, with its epicentre near the settlement of Lone Pine. It was one of the largest to take place in the region in recorded history and occurred at 2am killing 27 people and causing scores of injuries. Despite the destruction and panic, the valley floor remained intact, vindicating Muir's stance.

Upon hearing the roar of the Earth and feeling the huge tremor underfoot, he excitedly rushed from his cabin to investigate it exclaiming "a noble earthquake!". Where most were fearful, Muir rejoiced in the novelty and sublime nature of the experience.

THE GLACIAL PHASE

Following the conflict with Whitney, Muir sought to fortify his understanding of the role of glaciers on the landscape. In 1879 he was part of the first group of Euro-Americans to explore Glacier Bay, Alaska. It was there where he would be able to witness the living processes on the scale of the Yosemite glacier in his own age. He visited Alaska four times and on each trip, he added to his body of research -including beautiful sketchbooks-which would then form the basis for letters and papers to fellow academics. He also wrote exciting accounts of his explorations which were later published in the form of his best-selling book 'Travels in Alaska' (1915)- helping to make his name as a popular adventure writer.

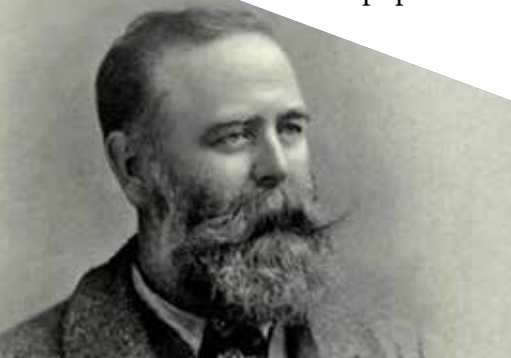
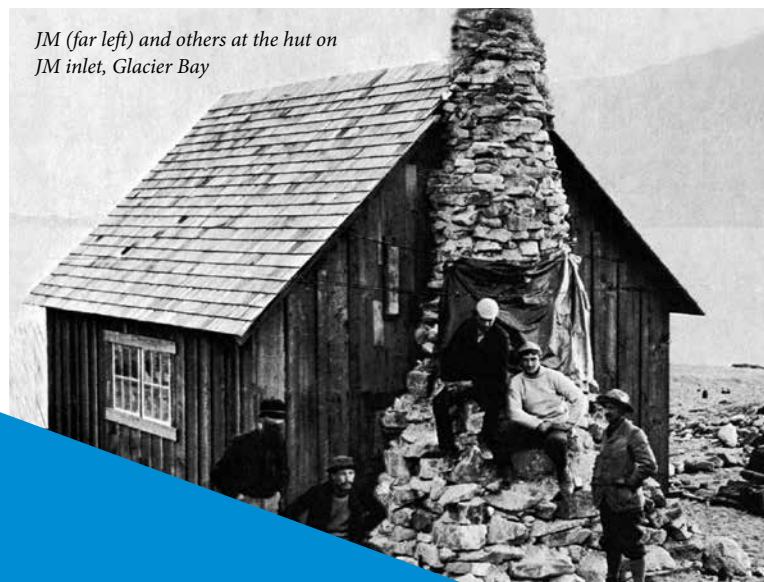


Photo of James Geikie (1839-1915) taken in 1888 by Guteirunst.

Upon arriving at Glacier Bay on his first trip, Muir named one of the glaciers after geologist James Geikie (1839-1915). He was particularly respected as a glaciologist whilst his elder brother Archibald Geikie (1835-1924) had a passion for volcanoes. It is likely that their paths crossed at an early stage in life owing to the closeness of their ages and the fact that the Geikie's mother had also been born in Dunbar.



JM (far left) and others at the hut on JM inlet, Glacier Bay

Muir recorded hundreds of glaciers on these trips and named many of them after fellow geologists by way of honouring their contributions to the field.

In a rather prophetic manner, Muir noted that many glaciers were in a state of retreat, however it is not clear that he attributed this to human induced climate change. He wrote:

"The glaciers are in the first stage of decadence, the waste from melting and evaporation being greater than the supply of new ice from their snowy fountains."

Sketch by John Muir of Davidson Glacier, Alaska - John Muir Papers, Holt-Atherton Special Collections, University of the Pacific Library. ©1984 Muir-Hanna Trust



As these images of the Muir Glacier show, such retreat is indeed now unfortunately emblematic of global warming due to our release of harmful greenhouse gases into the atmosphere.



Image courtesy of US National Snow and Ice Data Centre

UNDIMMED

Rather than slowing down in the last decade of his life, Muir was as prolific in his campaigning, travelling and exploring as he had ever been.

His passion undimmed, in 1905 he collected fossils in the Petrified Forest in Arizona whilst spending time there with his daughters. The dry air of the state was deemed beneficial to his daughter Helen who was recovering from ill health.

Muir instantly recognised the importance of the spectacularly colourful deposits of fossilised wood. Forged over 210 million years, the organic matter of these drowned trees was replaced by dissolved silica where it formed beautiful quartz crystals.

The National Museum of Scotland, Chambers Street, Edinburgh houses this example in its 'Discoveries' wing. It was collected by Muir and donated to the museum.

Fossil wood from
Petrified Forest
National Park, USA.

© National
Museums Scotland



Photograph of Muir
(1905) Arizona



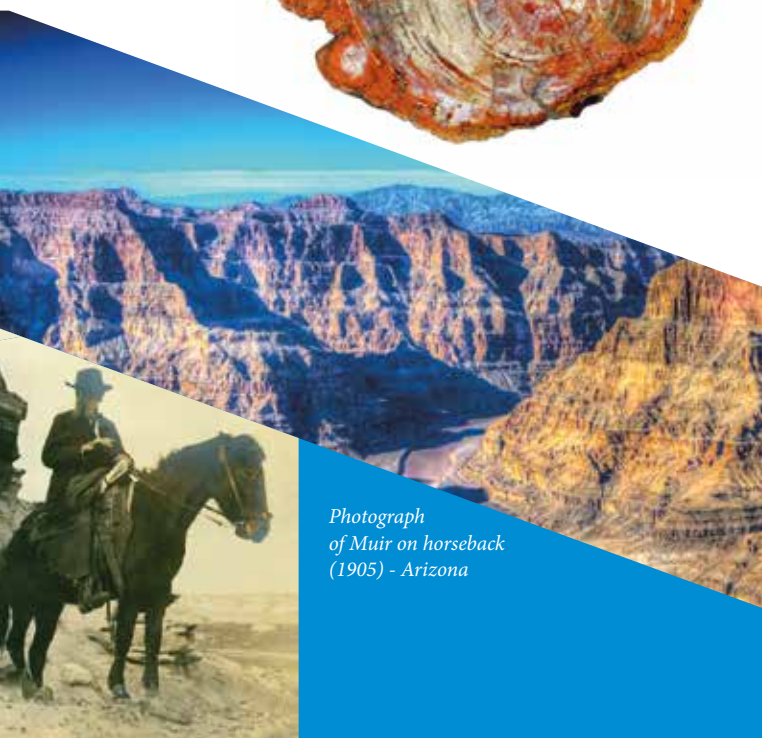
The following year the Petrified Forest was designated as a National Monument by President Theodore Roosevelt (1858-1919). In that year too, another cataclysm of nature impacted Muir's campaigning when San Francisco was struck by a devastating earthquake. The huge fire damage wreaked in its aftermath led to a clamour for a greater water supply for the city and John's beloved Hetch Hetchy valley in Yosemite National Park was identified as the site of a massive dam to flood the valley to create a vast reservoir. Muir would battle against this for the remainder of his life to no avail and it remains a bone of contention to this day.

Soon after, in 1908 there was more positive news though when the Grand Canyon National Monument was established. It would not be until after Muir's death that it gained National Park status. However he was instrumental in the argument to make that the case. Upon visiting the canyon for the first time he described it in characteristic poetic form. He wrote:

"It is the most tremendous expression of erosion and the most ornate and complicated I ever saw. Man seeks the finest marble for sculptures; Nature takes cinders, ashes, sediments, and makes all divine in firmness of beauty- turrets, towers, pyramids, battlemented castles, rising in glowing beauty from the depths of this canyon of canyons noiselessly hewn from the smooth mass of the featureless plateau."

Source: The Grand Canyon, Muir, John (1896)

Photograph
of Muir on horseback
(1905) - Arizona





SILENT SCULPTORS

The action of flowing ice, whether in the form of river-like glaciers or broad mantling folds, is but little understood as compared with that of other sculpturing agents. Rivers work openly where people dwell, and so do the rain, and the sea thundering on all the shores of the world; and the universal ocean of air, though unseen, speaks aloud in a thousand voices and explains its modes of working and its power. But glaciers, back in their cold solitudes, work apart from men, exerting their tremendous energies in silence and darkness. Coming in vapor from the sea, flying invisible on the wind, descending in snow, changing to ice, white, spiritlike, they brood outspread over the predestined landscapes, working on unwearied through unmeasured ages, until in the fullness of time the mountains and valleys are brought forth, channels furrowed for the rivers, basins made for meadows and lakes, and soil beds spread for the forests and fields that man and beast may be fed. Then vanishing like clouds, they melt into streams and go singing back home to the sea.

Source: Sierra Club, John Muir Exhibit, The Yosemite, Muir, John (1912)



The Father of the Glaciers (photograph by CL Andrews on Muir Glacier Alaska, 1902)



John Muir 1905, Petrified Forrest National Park, Arizona.



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