From "Cramped Cabins to 'Floating Laboratories'": Transporting Knowledge and Collections

Overview

This lesson explores British scientific voyages from the late 17th to early 19th centuries, with particular attention to identifying "traces" of unnamed contributors in historical sources. Scientific expeditions required extensive collaboration among ship captains and crews, colonial agents, Indigenous guides, enslaved and free Africans, and local collectors who provided essential knowledge and labor—yet most of these contributors remain anonymous in historical records. Through examining sources like James Petiver's instructions to collectors and the evolution from "cramped cabins to 'floating laboratories,'" you'll begin posing questions about these unnamed figures and considering strategies for uncovering their stories. This lesson highlights significant voyages by Royal Society Fellows and their collaborators, including Edmond Halley, Hans Sloane, James Cook, Olaudah Equiano, and Charles Darwin.[1]

1. Note: Historical sources often contain language that modern readers may find outdated or offensive. Despite this problematic language, it is important to preserve it when analyzing history because it helps us recognize how perspectives and power dynamics have shifted over time.

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Overview

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Introduction

As Lesson 1 notes, early modern European empires sought land, power, and wealth which, as the 1667 "Ode to the Royal Society" stated, meant it was "time to Discover Worlds and Conquer . . . / [and t]o [fathom] the vast depths of Natures Sea." These efforts included seeking new knowledge of astronomy, chemistry, geology, navigation, oceanography, and other natural sciences, like biology and botany. British government officials, merchants, and others came to excel at such challenges, charting sea routes and eventually creating the largest maritime empire in world history. Through these efforts, British naturalists gathered knowledge and specimens that helped make significant contributions to what became known as "Western science," though this knowledge was built upon extensive collaboration with Indigenous, African, and local knowledge systems.

It was a Royal Society Fellow, Edmond Halley (1656–1742), who led the first British maritime scientific voyage. From 1698 to 1700, he captained the HMS *Paramour* in the Atlantic Ocean. Halley's main goal was to map magnetic compass variations (referring to compass needle deviations from true north due to the Earth's magnetic field) to improve navigation. He also recorded wildlife sightings, expanding his mission to include biological discoveries. Despite its challenges, this voyage set the stage for future scientific expeditions.

Portrait of Edmond Halley, before 1722.

Key Terms:

Botanical Garden

Ecological Imperialism

Empirical

Evolution

Maritime

Settler Colonialism

Taxidermy

Terrarium

Halley's magnetic variation measurements, published in 1701, were more than scientific data. They became essential references for mariners, revolutionizing navigation in the Atlantic. His work, which significantly improved navigation, was pivotal in British maritime scientific exploration, setting the stage for significant subsequent missions, led by Captain James Cook and evolutionary biologist Charles Darwin. Halley's *Paramour* voyages marked British imperial efforts that tied scientific research to British ambitions to expand trade and colonization, underscoring the profound impact of their work on navigation and exploration.

Map showing lines of magnetic compass variation made by Edmond Halley in 1702.

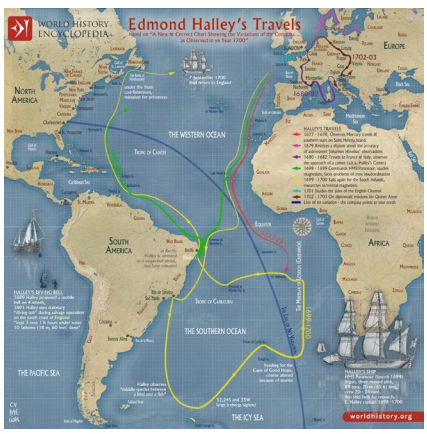
Maritime and scientific networks

As Lesson 1 revealed, from its inception, the Royal Society was a beacon of scientific communication. Its members initiated foreign correspondence to establish scientific links with British colonists in the Atlantic World. Over the next century, the Society developed policies to allow some colonial citizens (typically white men) to join its ranks, actively encouraging them to correspond with other Society Fellows, attend meetings, and stay updated with the latest scientific developments. This commitment to fostering scientific communication, a cornerstone of the Society's influence and the spread of scientific knowledge, underscores the importance of what Lesson 1 described as "gentlemanly" collaboration in scientific progress.

James Petiver's and Hans Sloane's maritime networks, often focused specifically on collection and transport of biological samples, played a crucial role in connecting Britain with its Caribbean colonies. Colonial collectors also sent specimens to Petiver, Sloane, and other Society members by ship, creating networks that benefited Society Fellows and led to the formation of scientific societies in the Americas.

Maritime expansion and scientific development

Britain's efforts to develop colonies involved establishing trading posts in strategic locations in the Atlantic World. This increased overseas communications and expanded dependence on British ships. The British Empire developed fleets of ships, including navy, packet (mail), and merchant vessels. Merchant vessels included those of chartered trading companies, including those directly involved in the slave trade. As recent scholars have argued, during the centuries that the British Empire participated in the slave trade, all British ships connected to imperial aims, regardless of their primary purpose, also participated in the slave trade. That included transporting enslaved Africans to

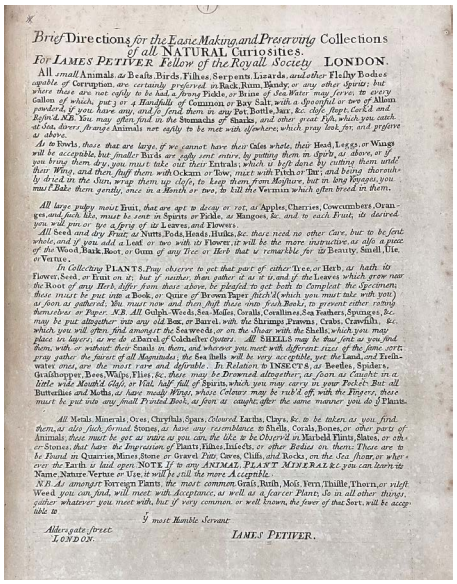


Voyages of Edmond Halley in the Atlantic World.

support colonial ambitions through forced labor.

To be clear, British naturalists' presence in the Atlantic World cannot be separated from the business of empire: The movement of flora (plants) and fauna (animals) back and forth between Britain and its colonies (known as the Columbia Exchange) was often directly tied to advancing British knowledge of the Atlantic World and landscaping it for British colonists (known as **ecological imperialism**). British collectors like Sloane and Petiver relied on these colonial networks to acquire natural specimens, often enlisting ship captains, plantation owners, and trading company employees to collect and transport specimens and scientific knowledge across the British Empire.

Advancements in specimen transport and preservation



Brief Directions for the Easie Making, and Preserving Collections of all NATURAL Curiosities.

For JAMES PETIVER, Fellow of the Royall Society. LONDON.

All small Animals, as Beasts, Birds, Fishes, Serpents, Lizards, and other Fleshy Bodies capable of Corruption, are certainly preserved in Rack, Rum, Brandy, or any other Spirit; but where these are not easily to be had, a strong Pickle, or Brine of Sea Water may serve, to every Gallon of which, put 3 or 4 Handfuls of Common or Bay Salt, with a Spoonful or two of Allom powdered, if you have any, and so send them in any Pot, Bottle, Jar, &c. close stopt, Corkt and Rosin'd. N.B. You may often find in the Stomachs of Sharks, and other great Fish, which you catch at Sea, divers strange Animals not easily to be met with elsewhere, which pray look for, and preserve as above.

As to Fowls, those that are large, if we cannot have their Skins whole, their Heads, Legs, or Wings will be acceptable, but smaller Birds are easily sent entire, by putting them in Spirit, as above, or if you bring them dry, you must take out their Entrails; which is best done by cutting them under their Wings, and then stuffing them with Ockum or Tow, must with Pitch or Tar, and being thoroughly dried in the Sun, wrap them up close, to keep them from Moysture, but in long Voyages, you must Bake them gently, once in a Month or two, to kill the Vermin which often breed in them.

All large pulpy moist Fruit, that are apt to decay or rot, as Apples, Cherries, Cowcumbers, Oranges, and such like, must be sent in Spirits or Pickle, as Mangoes, &c. and to each Fruit, as desired you will pen or tye a Sprig of its Leaves, and Flowers.

All Seed and dry Fruit, as Nutts, Pods, Heads, Husks, &c. those need no other Care, but to be sent whole, and if you add a Leaf or two with the Flower, it will be the more instructive, as also a piece of the Wood, Bark, Root, or Gum of any Tree or Herb that is remarkble for its Beauty, Smell, Use, or Vertue.

In Collecting PLANTS, Pray observe to get that part of either Tree, or Herb, as hath its Flower, Seed, or Fruit on it; but if neather, then gather it as it is, and if the Leaves which grow near the Root of any Herb, differ from those above, be pleased to get both to Compleat the Specimen, those must be put into a Book, or Quire of Brown Paper, pitch'd (which you must take with you) as soon as gathered; You must now and then shift those into fresh Books, to prevent either rotting themselves, or Paper. N.B. All Gulph-Weeds, Sea-Mosses, Corals, Coralines, Sea-Feathers, Spunges, &c. may be put altogether into any old Box, or Barrel, with the Shrimps, Prawns, Crabs, Crawfish, &c. which you will often find amongst the Seaweeds, or on the Shoar with the Shells, which you may place in layers, as we do a Barrel of Colchester Oysters. All SHELLS may be that sent as you find them, with, or without their Snails in them, and wherever you meet with different sizes of the same sort, pray gather the largest of all Magnitudes; the Sea Shells will be very acceptable, yet the Land, and Freshwater ones, are the most rare and desirable. In Relation to INSECTS, as Beetles, Spiders, Grashopper, Bees, Wasps, Flies, &c. these may be Drowned altogether, as soon as Caught in a little wide Mouth'd Glass, or Vial, half full of Spirits, which you may carry in your Pocket: But all Butterflies and Moths, as have mealy Wings, which Colours may be rub'd off with the Fingers, these must be put into any small Printed Book, as soon as caught after the same manner you do of Plants.

All Metals, Minerals, Ores, Chrystals, Spars, Coloured Earths, Clays, &c. to be taken as you find them, as also such formed Stones, as have any resemblance to Shells, Corals, Bones, or other parts of Animals, these must be got as neare as you can, the like to be Observed in Marbled Flints, Slates, or other Stones, that have the Impression of Plants, Fishes, Insects, or other Bodies on them: These are to be Found in Quarries, Mines, Stone or Gravel Pitts, Caves, Cliffs, and Rocks, on the Sea shoar, or wherever the Earth is laid open: NOTE If to any ANIMAL, PLANT, MINERAL &c. you can learn the Name, Nature, Vertue or Use, it will be still the more Acceptble.

N.B. As amongst Forreign Plants, the most common Grass, Rush, Moss, Fern, Thistle, Thorn, or other Weed you can find, will meet with Acceptance, as well as a far more Plant, so in all other things, gather whatever you meet with, but if very common, or well known, the fewer of that Sort, will be acceptable to

Your most Humble Servant

Aldersgate street. LONDON.

JAMES PETIVER.

James Petiver's instructions for specimen collectors, c. 1709.

Sea travel and ship conditions were rife with danger for biological specimens exposed to heat, cold, drought, exposure to salt water, harm by shipboard pests (for example, insects and rats), or simple neglect by their shipboard caretakers. Ship captains, surgeons, and other travelers hired to transport specimens often lacked the necessary knowledge and interest in the careful transport of live specimens. Naturalists had to develop new techniques for transporting live botanical specimens across the Atlantic, including protecting seeds from rot and germination, understanding different plants' specific moisture and soil needs, and methods for transplanting and maintaining plants in new environments.

Ships transported animal specimens, including mammals, birds, reptiles, fish, and insects as carcasses, taxidermy mounts, and live specimens. Each required particular care to maintain its usefulness to naturalists in Britain for further study and display in personal, local, national, and colonial collections like the hummingbird display (lesson warm-up activity). Naturalists like Petiver developed detailed instructions for preserving specimens of many varieties.

The French naturalist René-Antoine Ferchault de Réaumur, a fellow of the Royal Society, published "Diverse Means for Preserving [Specimens] from Corruption" (c. 1749) in the Royal Society's journal. He outlined four methods for preserving specimens, including soaking specimens in alcohol, using spices, salt, chemical compounds, or oven-drying specimen carcasses. These methods helped naturalists better transport specimens across the ocean, though they did not solve long-term storage issues. Building on Réaumur's work, other naturalists like Tesser Samuel Kuckahn developed improved preservation techniques and encouraged the development of **taxidermy**.

These improvements allowed significant specimen collections like Ashton Lever's Leverian Museum in London (1775–1786), which attracted public audiences and contributed to the foundations of the British Museum and Natural History Museum. Remarkably, some specimens from these early collections, such as 300-year-old butterfly specimens

Interior view of a private natural history museum in London, 1785. Among other items, the museum included items collected on Cook's and other voyages to Australia and the Pacific.

contributed by Petiver and Sloane, survive today.

The Wardian Case, invented in 1829, advanced the transport of live plants. The glass and wood cases were portable **terrariums** that protected plants on long sea voyages. The glass allowed sunlight in and created conditions inside the cases that helped keep plant specimens hydrated. These cases ensured British naturalists could collect and safely deliver botanical specimens to British **botanical gardens** such as Kew, located in London.

While naturalists strived to ensure excellent care to preserve the specimens during arduous ocean voyages, the British considered the health of the enslaved humans who made up the bulk of the slave ships' cargo less critical. The contradictory treatment of scientific specimens versus human lives starkly reveals the dehumanizing mindset toward the enslaved African people also transported across the Atlantic to serve the growing British Empire and its global power.

Black sailors on British ships

It is important to state, however, that African people sometimes sailed on British ships as more than just chattel (private property). Enslaved and free Black sailors played significant roles in European maritime history, particularly in the British Navy during the 18th century. While most were regulated to the most menial crew roles, some advanced to higher ranks, including at least one, John Perkins, who became a ship captain. Some Black sailors enjoyed unique opportunities in the Atlantic World, including access to Western educational opportunities, allowing them to become highly literate in European languages and writing. As skilled and experienced sailors, often bringing African knowledge of water routes, they contributed to Atlantic World history in diverse ways.

A relief from Nelson's Column, a monument in London commemorating the 1805 British naval victory over the French and Spanish at the Battle of Trafalgar. Among the men depicted is a Black sailor named George Ryan, on the far left.

Maritime trading companies, including The Royal African Company and the British Navy, relied on Black sailors as essential additions to most white crews. Black sailors contributed to nautical innovations, such as a simple but crucial early form of sea anchor invented by a Black sailor in 1763. Early modern Europeans recognized and described enslaved Africans' swimming and diving abilities, skills that Europeans generally lacked. Research reveals that Africans from coastal regions, for example, learned to swim at an early age and that many African peoples developed cultural norms related to their lives near oceans and rivers. While Black sailors joined European ship crews for a variety of reasons, enslaved maritime workers were hired out

to ship captains, as happened with Olaudah Equiano before his freedom, sometimes even earning wages. As many European sailors at the time could not even swim, Africans' aquatic skills could be crucial at sea and in collecting aquatic specimens.

Tracing maritime missions and the evolution of shipboard science

Early voyages like Halley's often focused on improving accuracy in navigation and mapping ocean currents and coastlines. However, the concurrent developments of **settler colonialism** and scientific methods in the natural sciences created new interest in colonial plants and animals as sources of food, medicine, and raw materials for finished goods. Fascinating developments in British ship-board science occurred between Halley and Darwin's scientific work.

Scholars have identified essential transitions from ships that merely *carried* scientific equipment and naturalists in cramped quarters to ships that evolved into sophisticated "floating laboratories" designed specifically for advanced scientific work. Shipboard cultures and physical spaces adjusted from early ship captains and crew's annoyance at scientists and their goods taking up space in the tight quarters of British ships to acceptance of scientific work as part of their maritime missions supporting the interconnectedness of exploration, colonization, scientific knowledge, and imperial power. Eventually, some ships were explicitly refitted for scientific research, revealing the recognized value of that work.

Halley's voyage set precedents for British maritime scientific endeavors, which gradually developed to include Charles Darwin's Atlantic voyage. Darwin's famous journey to South America marked one of the most significant developments in the natural sciences: evidence and analysis that would cement the theory of **evolution** in Western science.

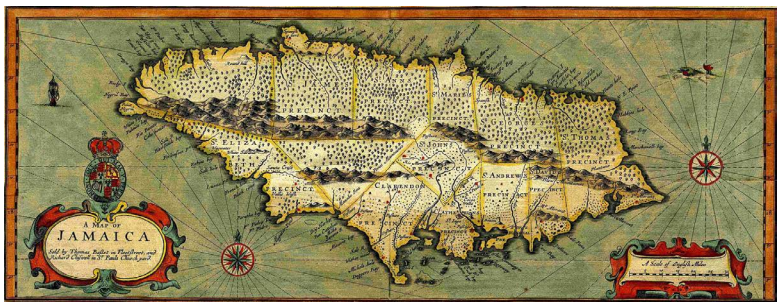
Hans Sloane's Jamaican expedition

Sloane, primarily known for his work in England, did make a significant journey to Jamaica in 1687. While his primary role was as a physician to the British governor, Sloane used this opportunity to pursue botany. From 1687 to 1689, Sloane collected hundreds of plant specimens in Jamaica and other Caribbean islands. He often relied on the knowledge of local enslaved people, a common practice in the British colonies at that time. Despite seasickness during the voyage, Sloane collected specimens at various stops, including the island of Madeira, off the coast of Africa, then controlled by the Portuguese.

Portrait of Hans Sloane, 1736.

Once safely in Jamaica, Sloane continued his fieldwork and specimen collecting with the help of residents, including enslaved Africans. He collected and dried roughly 800 plant specimens in Jamaica, most

of which were new to him. His primary preservation method was to press and dry plant specimens, allowing him to bring an enormous collection back to England, which he carefully bound into seven large volumes.



Map of Jamaica, 1676.

For specimens like fruits that were too bulky to dry and press, Sloane hired an illustrator to create accurate drawings. He also kept detailed journals, using his thumb as a rough measurement (representing an inch). Sloane noted challenges in describing unfamiliar specimen colors and observed environmental conditions, such as noting that plant parts exposed to direct sunlight were greener than those on the underside of leaves.

After returning to England, Sloane shared his findings with colleagues and donated specimens to museum collections. His work impressed other naturalists, including Arthur Rawdon, known as "the father of Irish gardening," who sent gardener James Harlow abroad to attempt to bring back live plant specimens.

A botany sheet showing a cocoa plant brought back from Jamaica in 1689 by Hans Sloane (left); and a drawing from Sloane's A Voyage to the Islands illustrating animal life.

Sloane's specimens and descriptions offered valuable insights into late 17th-century European knowledge of the ecology and vegetation of the Caribbean islands he visited. Sloane's collections formed part of the founding collections for the world-renowned British Museum and the Natural History Museum in London. His potentially perilous journey and careful, though preliminary observations, collections, and preservation methods helped ensure his legacy in British natural sciences and cuisine. In Jamaica, he is said to have tasted an unsweetened water-based version of hot chocolate and is given limited credit for updating the recipe. He brought his sugar, milk, and cocoa version back to Europe as a medicinal drink that became increasingly popular.

Captain James Cook's voyages

James Cook's work in Newfoundland from 1763 to 1767 marked a significant chapter in the Royal Society's involvement in the Atlantic World. Initially appointed as "Master Surveyor of the Coast of Newfoundland and Labrador," Cook made valuable observations on natural history that led to his appointment as captain of his best-known voyages aboard the *Endeavour*.

The early HMS Endeavor, 1768.

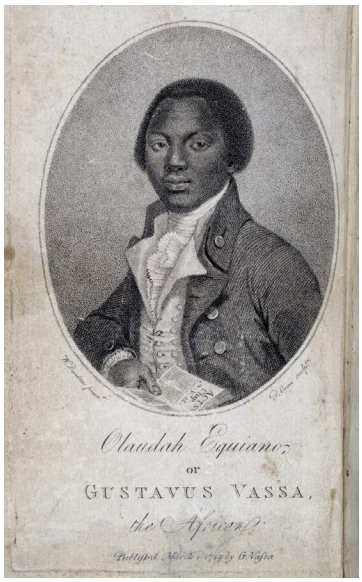
His first voyage on the *Endeavour*, 1768–1771, was another significant moment in British scientific discovery in botany, biology, and other sciences. Although his voyages extended beyond the Atlantic, his crew made substantial journeys in the Atlantic waters. Onboard the *Endeavour* were two Royal Society naturalists (Joseph Banks and Daniel Solander), two scientific illustrators, a personal secretary, and four servants, including three who were Black. Banks and Solander collected over 1,000 species of plants, many new to Europeans. All, including Cook, took copious notes on flora and fauna and created exceptional illustrations that set a precedent for including artists on future journeys. While Cook's public orders for the journey related to celestial observation, clandestine orders from the British admiralty dated July 20, 1768, which the captain opened once on the open sea, revealed the connections between British imperial aspirations about colonization and scientific knowledge:

> You are also carefully to observe the nature of the soil and the products thereof, the beasts and fowls that inhabit or frequent it, the fishes that are to be found in the rivers or upon the coast, and . . . you are to bring home specimens of each as also such specimens of the seeds of the trees fruits and grains as you may be able to collect and transmit them to our Secretary that we may cause proper examination and experiments to be made of them.

This information was meant to advance British settler colonialism and scientific knowledge.

Olaudah Equiano's Arctic expedition

In 1773, Olaudah Equiano, a formerly enslaved Black sailor, joined a British naval expedition to the North Pole led by Constantine John Phipps. Like many expeditions in this period, the voyage was commissioned by the Royal Society and supported by the British Admiralty. The maritime mission involved two ships: HMS *Racehorse* (with Equiano aboard) and HMS *Carcass* (with a 14-year-old Horatio Nelson aboard, who would eventually be revered as the greatest Royal Navy officer in history).



Portrait of Olaudah Equiano, 1789.

A primary goal of the Arctic exploration was to find a northern sea route to India and the Pacific—the Northwest Passage. The Royal Society provided scientific instructions and equipment. Naturalist Joseph Banks (who became the longest-serving Royal Society president) gave detailed instructions for botanical and zoological collections. Extensive scientific observations were made, including astronomical, meteorological, oceanographic, and natural

An Ivory Gull.

history studies. Natural history observations led British naturalists to record two new species: the Ivory Gull and the Polar Bear. The crew also encountered walruses, which they described as "sea horses."

The crew's work, including Equiano's contributions as scientific assistant to Dr. Charles Irving, contributed significantly to European scientific knowledge of the Arctic. According to Equiano's own account, his contributions included operating Dr. Irving's water distillation apparatus, purifying up to forty gallons daily, and documenting Arctic wildlife observations that he recorded in his narrative. This expedition highlights the involvement of Black sailors in significant scientific and exploratory missions of the 18th century.

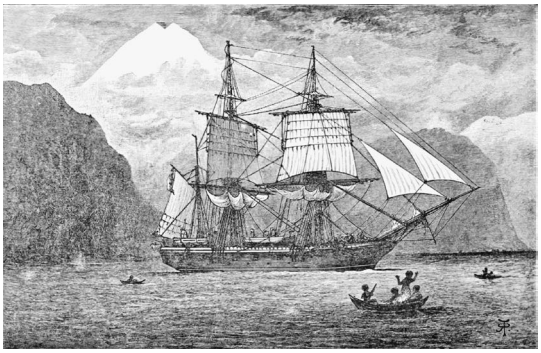
Painting of HMS Carcass midshipman Horatio Nelson, who encountered a Polar Bear on the 1773 expedition, c. 1809.

A view of the HMS Racehorse and HMS Carcass passing through an expanse of floating ice, 1773.

Charles Darwin's Beagle voyage

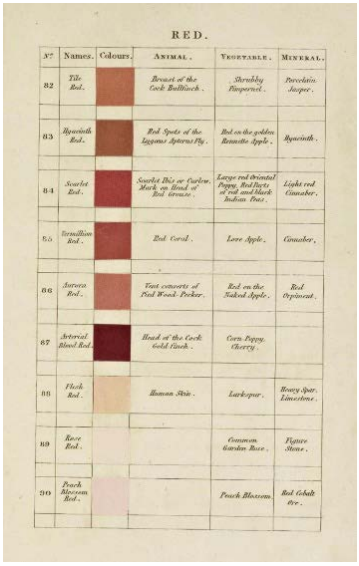
Maritime British natural history successes include Sloane, Cook, and Equiano's voyages and recordings. These British explorations set a precedent for other naturalists to join British sea journeys, including arguably one of the most significant: Darwin's five-year voyage (1831–1836) aboard the *Beagle*. Darwin's significant work led to his election to the Royal Society. It also led to his theory of evolution, a paradigm shift in human understanding of natural science, and the existence and development of all life on Earth.

The British government funded the journey, and Darwin's family contributed to purchasing personal and scientific supplies. Although Darwin's family was notably anti-slavery, his family's wealth was connected to British industrial and colonial networks. As



Engraving of the HMS Beagle in the Straits of Magellan.

this lesson argues, the expedition reflected British imperialism as the *Beagle*'s primary purpose was to survey the coast of South America, looking for natural resources and footholds for British colonialism. In addition, Darwin learned **taxidermy** skills from a formerly enslaved man in Edinburgh, where Darwin studied as a young man. This begins to reveal the connections between Darwin's work and the slave trade.



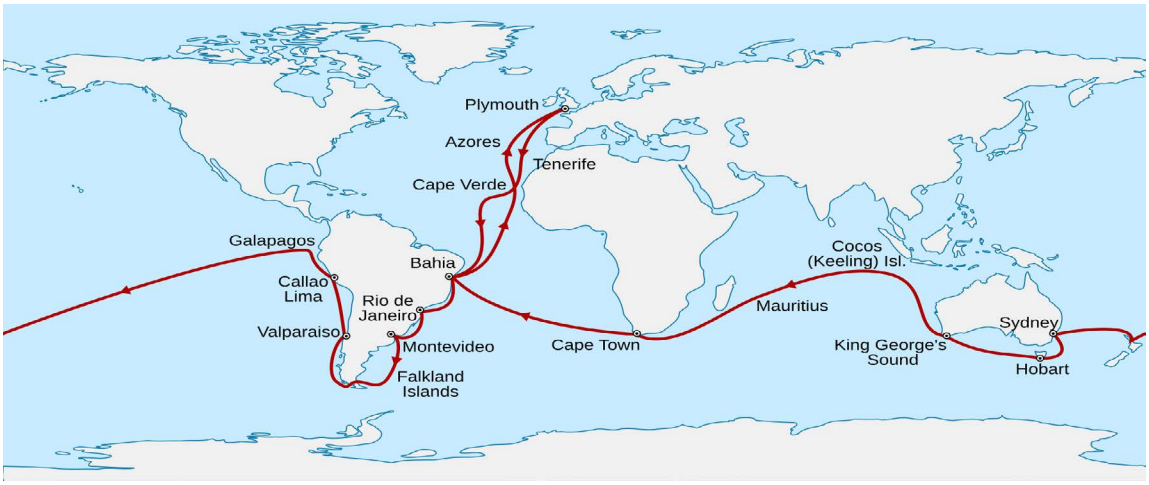
During the Beagle voyage, Darwin carried a reference book useful for scientific illustrators, called Werner's Nomenclature of Colours, specifically designed for naturalists and other scientists to assist in depicting the colors of specimens. Note the reference to "human skin."

In an 1826 letter to his sister, Susan, Darwin noted, "I am going to learn to stuff birds, from a Blackamoor I believe an old servant of Dr. Duncan: it has the recommendation of cheapness if it has nothing else." In his autobiographical notes, later published by his son, Darwin further noted, "a negro lived in Edinburgh, who had travelled with Waterton, and gained his livelihood by stuffing birds, which he did excellently: he gave me lessons for payment, and I often used to sit with him, for he was a very pleasant and intelligent man." Darwin did not name his teacher, although other sources suggest it was John Edmonstone, a formerly enslaved Black man who had learned to preserve animal specimens in the colonies. Therefore, Darwin and his *Beagle* assistants likely used knowledge learned from Edmonstone to preserve some of the 500 bird skins he collected. Darwin may also have gained knowledge of South American flora and fauna from Edmonstone during these lessons. Born into slavery in the British colony Guyana, in northern South America, Edmonstone had first-hand knowledge of the area.

Records suggest that the naturalist Charles Waterton trained Edmonstone during Waterton's travels in South America. Records also indicate that John Edmonstone traveled to Scotland with plantation owner Charles Edmonstone (John's name, like other enslaved Africans, reflected his status as an enslaved person and thus Charles' last name.) John gained his freedom in Scotland and set up a successful taxidermy business. This is how Darwin became acquainted with Edmonstone's expertise. Darwin's famous work on finches and mockingbirds, which led to his theory of evolution, is thus not only an apex of British natural science but reveals its connections to the British Empire, the British slave trade, and the contributions of African naturalists.

Darwin also visited British colonial islands where slavery was not yet extinguished, and while he noted his horror of the treatment of enslaved people, he did visit slave colonies during his voyage, meaning that his work, despite his personal feelings, is tainted by the transatlantic slave trade.

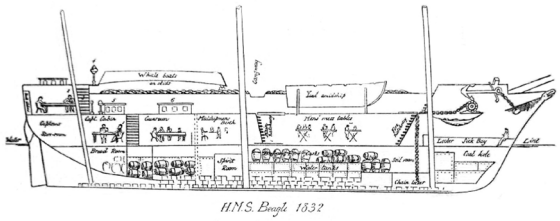
Later artist's impression of John Edmonstone teaching Darwin to preserve birds.



Voyage of the Beagle, 1831-1836.

Small corners in tight quarters

Darwin's experiences onboard the *Beagle* reveal the cramped conditions that naturalists faced, the changing cultures of shipboard life, and the evolution of ships that carried scientists and their equipment. The *Beagle* carried 74 crew members and their supplies on a vessel only 90 feet long. With such limited space, Darwin had only a few drawers and shelves to store his personal effects and scientific equipment. At night, he hung his hammock in the map room, described in a letter to his Cambridge mentor as "the corner of the cabin . . . most woefully small." Regardless, his findings advanced British interest in designing shipboard laboratories.



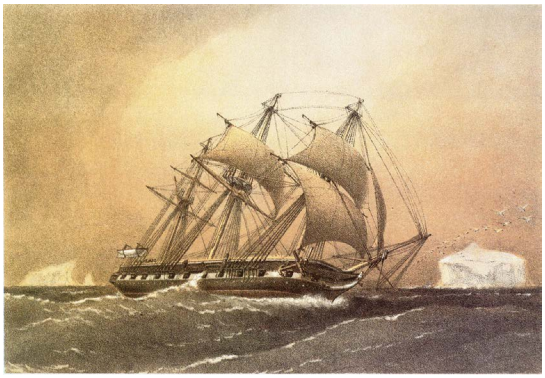
Cross-section of the HMS Beagle, 1832.

In this space, Darwin kept his naturalist's tool kit, including microscopes, telescopes, spirits and saltwater to preserve specimens, vials and containers, equipment for preserving specimens, notebooks, writing and drawing utensils, magnifying glasses, nets and traps to capture specimens, and reference books. Despite the cramped conditions, Darwin was also allowed a small space to store his collected specimens. He had the foresight, however, to plan to ship many of the larger specimens back to England aboard other vessels he found at various ports. He also sent mail on these ships to maintain correspondence with his colleagues at home. Although best known for his bird research, Darwin collected flora, which he dried, pressed, or stored in alcohol. This method allowed him to transport plant specimens more efficiently. He maintained a close friendship with botanist Joseph Dalton Hooker, who later became the director of the renowned Kew Gardens in London. Hooker played a significant role in cataloging and studying Darwin's plant specimens.

From "cramped cabins to 'floating laboratories'"

Darwin's successes spurred the refitting of the warship HMS *Challenger* to a "floating laboratory" in the late 19th century on a scientific voyage that would significantly advance marine sciences. At the request of the Royal Society, the *Challenger* expedition (1872–1876), funded by the British government, completed a global survey of oceanic depths. This work revolutionized human understanding of oceans, proved the existence of life in the deepest sea, and described nearly 5,000 species. Outfitted with laboratories, workrooms, and storage

space, the former Navy ship and its crew laid the groundwork for increasingly advanced maritime science. Yet maritime historians argue that British imperial ambitions still shaped the *Challenger's* work and note that while its records are mainly from the point of view of its European crew and naturalists, it also landed in many ports where people of color contributed to its scientific successes.



19th-century painting of the HMS Challenger.

Conclusion

Between the late 17th and early 19th centuries, transatlantic shipment of plant and animal specimens, as well as other endeavors, turned some British navy, merchant, slave, and packet ships into instruments of science. Naturalists and their associates used the movement of British ships in the Atlantic World for scientific exploration and to send specimens and correspondence. As the British realized the worth of scientific work, including the collection of natural specimens, ships developed more extensive and specialized spaces to allow naturalists to perform their work better. Naturalists also developed more advanced methods to ship specimens during voyages safely. On slave ships, this advancing care for biological specimens was in stark contrast to the inhumane treatment of the ships' enslaved human passengers. Building on the foundations established by these naturalists and collectors allowed significant further scientific developments in the 19th century.

The HMS Challenger at the naval base at Bermuda, West Indies.

The evolution from "cramped cabins to 'floating laboratories'" required extensive networks of collaboration that built upon the Royal Society's institutional foundations described in Lesson 1. Individual naturalists working in tiny spaces gradually developed systematic collecting operations through networks that relied on ship crews, colonial agents, enslaved and free Africans, and other local collectors who provided essential knowledge and labor. Naturalists working for collectors like Sloane and Petiver had to not only collect and identify colonial specimens but also learn how to transport plant and animal specimens safely back to Britain aboard ships. In Britain, Royal Society Fellows could store and study them in private collections and museums and, in the case of plants, grow valuable specimens in British-owned botanical gardens, such as Kew in London.

Discussion questions

- What specific challenges did naturalists face when trying to do scientific work on ships, and how did they solve these problems over time?
- The reading mentions many different people who contributed to maritime science—ship captains, enslaved people, local guides, and crew members. Why were these contributors essential for naturalists' successes, and what does this tell us about scientific networks?

Further Reading

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