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1858

# Frederick Law Olmsted

1822–1903

## Emerald necklaces

Frederick Law Olmsted was fascinated by nature from his youth. After attending Phillips Academy, he studied agricultural science and engineering at Yale.

Olmsted's friend and mentor, Andrew Jackson Downing, the charismatic landscape architect, first proposed the development of New York's Central Park when he was publisher of *The Horticulturist* magazine. It was also Downing who introduced Olmsted to the English-born architect Calvert Vaux, whom Downing had personally brought back from England as his architect-collaborator. After Downing died a hero's death in a steamboat explosion on the Hudson River in July 1852, Olmsted and Vaux entered a competition in his honour to present designs for Central Park and, in 1858, won. Their 'greensward' plan envisaged sweeping meadows and lakes to mimic pastoral landscapes.

After 16 years of work by thousands of Irish, German and New England labourers, a difficult terrain of swamps and bluffs, punctuated by rocky outcroppings had been converted into Central Park. More than 10 million cartloads of material had been hauled through it, including 4 million trees, shrubs and plants, representing more than 1,400 species. Thirty-six bridges and archways had been built and four artificial lakes fed by the city's water supply.

The design of Central Park embodied Olmsted's social consciousness and commitment to egalitarian ideals. Influenced by Downing and by his own observations regarding social class in England, China and the American south, Olmsted believed that common green space must be equally accessible to all citizens. This principle is now so fundamental to the idea of a 'public park' as to seem self-evident, but it was not so then; Olmsted's tenure as park commissioner was one long struggle to preserve that idea.

Olmsted not only created city parks in many cities around the US, he also conceived entire systems of parks and interconnecting parkways which connected certain cities to green spaces. Two of the best examples of the scale on which Olmsted worked are the park system designed for Buffalo, New York, and the system he designed for Milwaukee, Wisconsin. For Boston, Olmsted conceived a rural park system he called the 'emerald necklace'. It involved developing 810 hectares to create five large parks, an interconnecting riverfront and playgrounds, which looped around the city in a giant semi-circle.



Olmsted's other great environmental achievement concerned the protection of Niagara Falls. By the early 1880s, only a small portion of the Falls were visible to the tourist. Olmsted felt that many people were losing out on the vast beauty that the Falls had to offer. He therefore set about purchasing Goat Island, which separated the Canadian and US Falls, as well as neighbouring Bath Island which had a small factory on it. He returned them to their natural glory and in 1885 helped create the Niagara Reservation, the country's first state park.

“What artist so noble . . . as he who, with far-reaching conception of beauty, in designing power, sketches the outlines, writes the colors, and directs the shadows of a picture so great that Nature shall be employed upon it for generations, before the work he arranged for her shall realize his intentions.”



[www.fredericklawolmsted.com](http://www.fredericklawolmsted.com)



Frederick Law Olmsted, *Civilizing American Cities: Writings on City Landscapes* (New York: Da Capo Press, new edn 1997)

1859

## Charles Darwin

1809–1882

### The theory of evolution

In 1831, Charles Darwin, a 22-year-old theologian and naturalist, embarked on HMS *Beagle*, bound for Patagonia on a scientific survey expedition. Already a passionate collector of plants, insects and geological specimens, this voyage of discovery was to be one of the most important in human history. During the five-year expedition, Darwin obtained an intimate knowledge of the fauna, flora and geology of South America, Australasia and Africa. But his most famous stay was in the Galapagos Islands, where he observed many plants and animals of the same general type as those on the South American continent. Back home after five years, the publication of his journal in *The Voyage of the Beagle* made Darwin famous as a popular author.

During the 1840s, Darwin remained a country gentleman among his gardens and conservatories in Downe, Kent. But, from the practical knowledge he had gained, he gradually developed a theory that the origin and evolution of species had taken place over thousands of millions of years, and not the few days recounted at the beginning of the Bible.

In November 1859, he published his findings in a book: *On the Origin of Species by Means of Natural Selection, or, the Preservation of Favoured Races in the Struggle for Life*. The book provided scientific evidence to show that all species of life have evolved over time from one or a few common ancestors through the process of 'natural selection'. The veracity of his arguments led to his theory of evolution being accepted

in his lifetime, while the theory of natural selection came to be widely seen as the primary explanation of the process of evolution by the 1930s and now forms the basis of modern evolutionary theory. Darwin's discovery remains the basis for our understanding of biology, as it provides a unifying logical explanation for the diversity of life.

Darwin wrote, 'There is grandeur in this view of life, with its several powers, having been originally breathed by the Creator into a few forms or into one; and that, whilst this planet has gone circling on according to the fixed law of gravity, from so simple a beginning endless forms most beautiful and most wonderful have been, and are being evolved.'

Darwin continued to write a series of books on botany, zoology, fertilisation and geology. His final work, *The Formation of Vegetable Mould through the Action of Worms*, was published in 1881, the year before his death. In 1959, one hundred years after publication of *On the Origin of Species*, the Charles Darwin Foundation was founded, dedicated to the conservation of the Galapagos Islands ecosystems.

“ It is not the strongest of the species that survives, nor the most intelligent that survives. It is the one that is the most adaptable to change. ”



darwin-online.org.uk

1864

## George Perkins Marsh

1801–1882

### America's first environmentalist

In the 19th century, geographers believed that the physical aspects of the Earth were entirely the result of natural phenomena. This was not an opinion held by George Perkins Marsh, a widely travelled philologist and diplomat, originally from Vermont. Marsh believed that we are not passive inhabitants of Earth. Rather, we give Earth its shape and form; we are responsible for it.

Marsh was partially sighted. As a child, finding reading difficult, he explored the forests near his boyhood home. If he could not read books, he could at least read nature. He developed an abiding love of animals, plants and the world they occupy. Few of us, he once said, could make as good a claim to personality as a respectable oak.

In 1864, while acting as US Ambassador in Italy, Marsh wrote an early key work of ecology called *Man and Nature* (or *Physical Geography as Modified by Human Action*). He had seen the damage humans had caused by clearing the once lush forests surrounding the Mediterranean. Marsh argued that deforestation could lead to desertification, highlighting the advance of the Sahara as evidence. He asserted,



‘The operation of causes set in action by man has brought the face of the Earth to a desolation almost as complete as that of the moon.’

We are, he wrote, destined to disturb nature’s harmonies. But we have to learn to do so as good stewards not as vandals.

*Man and Nature* was heavily revised and republished in 1874 as *The Earth as Modified by Human Action*. Marsh’s book was widely praised by critics and scientists and indirectly sparked the Arbor Day movement, the establishment of forest reserves and a national forest system, as well as being a catalyst in the establishment of the Adirondack State Park. His influence also extended beyond North American borders.

George Perkins Marsh’s book fell into disuse until the 1930s when it was rediscovered by those who were beginning to realise how much the planet was being harmed. The historian Lewis Mumford has called him ‘the fountainhead of the conservation movement’.

“ Man, who even now finds scarce breathing room on this vast globe, cannot retire from the Old World to some yet undiscovered continent, and wait for the slow action of such causes to replace, by a new creation, the Eden he has wasted. ”



David Lowenthal, *George Perkins Marsh: Prophet of Conservation* (Seattle, WA: University of Washington Press, 2000)

1868

## Joseph Bazalgette

1819–1891

### The sewage engineer

By the 1850s, London was suffering from recurring epidemics of cholera, with tens of thousands dying from the disease. At the time, the River Thames was little more than an open sewer, devoid of any fish or other wildlife. Following ‘The Great Stink’ caused by the summer heatwave of 1858, Parliament decided that something must be done about the foul air they believed to be causing disease.

Joseph Bazalgette, chief engineer to London’s Metropolitan Board of Works, realised the cause was not the air but contaminated water. He put forward propos-

als to revolutionise London's sewerage system at colossal expense. Bazalgette's solution was to construct 133 km of underground brick main sewers to intercept sewage outflows, and 1,770 km of street sewers to intercept the raw sewage which up until then flowed freely through the streets and thoroughfares of London. The scheme involved the construction of a number of major pumping stations both north and south of the river. By removing sewage contamination from water supplies, the new sewerage system dramatically reduced the incidence of cholera and other water-borne diseases.

Bazalgette also had a significant impact on London's appearance. His sewers were built behind embankments on the riverfront, replacing the tidal mud of the Thames shoreline with reclaimed ground for riverside roads and gardens. He constructed the Victoria, Albert and Chelsea Embankments, the latter reclaiming over 21 hectares from the Thames.

“ The whole of the sewage passed down sewers from the high ground at right angles to the Thames into the low grounds adjoining the Thames, where at high water it was pent up in the sewers, forming great elongated cesspools of stagnant sewage, and then when the tide went down and opened the outlets, that sewage was poured into the river at low water at a time when there was very little water in the river. ”



Stephen Halliday, *The Great Stink of London: Sir Joseph Bazalgette and the Cleansing of the Victorian Metropolis* (Stroud, UK: Sutton Publishing, 1999)

1872

## John Ericsson

1803–1889

### Inventor of the 'sun motor'

Following the end of the American Civil War, 60-year-old Swedish-born engineer, John Ericsson, the inventor of the screw-propeller and the first metal-clad warship, turned his genius to developing what he called the 'sun motor'. His work was inspired by a fear shared by virtually all of his fellow solar inventors that coal supplies would someday end. Following extensive experiments from the rooftop of his Manhattan home, in 1872 Ericsson built a machine that used two concave mirrors to gather radiation from the sun strong enough to run an engine at 240 rpm. His original intention was that Californian farmers utilise his sun motor for irrigation projects.

Ericsson maintained an unshakable belief in the future of solar power to his last breath. He had set up a large engine in his back yard and was still perfecting it when



he died in early 1889. Unfortunately for the struggling discipline, the detailed plans for his improved sun motor died with him. Nevertheless, the search for a practical solar motor was not abandoned. In fact, the experimentation and development of large-scale solar technology was just beginning.

“ The time will come when Europe must stop her mills following the inevitable exhaustion of the coal fields. Upper Egypt then, with her never-ceasing sun power, will invite the European manufacturer to remove his machinery and erect his mills on the firm ground along the sides of the alluvial plain of the Nile where sufficient power can be obtained to enable him to run more spindles than a hundred Manchesters. We estimate that 22 million solar engines, each of 100 horsepower could be kept in constant operation, during nine hours a day, by utilising only that heat which is now wasted on a very small fraction of the land extending along some of the water fronts of the sunburnt regions of the Earth. ”

 [www.johnericsson.org](http://www.johnericsson.org)

1872

## Julius Sterling Morton

1832–1902

### Founder of Arbor Day

In the 1840s, the Midwestern state of Nebraska was a territory with a wide prairie. When pioneers moved to settle there, they found few trees to build houses or to burn fuel. There was no shade from the sun or shelter from the wind, and crops did not grow well in the dry earth.

When Julius Sterling Morton and his wife moved from their home in Detroit, Michigan to settle in Nebraska, one of the first things they did was to plant trees. As the editor of the state's first newspaper, *The Nebraska City News*, Morton began to advocate planting trees to help sustain life on the vast, barren plain.

In January 1872, Morton, now Secretary of the Nebraska Territory, spoke at a meeting of the State Board of Agriculture, proposing that citizens set aside a day to plant trees. He suggested offering prizes as incentives for committees and organisations that successfully planted the most trees. On 10 April 1872, Nebraska celebrated its first Arbor Day, with Nebraskans planting a staggering 1 million trees in less than 24 hours. Two years later, Arbor Day was officially proclaimed by Governor Robert W. Furnas. In 1882 it became a legal holiday in Nebraska and 22 April, Morton's birthday, was selected as the date for its permanent observance, particularly at schools. Julius Sterling Morton later wrote:

Arbor Day which has already transplanted itself to every state in the American Union and has even been adopted in foreign lands . . . is not like other holidays. Each of these reposes on the past, while Arbor Day proposes for the future.

Today the most common date for state observances is the last Friday in April, and several US presidents have proclaimed Arbor Day on that date. But a number of Arbor Days have taken place at other times to coincide with the best tree-planting weather, ranging from January and February in the south to May in the north.

Julius Sterling Morton became Secretary of Agriculture in the government of President Grover Cleveland. He is credited with helping change that department into a coordinated service to farmers, and he supported Cleveland in setting up national forest reservations.

“ Each generation takes the Earth as trustees. We ought to bequeath to posterity as many forests and orchards as we have exhausted and consumed. ”



[www.arborday.org](http://www.arborday.org)

1876

## Ellen Swallow Richards

1842–1911

### The feminist ecologist

In 1876, Ellen Swallow Richards, a chemistry professor at the Massachusetts Institute of Technology (MIT), bought an Italianate home in Jamaica Plain, a part of Boston, which she systematically began to convert into what she later called the Center for Right Living.

She installed window units that opened at both the top and bottom to release warm, stale air. She removed lead pipes, set up a system of indoor oxygen-producing plants and re-routed the waste system away from the property's well. Richards hired MIT students to scientifically test foods, utilities and utensils to the point of calculating the smallest units of fuel, time and money needed for individual tasks. She would call this 'home economics'.

Richards was a pioneer in many ways. The foremost female industrial and environmental chemist in the US in the 1800s, Richards was the first woman admitted to MIT and its first female instructor, the first woman in America accepted to any school of science and technology, and the first American woman to earn a degree in chemistry.

Her work was not confined to her home. In 1887, at the request of the Massachusetts State Board of Health, Richards and her team undertook a survey of the quality of the inland bodies of water of Massachusetts, many of which were already polluted with industrial waste and municipal sewage. Over 20,000 water samples

were examined, the first such large-scale study in America. As a result, Massachusetts established the first water quality standards in America, as well as the first modern sewage treatment plant, in Lowell. Richards was a consulting chemist for the Massachusetts State Board of Health from 1872 to 1875, and the official water analyst from 1887 until 1897.

In later years, Richards was a tireless campaigner for the new discipline of home economics applying scientific principles to domestic situations, such as nutrition, clothing, physical fitness, sanitation and efficient home management, with the aim of allowing women more time for pursuits other than cooking and cleaning. In 1908, she was chosen to be the first President of the newly formed American Home Economics Association.

1876

## George Bird Grinnell

1849–1938

### A journalist and conservationist

In 1860, the 11-year-old George Bird Grinnell moved with his father to Audubon Park, a piece of land owned by the ageing Lucy Audubon, the widow of bird artist **John Audubon**. His friendship with Lucy laid the foundation for his lifelong love of the outdoors and of protecting bird life. In his twenties, while on fossil-hunting expeditions, the young George realised that hunting and shooting had brought such species as the passenger pigeon, the Carolina parakeet and the buffalo to the very edge of extinction. ▶

Grinnell had extensive contact with the terrain, animals and Native Americans of the northern plains, starting with his participation in the last great hunt of the Pawnee in 1872 and spending many years pursuing the natural history of the region. As a naturalist he accompanied Custer's 1874 Black Hills expedition in search of gold. In 1875, Colonel William Ludlow, who had also been on Custer's gold exploration effort, approached him to again serve as naturalist and mineralogist on an expedition to Montana and the newly established Yellowstone Park. His experience in Yellowstone led to the production of the first of many magazine articles dealing with conservation and the American west.

Seeing the need for urgent action, Grinnell purchased a hunting and fishing tabloid publication called *Forest and Stream*. As its new editor, he directed its editorial to fiercely champion the cause of conservation and sportsmanship. He championed the protection of big game from poachers in the Yellowstone Park. He advocated the protection of the Adirondack mountain range and pressed for sustainable management of the nation's forests. He remained editor for 35 years, until 1911.

In 1885, Grinnell discovered the glacier in Montana that now bears his name and was later influential in establishing Glacier National Park in 1910. He was also

a member of the Edward Henry Harriman expedition of 1899, a two-month survey of the Alaskan coast by an elite group of scientists and artists.

51 In 1887, Grinnell was a founding member, with **Theodore Roosevelt**, of the Boone and Crockett Club, dedicated to the restoration of America's wildlands. Other founding members included General William Tecumseh Sherman and **Gif-**

48 **ford Pinchot**.

Subsequent US legislation to regulate the hunting of migratory birds was indirectly due to the campaigning journalism of George Bird Grinnell.

“ We are a water drinking people, and we are allowing every brook to be defiled. ”



[www.boone-crockett.org](http://www.boone-crockett.org)



Michael Punke, *Last Stand: George Bird Grinnell, the Battle to Save the Buffalo, and the Birth of the New West* (London: Collins, 2007)

1883

## William Morris

1834–1896

### Eco-socialism

With the relentless advance of the industrial revolution in Victorian Britain, William Morris – poet, critic, artist and designer – a towering figure in the cultural and political landscape of England, devoted his later literary and theoretical skills to promoting socialism.

From 1883, Morris promoted his ideas within the Social Democratic Federation and, later, The Socialist League. He also expressed his utopian and radical views in his writing of an imaginary future socialist world in *A Dream of John Ball* and, in 1890, *News from Nowhere*. The latter intimately linked Marxism to ecological regeneration and sustainability. In this respect, many contemporary scholars believe him to be one of the first eco-socialist thinkers. His romantic vision most likely came from his earlier commitment as an artist to a ‘critical notion of beauty’.

Morris was radically opposed to industrialisation. With a group of friends, he set up a company (‘The Firm’) to revive traditional, hand-made crafts such as stained-glass painting, dyeing and printing fabrics, tapestry weaving and furniture making. He was one of the principal founders of the British Arts and Crafts movement.

“ I do not [believe] we should aim at abolishing all machinery; I would do some things with machinery which are now done by hand, and other things by hand which are now done by machinery; in short, we would be the masters of our machines and not their slaves, as we are now. It is not this or

that . . . machine which we want to get rid of, but the great intangible machine of commercial tyranny which oppresses the lives of all of us. ”



[www.morrisociety.org](http://www.morrisociety.org)



William Morris, *News from Nowhere* (Oxford: Oxford University Press, new edn 2003)

1888

## Ernst Rudorff

1840–1917

### A musician protects nature

Ernst Friedrich Karl Rudorff of Leipzig came from a wealthy musical family. He was a highly respected music teacher and composer. But Rudorff became increasingly concerned about the protection of nature in his native Germany, including rural paths and landscapes. His enemies were the scars of economic development – unsightly railways, dams on scenic rivers, the extension of agriculture into virgin land, the replacement of small fields, copses and hedgerows by larger fields suitable for mechanical equipment, and the despoiling of the landscape by tourist hotels, scenic railways and litter.

In 1888, Rudorff coined a new word in the German language – *Naturschutz* (nature protection). One of Rudorff's close colleagues was Hugo Conwentz, 15 years his junior and director of the Prussian Natural History museum. Conwentz had been making a detailed inventory of objects such as moraines, dunes and quarries which should, in his opinion, remain wild. In 1901, Rudorff published a book, *Heimatschutz* (*Homeland Protection*), in which he protested against the destruction of nature and called for the creation of nature reserves.

Three years later, Rudorff, Conwentz and other supporters founded the League for Homeland Protection (*Bund Heimatschutz*) to preserve natural wonders, endangered species, rural landscapes and other threatened historic objects such as buildings, costumes and crafts.

1889

## Mrs Phillips and Mrs Williamson

dates of birth and death unknown

### For the protection of birds

Towards the end of the Victorian era in Britain, several waterfowl birds were seriously threatened with extinction due to the demands of fashion. For example, the

skin and soft underpelt and head frills of the great crested grebe's feathers were particularly in demand by the millinery trade to decorate ladies' fancy hats and ruffs. The only way to obtain such feathers was by killing the birds. In one year, according to the official trade figures of auctions at the London Commercial Sales Rooms, some 1,608 packages of heron plume came under the hammer.

In 1889, two small concerned groups decided that if they got together something could be done. One was Mrs Emily Williamson's Plumage League in Didsbury, Manchester, which met at the local Fletcher Moss Botanical Gardens to campaign against the craze for egret feathers from Florida. The other was the Fur and Feathers League run by Mrs Phillips in Croydon, near London, which campaigned against the killing of grebes.

The first publication of the Society for the Protection of Birds, formed by the merger of the two groups, was called *Destruction of Ornamental Plumaged Birds*. Soon afterwards, the Duchess of Portland accepted the office of President and the Society for the Protection of Birds began in earnest.

Incorporated by Royal Charter in 1904, today the Royal Society for the Protection of Birds has 1,500 employees, 12,000 volunteers and over 1 million members, making it the largest wildlife conservation charity in Europe. In recent years, legislation, changing fashions and an increase in the number of lakes available for breeding have seen great crested grebe numbers in Britain and Ireland grow to over 1,000 pairs and the egret has even expanded its worldwide range to include south-western England.



[www.rspb.org.uk](http://www.rspb.org.uk)

1891

## Poul la Cour

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1846–1908

## Johannes Juul

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1887–?

### Harnessing the power of the wind

The Danish are culturally predisposed towards wind power and, at a time when electricity was about to be introduced, Poul la Cour, a Danish scientist, inventor and educationalist, believed that wind should contribute to the electrification of the country. In Holland, proposals to produce electricity from windmills had been investigated but not implemented because of their low efficiency and the problem of storing the energy. Overcoming these problems appealed to the inventor and physicist la Cour.

In 1891 la Cour got the idea of storing wind energy in the form of hydrogen (and oxygen) using electrolysis. He was granted financial support by the Danish government and the first experimental mill at Askov Folk High School, where he was teaching, was erected in the summer of 1891. La Cour's first task was to make the mill produce a constant current to drive a generator. This was solved by a differential regulator, the so-called 'kratostate', which was later simplified and widely used in electricity-producing windmills in the Nordic countries and Germany.



In 1904, la Cour founded the Society of Wind Electricians which reached a membership of 356 after a year. By the end of the First World War, more than a quarter of all rural power stations in Denmark were using wind turbines. During the long wartime blockade, the 3 MW (megawatt) provided by these crude wind machines and the widespread use of small farm windmills for grinding grain were a valuable source of power for an impoverished rural population. Though most windmills

were used for mechanical power, the Danish Energy Agency estimates that wind turbines were providing the equivalent of 120–150 MW in Denmark by 1920.

One of la Cour's students at Askov was the engineer Johannes Juul. Half a century later, Juul built the first alternating-current wind turbines at the Danish village of Vester Egesborg. In 1957, he built a 200 kW (kilowatt) turbine on the coast of Gedser in southern Denmark. Its aerodynamic efficiency enabled it to run for 11 years, virtually maintenance-free. Indeed, the Gedser wind turbine was renovated as late as 1975 at the request of NASA which wanted measurements from the turbine for the new US wind energy programme.

Poul la Cour and Johannes Juul were the European pioneers of wind power, and their work carries huge importance as the world comes to terms with the problems of climate change and the finite resources of a carbon-based economy.

 [www.windsofchange.dk](http://www.windsofchange.dk)

1892

## John Muir

1838–1914

### High sierra

When he was 29 years old, the Scottish-born John Muir was working in a factory in Wisconsin. While connecting a machine belt, he accidentally thrust the point of

a file into his right eye. That evening his other eye failed him. Thinking he had gone blind he protested, 'My right eye is closed forever on God's beauty!' Muir's eyesight would return, but he found the prospect of blindness so terrifying that he began plans to see the world's natural wonders. He became a wilderness explorer, renowned for his adventures in California's Sierra Nevada, for crossing Alaskan glaciers, for riding an avalanche down a mountain and surviving, for exploring the source of waterfalls and for travelling all over the world to see trees and mountain landscapes.

In 1892 Muir wrote to the editor of *The Century Magazine*, 'Let us do something to make the mountains glad!' The result was the foundation of the Sierra Club, the first major organisation in the world dedicated to using and 'preserving' wild nature, and now one of the most important conservation organisations in the US. Muir was the club's president for 22 years until his death.

Muir's hugely popular writing contributed greatly to the creation of the US national parks Sequoia, Mount Rainier, Petrified Forest and Grand Canyon. His words and deeds helped

51 inspire President **Theodore Roosevelt**'s innovative conservation programmes, including the establishment of Yosemite National Park by Congressional action. He was not always successful, however, and some say he died of a broken heart in 1914 when his beloved Hetch Hetchy Valley, which he referred to as 'a second Yosemite', was flooded to create a reservoir to supply water to San Francisco.

Muir's vision of nature's value for its own sake and for its spiritual, not just practical, benefits to humankind helped to change the way we look at the natural world. He was a preservationist rather than a conservationist and argued for many years with leading figures

48 in the latter camp, such as **Gifford Pinchot**.

Muir's heroic life is recognised in the naming of many places, including the Muir Glacier in Alaska, Muir Memorial Park in Wisconsin and, in California, by such places as Muir Woods National Monument, John Muir Trail, John Muir Wilderness and the John Muir National Historic Site. In his birthplace of Dunbar, Scotland, there is a Muir Country Park, and his birthplace home is now a museum. Scotland also boasts a John Muir Trust which works to preserve nature in the UK, much as the Sierra Club does in the US and Canada, and through global partners around the world.

“ When we try to pick out anything by itself, we find it hitched to everything else in the Universe. ”

