Chapter 9
Science, Photography, and Objectivity? Exploring Nineteenth-Century Visual Cultures through the HMS *Challenger* Expedition (1872–1876)

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Abstract Preparing to set off from England in 1872 on an oceanographic expedition around the globe, the officers and crew of HMS *Challenger* gathered on board the ship for a photographic portrait. It was one of the first photographs of crew on a scientific voyage of exploration ever taken. Over eight hundred photographs were taken or acquired on the *Challenger* in addition to drawings and paintings. This chapter uses these photographs to reexamine Daston and Galison's theory that photography was successful in nineteenth-century science on account of its perceived "objectivity" as an epistemic ideal. The chapter first outlines the history and historiography of photography and of the *Challenger* expedition, proceeding to outline photographic practices on the voyage, and evaluating the photographs' place within longer aesthetic traditions. It then examines the *Challenger* photographs' circulation and use in its official scientific report, and in wider scientific contexts. The chapter finally analyzes the photographs' personal, and then broader public, economic, and political circulation and uses. It concludes by arguing that drawing and painting were the preferred scientific visual strategies on the *Challenger*, indicating that photography was not preferred on account of its perceived "objectivity" for science. Instead, photographs afforded other benefits such as speed of capture, replicability, and adaptability—for economic, social, and political use as well as scientific. Photography was therefore an effective visual strategy not on account of its perceived scientific "objectivity" but due to its *flexibility*, which corresponded to the expedition's scientific aims as well as its broader economic, social, and political context.

Keywords Objectivity · Visual culture · Photography · Global exploration · Nineteenth-century science

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9.1 A Short History of the *Challenger* Expedition, Photography, and Their Historiographies

9.1.1 History and Historiography of the Challenger *Expedition*

As the first ship known to be specifically adapted for global oceanographic investigation, the HMS *Challenger* undertook her 69,000-nautical mile circumnavigation of the globe between December 1872 and May 1876. Commissioned and sponsored by the British government and the Royal Society (Britain's organization for scientific research), the ship carried both naval and civil scientific crew, including Royal Navy Officer and explorer Captain George Strong Nares (1831–1915) and a Director of Scientific Staff, the natural historian and marine zoologist Charles Wyville Thomson (1830–1882). The expedition's scientific objectives, as outlined by the Royal Society, were clear: to research the biological, physical, and chemical constitutions of the ocean. The ship was equipped especially for purpose, comprising the chemical and zoological laboratories, workrooms, libraries, archival resources, and measuring devices requisite for oceanographic research (Brunton 2004, 1–15). It is therefore unsurprising that the historiography of the *Challenger* voyage has focused upon its scientific purposes and achievements. Accounts by historians Richard Corfield, Erika Jones, Eric Linklater, Helen Rozwadowski, and Maurice Yonge have outlined the importance of the expedition for scientific research, with Rozwadowski in particular emphasizing how the *Challenger* signified a shift from the "romantic" voyages reminiscent of those of James Cook to "business-like" scientific exploration (Linklater 1972; Yonge 1972; Corfield 2003; Rozwadowski 2009, 27–61, 106–216; Jones 2019). Although voyages of exploration were common in the nineteenth century, the *Challenger* generated significant interest: regular updates were published in both scientific circles and public press during the expedition, and afterwards in the official scientific *Report,* receiving considerable public and scientific attention (Tizard et al. 1885, 47–48; Linklater 1972, 12; Corfield 2003, 4–5; Kennedy 2007).

9.1.2 Visual Culture on the Challenger *Expedition*

Visual depiction had long been a common practice on such voyages of exploration, with drawing and painting serving for scientific, artistic, and other documentary purposes (Jacobs 1995; Smith 1992, 1985; Quilley 2011). Drawing and painting was likewise an integral practice on the *Challenger* expedition—but in addition over eight hundred photographs were accumulated, including the first known to exist of Antarctic icebergs (Headland 1989, 107). Other photographs in the expedition's unique collection depict the voyagers aboard the ship with indigenous peoples and

in vast landscapes, as individual portraits and amongst groups of people; vegetation, modes of transport, various forms of architecture, geology, tombstones, and copies of graphs and drawings also featured. Historian Eileen Brunton made significant progress in cataloguing the photographs, identifying the names of the photographers and inferring their purpose to have been as anthropological evidence and as economic commodities (Brunton 2004, 1–20). Rosamunde Codling has claimed photographs of icebergs made on the *Challenger* expedition were seen as an "accurate reproduction" of their subjects, while James Ryan has described the photographs' "unique appeal" in comparison to other forms of visual depiction to "serve the sciences of anthropology, geography, geology, and botany," nevertheless noting that many of them are more comparable to tourist souvenirs than scientific evidence (Codling 1997, 206; Ryan 2013, 33–35, 116–117). Aside from these historiographies, the visual culture of the *Challenger*, and in particular its photographs and photographic practices, have evaded in-depth historical research until now.

9.1.3 Objectivity? The Historiography of Nineteenth-Century Photography and Science

Photography was a popular visual strategy in scientific research in the latter half of the nineteenth century, and photographic practices in science more generally during this time period have received greater historiographical attention. Photography was fundamentally perceived as an empirical, objective means of recording the world in the years of the *Challenger* voyage: a photographic manual published during the expedition claimed that "a painting or watercolor can never have such rigorous precision" in comparison (Tissandier 1876, 302). A common historiographical theme is therefore that of photography's perceived "objectivity" in science, supposedly achieved through its ability to overcome the subjectivity of human observation, and that represented a shift from the preceding aesthetic and representational traditions seen in drawing and painting. One example of such historiography is that of Lorraine Daston and Peter Galison, who argue—using atlases as a case study—that photography was applied in nineteenth-century science owing to this supposed ability to combat "the subjectivity of scientific and aesthetic judgment" (Daston and Galison 2007, 82). Photography, Daston and Galison argue, was perceived as a tool that enabled one to achieve "mechanical objectivity" in scientific image-making that, when undertaken by a trained "ideal character," would "move nature to the page through a strict protocol, if not automatically" (Daston and Galison 2007, 121). This mechanical objectivity stood in contrast with the earlier visual "ideal" or "truth-to-nature" illustrations produced by drawing and painting—which aimed to extract universal truths and depended upon the subjective judgment of its artist—and made photography particularly appealing as a visual strategy in nineteenth-century science (Daston and Galison 1992, 98).

Likewise, historians Kelley Wilder, Christopher Pinney, and Joan Schwartz have emphasized a nineteenth-century preference for photography in science owing to its perceived "objectivity." Schwartz, for example, has claimed that "photographs were embraced as a scientific and objective way of capturing the world" during the time period (Schwartz 2000, 7–23, 26, 33–34; Wilder 2009, 7; Pinney 2011, 15). Similarly, the visual and historical anthropologist Elizabeth Edwards has shown that photography was preferred over drawings as a means of obtaining objective images for racial "typing" of people in nineteenth-century anthropological science (Edwards 1990, 235–258). This historiographical trend gives additional weight to the idea that photography was successful on account of its reputation as an "objective" means of data collection and visual observation for science in the nineteenth century, which was preferred over "subjective" written accounts, drawings, and paintings (Davenport 1991, 59–75, 106–107; Schwartz 2000, 7–23, 33–34; Kennedy 2007; Wilder 2009, 7; Pinney 2011, 15).

9.1.4 Historiographical Divergence and Complexity

This historiographical norm has nevertheless not gone entirely undisputed. Some historians such as Jennifer Tucker argue that the idea is too simplistic, and that nineteenth-century scientists "did not…accept photographic evidence as unconditionally true" but viewed and interpreted photographs just as they did other scientific images (Tucker 1997, 378–381; 2005, 2–4). More closely connected to this chapter's theme, Ryan has also revealed the complexity of photography on voyages of exploration and argued that photographs were "essential to visualizing the romance as well as the science" of expeditions during this period (Ryan 2013, 19–21, 117, 170–171). Despite claiming that photography was successful in science on account of its supposed objectivity, Wilder too has emphasized how even photographs made as scientific evidence could also be used as art, consequently taking on different, subjective meanings and uses (Wilder 2009, 53). It is this complexity that this chapter seeks to further investigate in relation to the *Challenger* expedition: from here it therefore begins by evaluating the expedition's photographic collection and practices, and how it connects to this historiography.

9.2 Complexity: The *Challenger's* Photographic Practices and Collections

From the 1850s—not long after photography's invention by Louis Daguerre (1787–1851) and William Henry Fox Talbot (1800–1877) in 1839—photographic equipment became a standard tool for visual documentation on voyages of exploration (Wamsley and Barr 1996; Hannavy 2007; Ryan 2013, 8–13). The *Challenger* expedition was

no exception to this development: the ship adopted photography as a visual strategy in addition to carrying an official artist, John James Wild (1824–1900), and benefited from its own on-board darkroom that was installed especially for the voyage (Brunton 2004, 16). It is not clear whether the *Challenger* expedition's photography followed a formal procedure—a discernible official protocol has not been found—but the need for "objectivity" in photography was not mentioned in any of the available reports by the crew. The expedition's photographic practices therefore demand further analysis.

9.2.1 *Ideal Characters? The Several Photographers of the* Challenger *Expedition*

At least three official photographers were employed on the *Challenger* voyage. The first, Caleb Newbold, joined at the start of the expedition in December 1872. A letter from his instructor in the *British Journal of Photography* stated that he had taken his photographic training with the Royal Engineers—a corps of the colonial-era British Armed Forces providing military engineering and technical support—for "some two-and-a-half years" (Abney 1873, 57). This indicates that some consideration had gone into placing the *Challenger* photography into trained hands.[1] Since photographers of the Royal Engineers were employed to generate a "collective record" of exploration rather than being independent creators of their work, the information on Newbold is unfortunately limited (Ryan 1997, 81). However, as a Royal Engineer, we *can* know that Newbold would have been trained for military and topographic surveying rather than necessarily for producing objective scientific evidence (Haworth-Booth 1984, 114). After Newbold deserted the ship in late 1873, Frederick Hodgeson replaced him until June 1874, from when there exists a gap—possibly occupied by an unnamed photographer—until Jesse Lay, another Royal Engineer photographer trained for military purposes, joined the expedition in 1875 and stayed for remainder of the voyage (Brunton 2004, 1–21).[2] The multiple photographers and the fact that

[1] See also (Haworth-Booth 1984, 114) regarding the training of photographers from 1855 by the Royal Engineers for the purpose of surveying; (Brunton 2004, 16–18) and the Quarterly ledger of HMS *Challenger*, 15 Nov. 1872–1831 Dec. 1873, Records of the Admiralty, Naval Forces, Royal Marines, Coastguard, and related bodies, National Archives, London, ADM 117/196, n.p.

[2] See also Captain Nares' log books regarding the names of photographers (George Nares' ship's log, 1873–1876, Records of the Admiralty, Naval Forces, Royal Marines, Coastguard, and related bodies, National Archives, London, ADM 53/10536, n.p.). In his journal, Lieutenant Pelham Aldrich wrote about the presence of a new photographer, Hodgeson, on board in December 1873 in accordance with these dates (Journal of Pelham Aldrich on HMS *Challenger*, 1873–1874, Foyle Reading Room, Royal Geographical Society, London, ar PEA/2, f.47r). The supposed existence of only one photographer at a time is however complicated by Aldrich and Balfour's journal descriptions of the presence of more than one on board in January and November 1873, whilst the official artist, Wild, himself inferred some involvement with the photographic process (Journal of Andrew Balfour from HMS *Challenger*, 1873–1874, Foyle Reading Room, Royal Geographical Society, London, mg ABA/1, n.p.; Diary of JJ Wild, 1872–1876, Natural History Museum Library and Archives, London, Murray Col. Section 1.7 (Volume 2), f. 74r.).

they were primarily trained for military purposes indicates that the scientific "ideal character" was not a priority in the photography of the expedition.

9.2.2 The Challenger's Diverse Photographic Methods

The various methods by which the *Challenger* photographs were made also uncover their limitations as "objective" scientific evidence. Its photographic practice was certainly taken seriously: as well as having its own darkroom, a notice in *The British Journal of Photography* claimed "a very complete photographic equipment" to have been purchased for the expedition (Abney 1873, 57). It has not been possible to confirm the camera type used by the official photographers, but a whole plate Dallmeyer wide-angle rectilinear lens was purchased eighteen months into the voyage.[3] This lens was popular for landscape photography, so it is likely that the official photographer chose lenses for certain purposes, using more than one lens type to suit the subject and conditions (Dallmeyer 1874, 59–62; Kingslake 1989). Both whole plates (6½" × 8½") and the more customary half plates (4½" × 5½") were used, enabling the production of different sized photographs.[4] Inventories from England, Hong Kong, and Japan also reveal the purchase of collodion filters that, together with the listing of a dark tent for portable developing, indicates that photographs were made using the wet collodion method standard for professional and amateur photographers from the mid-1850s onwards.[5] Wet collodion was also the most common photographic technique on voyages of exploration until the mid-1870s owing to its sharpness, durability, and speed in comparison to earlier daguerreotype and calotype photography, and due to the wider availability of its equipment compared to the newer dry plate method (Davenport 1991, 22; McGabe 1991, 41–45).

The *Challenger* expedition photography therefore represents a continuation of the photographic practices common on other voyages of exploration in the mid-nineteenth century (Davenport 1991, 22). The wet collodion method enabled a near-universal representation of a range of subjects and was popular in scientific imaging on account of its fine detail (Davenport 1991, 22; Ryan 1997, 25). But even this method required long exposure times and could be unreliable in the development process, often resulting in a rippling effect in the final photograph. On the *Challenger*

[3] Purchased from Hopkin and Williams on September 30, 1874 (Detailed account of scientific apparatus, chemicals, philosophical & mathl. instruments, drawing materials, stationery etc. etc. on board H.M.S. "Challenger" for the service of the scientific staff of the circum navigation expedition, 1872, Natural History Museum Library and Archives, London, Murray Col. Section 1, No. 49, n.p.).

[4] The negative size is evident in the glass negatives—which are whole plates—and in the purchase of half plates in the inventory, in addition to the original photographs which would have been developed in the same size as the plates and are of both half and full size (Detailed account of scientific apparatus 1872, n.p.; also through discussion and with thanks to Dr Michael Pritchard of the Royal Photographic Society). Photographs as measured in the Carpenter album (Photograph album of Alfred Carpenter 1872–1876, n.p.).

[5] Detailed account of scientific apparatus 1872, n.p.; (Brunton 2004, 19–20).

expedition this problem was even more severe than usual, as highlighted by Assistant Paymaster John Hynes' complaint in his journal that photographs taken of icebergs between Samboangan and Humboldt Bay were "not very good in consequence of the motion of the ship."[6] The naval crew members were not the only people on the *Challenger* to lament at the poor quality of its photography: on attempts to produce photographs as scientific evidence, Director of Scientific Staff Thomson complained that we were very anxious to carry away a permanent record of the present condition of…stalagmite, and we twice tried to photograph it with the magnesium light. On the first occasion the picture came out fairly, but, most unfortunately, in the darkness the difficulty of conducting such operations it was spoiled. When we tried it again, there was something wrong with the bath, and it was a complete failure (Thomson 1878, 34).

We can see ourselves that this was the case: a number of the *Challenger* photographs were blurred, smudged, and lacking lucidity.[7] Although Charles Wyville Thomson's statement indicates that the photographs were indeed *intended* for scientific use, the photographic process on the *Challenger* was clearly complex and prone to error, limiting its status as an objective visual strategy.

The story of photography on the *Challenger* is complicated further upon examination of two of the glass negatives from Lay's time on the voyage, which indicate that a second technique, the dry collodion method, was also used.[8] Dry plate technology was uncommon on voyages of exploration until the later 1870s owing to the lack of availability of apparatus as an early form of photographic technology (Wamsley and Barr 1996, 311–314; Ryan 2013, 13). However, it was more convenient for photographs taken at a distance from the ship compared to the wet collodion process, as it did not require developing immediately. Dry collodion photography also avoided the major disadvantage of wet collodion's requirement of a cumbersome traveling laboratory for instant developing, a constraint that greatly inconvenienced

[6] Journal of John Hynes on HMS *Challenger*, Dec. 1873–Mar. 1874, Caird Library, National Maritime Museum, London, JOD/15/1, f. 104r; Album two of Assistant Paymaster John Hynes 1872–1876, n.p.

[7] This poor quality can be seen in several photographs, such as the photo depicting "Natives in canoe" in Humboldt Bay, New Guinea (ship no. 344, in Journal two of Richard Routley Adams Richards on Board HMS *Challenger,* 1872–1876, Foyle Reading Room, Royal Geographical Society, London, RRR/2, n.p.). Photograph ship no. 390 also depicts people within a blurred landscape (in Photograph Album of Thomas Henry Tizard, 1873–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0859, n.p.). Wild was employed as both artist and private secretary to the Director of Scientific Staff, Dr. Charles Wyville Thomson, a dual role that was common of expedition artists (Codling 1997, 193; Rice and Bellamy 2000, 293).

[8] The glass negative for ship no. 436a, of Fuegian people, shows evidence of have been produced by the wet collodion method, including patterns of solution running down the plate, silvering around its edges, and grains fixed to the viscous wet collodion. Although it cannot be confirmed without detailed chemical analysis, the negative for photograph ship no. 439, a landscape of the Falkland Islands taken on the next stop of the voyage, lacks these features, suggesting it to have been produced using a dry plate process. Glass negatives from Natural History Museum Library and Archives, London, Murray Col., reference codes as per ship no. Established using McCabe, "Preservation of 19th-Century Negatives." With thanks to Dr Michael Pritchard of the Royal Photographic Society for advice.

the photographer when travelling long distances, in bad weather, or across awkward terrain (Davenport 1991, 22). The dry collodion method was certainly in use on the expedition: the renowned photographic supplier Henry Stuart-Wortley claimed in *Nature* and *The British Journal of Photography* to have supplied the photographers with apparatus for the dry plate method, and Lay claimed in a letter to Stuart-Wortley that he had "travelled up 2,500 feet (where the wet process seemed impossible) and obtained perfect negatives" using the dry plates (Stuart-Wortley 1875a, 25–26, b, 550–551). But while this method offered the benefit of convenience over wet collodion, it had the disadvantage of an average exposure time three times longer, leading it to produce even poorer quality and inaccurate images (Wamsley and Barr 1996, 309).[9] If "objectivity" required a "strict protocol" then these mixed practices indicate that photography was not being used on the expedition on account of such a benefit for its scientific research alone (Daston and Galison 1992, 118).

9.2.3 *The Multiple Mediators and Sources of the* Challenger *Photographs*

The *Challenger* photographs' multiple mediators and sources provide further evidence that their "objectivity" for scientific use was not a priority (Daston and Galison 2007, 121). Several people whom the crew encountered on land throughout the voyage requested photographs to be taken by the official photographer—for example, *Challenger* engineer William Spry declared in his book that the King and Queen of Tonga "expressed a wish during our stay to have their portraits taken. This was attended to, and for the occasion their Majesties were got up in regal attire" (Spry 1877, 184–185; Daston and Galison 1992, 103). The photographs that were taken appear to have been considered just as valuable as the others, as they were retained in the official expedition collection.[10] Around a quarter of the catalogued photographs were also purchased or received as gifts by the crew at several stages of the voyage, as opposed to having been taken by the on-board photographers. According to the letters of *Challenger* naturalist Rudolf von Willemoes-Suhm (1847–1875) some photographs were received in Hong Kong, and self-portraits were obtained from the Japanese Mikado and Mikadesse.[11] Spry also noted in his popular account of the expedition that a single photograph of a Buddha[12] was bought from a "priest in

[9] For further information about the wet collodion and dry plate processes, see (Davenport 1991, 22).

[10] The photographs can be attributed to ship nos. 247–248, originals in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.

[11] Photographs' origins described by Rudolf von Willemoes-Suhm, *Challenger-Briefe* (Leipzig: Verlag von Wilhelm Engelmann, 1877, 172). These photographs are attributable to ship nos. 353 and 355 (originals in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.).

[12] Brunton, *The Challenger Expedition,* photo no. 726 (original in Photograph album of Alfred Carpenter, 1872–1876, Natural History Museum Library and Archives, London, Murray Col. MSS CAR, n.p.).

attendance" at a temple in Japan, while Sub-lieutenant Andrew Francis Balfour, also onboard the ship, wrote in his journal that he had received photographs as gifts in Sydney, Australia from a local family and had bought others in Manila (Spry 1877, 294).[13] Other photographs in the collection were purchased from photographers in New Zealand, at least one of which can be attributed to William Thomas Locke Travers (1819–1903)—a local lawyer, politician, explorer, photographer, and naturalist.[14] Considering the multiplicity of the photographs—made by different people, in various ways, and collected from various sources—leads one to consider if they were even considered to be "scientific" images. How, for example, did they fit into wider aesthetic traditions?

9.3 Art or Science? Placing the *Challenger* Photographs within Longer Aesthetic Traditions

The nineteenth-century status of photography as an objective visual strategy has been taken to separate it from longer aesthetic traditions, such as the ideal, "truth-to-nature" representations achieved by drawing and painting (Daston and Galison 1992, 2007). Yet the *Challenger* photographs can be seen to represent such an "ideal," on account of the aesthetic selectivity as to what was chosen for inclusion, and as is evident in the photographs' broad range of content as described at the start of this chapter. Looking at how they fit within longer artistic conventions can therefore reveal more to us about the reasoning behind photography on the *Challenger*.

9.3.1 Aesthetic Selectivity and Naturalistic Visual Ordering

While Daston and Galison have claimed that the "objectivity" of photography was seen to *remove* artistry, arguing that the strategy was used for scientific evidence because those using it believed it "could and would triumph over art," the *Challenger* photographs display many traditions in art on voyages of exploration (Daston and Galison 1992, 98–100). Such images were able to gain authority not through their supposed "objectivity" but by *appealing* to artistic convention: the *Challenger* photographs continued the naturalistic visual ordering of the world that is commonly seen in the history of art on eighteenth and nineteenth-century voyages of exploration. Take, for example, the painting of eighteenth-century natural history artist Sydney Parkinson, *Portrait of a New Zealand Man* (1769), which has been credited

[13] Named 'the Alloways' (Journal of Andrew Balfour from HMS *Challenger* 1873–1874, n.p.).

[14] See also (Brunton 2004, ship nos. 243a, 313–315), which labels the photographers as a Mr Travers and Mr D.L. Mundy, respectively. For details relating to Travers see (Shepherd 2007; Willemoes-Suhm 1877, 108–109), specifically describing their acquisition from Mr Travers (originals in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.).

with recording people with the "detachment of an anthropologist" as part of naturalistic ethnographic conventions (Jacobs 1995, 84; Smith 1992, 83–85). Art historian Michael Jacobs asserts that this painting portrayed people with little evidence of displaying emotion—a tradition evoked in many of the front and profile portrait *Challenger* photographs of indigenous peoples in the Pacific.[15] In this way the photographs appealed to science through *following* naturalistic artistic conventions rather than by evading them.

9.3.2 The Depiction of Character, Romanticism, and Adventure in Artistic Traditions

While much art from voyages of exploration had developed this naturalistic style of depiction by the nineteenth century, it was inevitably influenced by the wider artistic conventions of the era, and particularly by the Romantic movement (Jacobs 1995, 9–14). The eighteenth-century painter William Hodges, who traveled on expeditions with James Cook, has been credited with sketching indigenous people not as detached ethnographic "types," but showing pronounced expression and a sense of character (Jacobs 1995, 88). This aesthetic theme can also be seen in a *Challenger* photograph of a Moro Indian, which is set up to include props that hint at the personality of the individual being represented (Fig. 9.1). In addition, by portraying extended topographical scenes across several photographs, the *Challenger* also continued the artistic tradition of the landscape panorama style that art historian Bernard Smith claims emerged in the late eighteenth century (Smith 1985, 218).[16]

A considerable number of artworks made on voyages of exploration in the late eighteenth and nineteenth-century were also influenced by a Romantic sense of adventure, and were often produced to appeal to increasing British public interest in travel (Jacobs 1995, 9–14, 80–90). Artists had long played important roles in familiarizing the public with unknown places, none more so than in the Pacific (Jacobs 1995, 80). This theme is also apparent in many of the *Challenger* photographs: one of the Pacific Island of Tonga depicts palm trees and people along a vast beach that disappears into the distance (Fig. 9.2), evoking a William Hodges' 1773 painting of the South Pacific, *View from Point Venus.* Although photographs were unable to capture color, perspective, or depict light to enhance the romance of the scene—and as a result *View from Point Venus* evokes the warm, tropical climate in a way that the photograph arguably does not—the Romantic aesthetic is evident in both. In this sense the *Challenger* photographs fit Ryan's assertion that photography was used to capture the romantic as well as scientific features of exploration (Ryan 2013, 19–21).

[15] For example ship no. 435a in Album three of Assistant Paymaster John Hynes, 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0176, n.p.

[16] Photographs in (Smith 1985) include ship nos. 267, 267a, 267b, 267c (originals in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.).

Fig. 9.1 Photograph of a Moro Indian (ship no. 339, original in Album three of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0176, n.p.)

This likelihood is raised further when comparing the photographs to Thomas Baines' watercolor *Herd of Buffaloes* at the Victoria Falls (1862), which depicts an unusual landscape and scenes of human interaction.[17] Such representation of both people and place is evident in a *Challenger* photograph of a village in the Admiralty Islands, in which a group of indigenous people dwells amongst palm

[17] *Herd of Buffaloes,* at The Victoria Falls, Zambezi River (1862) by John Thomas Baines (Foyle Reading Room, Royal Geographical Society, London, S0012338). See also analysis in (Butlin 2005, 19).

Fig. 9.2 Photograph of Beach, Tonga (ship no. 254, original in Album two of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans collection, National Maritime Museum, London, ALB0175, n.p.)

trees outside their "exotic" home.[18] Also outside of the newly-experienced South Pacific, drawings and paintings often portrayed nature, according to Jacobs, "at her most strikingly unusual…with an overlay of metaphor, poetry and adventure" (Jacobs 1995, 153).[19] As the first known photographs of Antarctic icebergs, the *Challenger* therefore likewise captured visual scenes to create an impression of the unusual with a sense of romance, adventure, and excitement typical of aesthetic traditions on voyages of exploration (Fig. 9.3).[20]

[18] See e.g., Photograph of a Village, Admiralty Islands (ship no. 351, in Journal two of Richard Routley Adams Richards 1872–1876, n.p.).

[19] Specifically on icebergs see (Potter 2007, 3–13; Mifflin 2011).

[20] Photographs of icebergs include ship no. 179, the original of which can be found in Album two of Assistant Paymaster John Hynes 1872–1876 (Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0175, n.p).

Fig. 9.3 Antarctic Icebergs (ship no. 178 in Album two of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0175, n.p.)

9.3.3 Aesthetics of Empire

In the context of nineteenth-century British imperialism, themes of Empire and trade were another common aesthetic in art in the eighteenth and nineteenth century (Barringer et al. 2007, 1–19; Quilley 2011). Such themes are also evident in the *Challenger* photographs: one of them, for example, shows indigenous peoples crossing the ocean in a canoe to trade with the inhabitants of a nearby island, inkeeping with a common aesthetic theme of exchange (Barringer et al. 2007, 1; Quilley 2011, 10). Other photographs appear to seek to express a sense of British imperial superiority, attempting to construct an image of a "civilized" crew amongst "primitive" indigenous people, which is another theme commonly seen in nineteenth-century expedition art in the context of Empire (Quilley 2011, 60).[21] The *Challenger* photographs furthermore represent such nineteenth–century themes as colonial possession by their depiction of churches and government buildings in the imperial Kingdom of Hawaii: the portrayal of colonial architecture was a particular theme in the paintings

[21] For example ship no. 349 in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.

of eighteenth-century artist Edward Dayes (Quilley 2011, 10; McLean 2007).[22] In addition, and further complicating the story of these images, one *Challenger* photograph in Lieutenant Alfred Carpenter's album not only portrayed a fort in Tahiti but was also annotated with a description of the "wall defending mountain pass," suggesting this fact to be of some importance and perhaps connecting it to art or even Imperial military survey rather than objective scientific evidence.[23]

This is not to argue that every *Challenger* photograph represented subjects or scenes in a way that connects them to the wider history of art on voyages of exploration, nor is every aesthetic tradition manifest in the photographs. Despite following themes in the history of art, the lack of color, comparable quality of light, and patterns of brushstrokes in photographs separates them from longer aesthetics traditions, while some photographs—particularly face and profile portraits—do neverthless appear more inkeeping with photography used as "objective" scientific evidence.[24] Yet for many of the photographs their status as evidence depended upon a debt to existing artistic conventions, inferring an epistemic authority as art rather than as "objective" visual scientific evidence. Such a paradox leads this chapter to ask: Were the photographs circulated and used scientifically, and if so, how? Can this reveal more about photography as a visual strategy on the *Challenger* expedition?

9.4 Scientific Circulation and Use: Photographs in the Official *Report of Scientific Results*

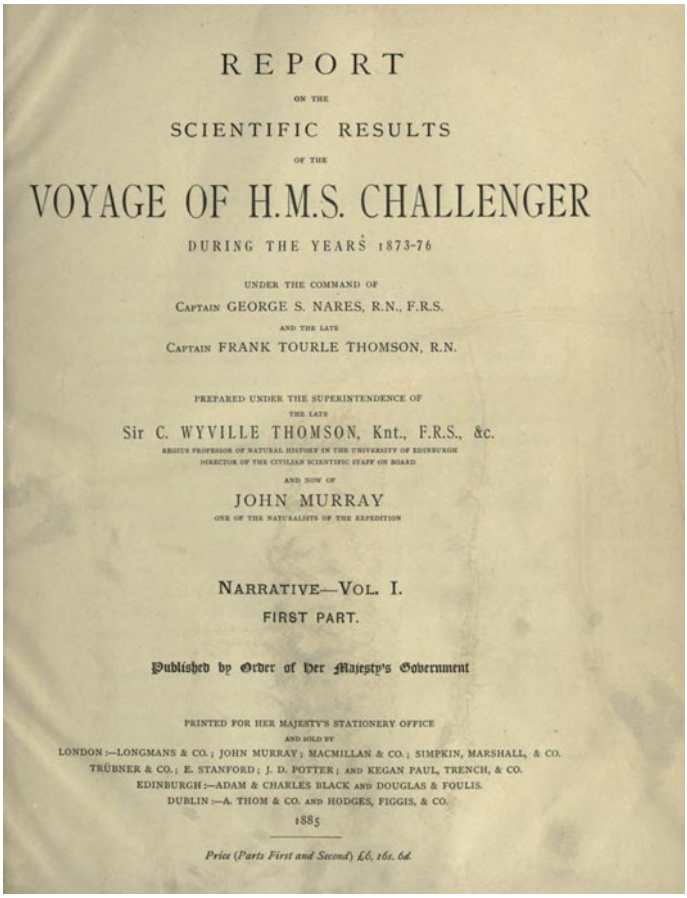
This chapter has already shown that the *Challenger* photographs were limited in their intention and ability to serve as "objective" scientific evidence, but it is nevertheless clear that a number of them were anticipated for scientific use from the outset. Minutes from a meeting of the Royal Society in the weeks before the expedition stated that "photographs or careful drawings of tropical vegetation often contain very interesting information, and should contain some reference to a scale of dimensions,"[25] while instructions added to the oceanographic objectives of the expedition stated that "Every opportunity should be taken of obtaining photographs of native races to one scale" for anthropological use (Brunton 2004, 15). These clear scientific intentions therefore warrant a further look at how the photographs were used in the

[22] Government buildings in Honolulu were taken as per ship no. 392 in Album three of Assistant Paymaster John Hynes 1872–1876, n.p. Churches are depicted in photo no. 842 in Photograph album of Alfred Carpenter 1872–1876, n.p.

[23] Ship no. 410 in Photograph album of Alfred Carpenter 1872–1876, n.p.

[24] For example, ship nos. 382 and 383 in Album three of Assistant Paymaster John Hynes 1872–1876, n.p.

[25] Unconfirmed minutes of the Royal Society, November 14, 1872. Library, Art and Archives, Royal Botanic Gardens Kew, London, JDH1/14/1, f. 5r.



REPORT

ON THE

SCIENTIFIC RESULTS

OF THE

VOYAGE OF H.M.S. CHALLENGER

DURING THE YEARS 1873-76

UNDER THE COMMAND OF

CAPTAIN GEORGE S. NARES, R.N., F.R.S.

AND THE LATE

CAPTAIN FRANK TOURLE THOMSON, R.N.

PREPARED UNDER THE SUPERINTENDENCE OF

THE LATE

Sir C. WYVILLE THOMSON, Knt., F.R.S., &c.

REGIUS PROFESSOR OF NATURAL HISTORY IN THE UNIVERSITY OF EDINBURGH

DIRECTOR OF THE CIVILIAN SCIENTIFIC STAFF ON BOARD

AND NOW OF

JOHN MURRAY

ONE OF THE NATURALISTS OF THE EXPEDITION

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FIRST PART.

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Fig. 9.4 Front page of the *Narrative* to the *Official Report of Scientific Results* (Tizard et al. 1885. Narrative of the Cruise of H.M.S *Challenger* with a General Account of the Scientific Results of the Expedition. In *Report on the scientific results of the voyage of HMS 'Challenger' during the years 1873–1876*. London: Longmans and Co.)

official fifty-volume *Report of Scientific Results*, which was issued in the decades following the voyage, alongside its other visual strategies (Fig. 9.4).[26]

[26] The *Narrative* (1885) was written by *Challenger* Staff Commander Thomas Tizard and its scientific crew members Henry Nottidge Moseley, J.Y. Buchanan, and John Murray.

9.4.1 Photographic Plates and Woodcut Reproductions

As intended, some of *the Challenger* photographs went on to find scientific uses in the official *Report*. Thirty-five of them appeared as plates in its first volume, the *Narrative*: one of them, labeled as "Wood Scenery, Tonga," was used as a means of illustrating "plain evidence of the reduction of the population" of vegetation in the landscape on the Polynesian island (Tizard et al. 1885, 484, ship no. 257a). Others were used to exhibit the patterns of the *Pringlea antiscorbutica* (Kerguelen cabbage) and *Azorella selago* plant species on the Kerguelen Islands of Antarctica, a prominent site of scientific enquiry in the 1870s (Tizard et al. 1885, 299, 300, ship nos. 228a, 220).[27]

In addition to these thirty-five plates, several of the *Challenger* photographs were also published in the *Narrative* as woodcut reproductions, such as those of *Carica papaya* trees (Fig. 9.5). There is no discernible reason as to why certain photographs were printed as plates and others as reproductions, but it might have been a result of the practical limitations posed by printing several plates, or more likely an issue of cost, since photographic plates were significantly more expensive to print than woodcuts. In any case, once transformed into woodcut reproductions, *less* authority was afforded to photographs over drawings or paintings as scientific evidence (Daston and Galison 1992, 101). Rather than photography serving as "objective" visual evidence, therefore, this serves as further indication that it must have been used as a visual strategy for the expedition's scientific purposes owing to *other* advantages it had over drawing and painting.

9.4.2 Maintenance of Drawing Practices for Illustrating Scientific Specimens

This assertion is further supported by the fact that drawing, rather than photography, was maintained as a means of accurately illustrating specimens in the *Narrative*. Few of the *Challenger* photographs depicted individual flora or fauna, a preference for the authentic depiction of which was maintained through these drawings made by the on-board artist Wild and the scientific crew Willemoes-Suhm, Moseley, and Wyville Thomson. Many of these illustrations published in the *Narrative* were produced using a camera lucida in order to draw to scale and with accurate perspective, such as that of the crustacean *Polycheles crucifera*.[28] The camera lucida was listed separately from Wild's drawing and painting materials, suggesting that it was perceived as a scientific instrument for the crew to be able to draw in perspective rather than as

[27] See (Mills 2003, 345–346) regarding the importance of Kerguelen.

[28] Drawing by Willemoes-Suhm of "*Polycheles crucifera*…twice the natural size. From 450 fathoms, off Sombrero, West Indies" (Tizard et al. 1885, 523). The camera lucida was used as a means of creating traceable images of objects to achieve accurate perspective (Davenport 1991, xiii). See also *Detailed account of scientific apparatus* 1872, n.p.

Fig. 9.5 "Papaw trees (Carica papaya), in the Governor's garden at Clarence Hill." Reproduced from ship no. 69 of trees in Bermuda (Tizard et al., "Narrative of the Cruise," 147; original photograph in Photograph Album of Thomas Henry Tizard 1873–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0859, n.p.)

a purely artistic tool.[29] Wild also asserted the importance of his own drawings and paintings in "representing…accurately…the natural scenery," indicating that these images were intended for use as accurate scientific evidence (Wild 1878, 4). This theory that drawing was preferred as a scientific visual tool on the *Challenger* is supported further by letters written by Captain Thomson during the voyage, where he claimed that certain species were to be "described and illustrated under my direction," praising Wild to be "most expert in drawing animals."[30]

9.4.3 Depicting Color

A further, and perhaps more clearly discernible reason that drawings and paintings were prioritized over photographs as visual strategies for the scientific *Narrative* was that photography was unable to depict color in the mid-nineteenth century.

[29] *Detailed account of scientific apparatus* 1872, n.p.; (Brunton 2004, 16; Codling 1997, 193).

[30] Letter from C. Wyville Thomson to Ctn Evans, 8 Jan. 1875, Library, Art and Archives, Royal Botanic Gardens Kew, London, JDH1/14/2, ff.169–170r–v.

The volume contained color lithographs, including drawings of icebergs by Wild, accompanied by detailed descriptions such as "the colouring of the southern bergs is magnificent…with a slight bluish tint…On this ground color there are parallel streaks of cobalt blue, of various intensities," and "the colouring of the crevasses, caves, and hollows is of the deepest and purest azure possible," clearly written with the aim of invoking the richness of color in the landscapes (Tizard et al. 1885, 433; Codling 1997, 193). The *Challenger* photographs can therefore be argued to have possessed little to no epistemological authority over drawing and painting as visual strategies, which had the advantage of depicting color.

The ability to illustrate color was also important for the anthropological sections of the *Narrative* as well as those parts that described fauna and flora. This is evident foremost in the inclusion of Wild's colorful sketches of people in Tonga "to show the color of race" and of spears from the Admiralty Islands drawn to depict their "highly decorated" patterns.[31] Despite the rise of photography in nineteenth-century anthropology and "race science" (scientific racism) the omission of photographs appears not to have limited the scientific value that was attributed to the anthropological parts of the publication: a review of the *Narrative* in the prestigious journal *Science* claimed that "the ethnologist will find himself well rewarded for his study of its pages" (Anon 1885, 15–16). This further suggests that drawings were seen by those on the expedition, and by scientific authorities outside of it, to be just as valuable for science as photography.

9.4.4 The (In)accessibility of Landscapes

Drawings and paintings not only provided the benefit over photography of depicting color in the *Narrative:* a further advantage was that certain scenes and objects were more accessible to the artist than to the photographer. Paintings and drawings printed in the volume depicted flora, fauna, and sediments taken from under the ocean as part of the expedition—not only were these printed in color, but they depicted samples that were underwater and therefore could not have been photographed in their natural habitat (Tizard et al. 1885, 926). Such specimens would have required artistic agency to depict them as accurately as possible, as their appearance and context would have changed upon their removal from the sea. Photography was unable to capture the sediments *as if* they were in the ocean, while the creative agency employed in drawing and painting enabled such depiction. This provides a further argument as to why drawing and painting were maintained as a scientific visual strategy on the *Challenger*.

From their use as plates and woodcuts in the *Narrative* it is clear that the *Challenger's* photographs held a function as scientific evidence. But that many of them

[31] See "Various Dancing Costumes worn at Nakello, Fiji; a Tongan to show the color of the race" (Tizard et al. 1885, 503) and "Admiralty Islands. Unusually large and highly decorated obsidian bladed spears" (Tizard et al. 1885, 710).

were printed as reproductions tells us that objectivity was not a significant factor in their use—traditional visual strategies such as drawing and painting were retained for this purpose in order to depict scale and color, and to illustrate specimens that photography was unable to due to inaccessibility. Looking instead at the photographs' circulation and uses in the wider scientific community points to other reasons that photography was used on the expedition.

9.5 The Reproduction and Circulation of the *Challenger* Photographs within Wider Scientific Circles

As well as being published in the *Narrative,* the *Challenger* photographs reached other scientific publications in the 1870s as engravings and woodcut reproductions. Focusing upon their reproduction and circulation in these contexts reveals more about why photography was a successful visual strategy on the expedition.

9.5.1 Speedy Capture and Replication

The photographs' use in these wider scientific contexts firstly serves as further evidence that photography served to speedily capture and reproduce visuals for their circulation as scientific evidence both during and after the expedition.[32] In 1876, the journal *Nature* included woodcut reproductions of photographs from the *Challenger* of the botany of the Bermudas, in illustration of the gardens rich with tropical vegetation such as *Carica papaya* trees.[33] A number of the photographs were also reproduced as woodcuts in *Nature* to illustrate geological structures including a "Sand-glacier" in Bermuda and indigenous people amongst various landscapes and vegetation types.[34] This functional benefit of replicability is also evident in Charles Wyville Thomson's scientific publication *The Voyage of the Challenger,* which included reproductions of the same photograph of sand glaciers in Bermuda shortly after the expedition. Drawing and painting would not have enabled the quick and simple reproduction of an image for dissemination to more than one scientific publication: in this case, therefore, photography possessed a distinct advantage over other visual strategies.[35]

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[32] See (Hamber 1990) regarding the common printing in newspapers of photographs as reproductions, since it was not possible to print them directly due to the technological limitations of the mid-nineteenth century.

[33] Reproduction of ship no. 64 in (Anon 1876, 97–99), original in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.

[34] Ship no. 80 in (Anon 1876, 97–100); original in Photograph Album of Thomas Henry Tizard 1873–1876, n.p.

[35] Ship nos. 61, 80 in (Thomson 1878, 290–291); originals in Album one of Assistant Paymaster John Hynes, 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime

This appeal of photography in reproducing visual scientific evidence was not limited only to their use in scientific publications, but in the ability to circulate such images amongst those in the wider scientific community during the expedition. Naturalist Willemoes-Suhm, for example, posted photographs from the expedition to zoologists in Europe for their scientific use, having acquired copies of them on board the ship (Willemoes-Suhm 1877, 27). Likewise naturalist Moseley, in a letter sent to fellow naturalist Joseph D. Hooker early on in the expedition, claimed "I will send you some [photographs] when I get them…Prof Thomson promised to give me a set for that purpose."[36] Moseley kept his word: the *Proceedings of the Linnean Society* stated that its President Joseph Hooker had in a lecture of 1875 "exhibited an extensive series of drawings and photographs taken during the 'Challenger' Expedition" whilst a "Professor Dyer, in illustration of Mr. Moseley's 'Notes on the Insects and Plants of Kerguelen,' called attention to a photograph showing the Kerguelen Cabbage (*Pringba antiscorbutica, Br.*) in different stages of growth" (Anon 1875b, v). No rationale was given for the use of both photographs and drawings, and it is not known if the drawings were those of Wild or one of the amateur artists or scientists on board the *Challenger*. But their use further demonstrates that photography was utilized due to its ability to quickly capture and reproduce scenes, which drawing was unable to do. This replicative capacity also enabled Willemoes-Suhm to post photographs home of indigenous people of the Philippines and Tonga on the account of their being "very anthropologically important" and thus to be kept for his later scientific study.[37]

9.5.2 Saving for Later: Photographs as Templates for Drawing and Painting

The *Challenger* expedition's photography also served as a speedy means of capturing and reproducing images for scientific use as *templates* from which to draw at a later date. One of Moseley's scientific publications on the inhabitants of the Admiralty Islands used a *Challenger* photograph from which to sketch people as anthropological illustrations (Moseley 1877). Yet another pencil-sketch drawing of a single person was unmistakably copied directly from a group portrait photograph taken on the voyage.[38] Whilst this drawing could have been made alongside the photographer

Museum, London, ALB0174, n.p., and in Photograph Album of Thomas Henry Tizard 1873–1876, n.p., respectively.

[36] Letter from Henry Moseley to Joseph Hooker, August 3 1873, Library, Art and Archives, Royal Botanic Gardens Kew, London, JDH1/14/1, f. 82r–v.

[37] Translated from German, "sind anthropologisch sehr wichtig" (Willemoes-Suhm, *Challenger-Briefe*, 111, 146–148: p. 146).

[38] Photograph of Admiralty Islanders in Photograph ship no. 348, original in Album two of Assistant Paymaster John Hynes 1872–1876, n.p. For the corresponding drawing see (Moseley 1877, pl. XIII).

taking the picture, the identical appearance of the drawing to the photograph—including the angle—and the obvious convenience of being able to capture scenes quickly to use as a template for producing scientific illustrations serves as further indication that the photograph was used for the artist to work with later, at a more convenient time or location. On this basis the appeal of photography for science on the expedition, over drawing and painting, can again be seen as its speed of capture and its replicability.

9.5.3 Photography as a Printing-Press-in-the-Field

Photography on the *Challenger* also functioned as a strategy for capturing, replicating, and disseminating drawings for various scientific publications, operating as what Ryan has defined as a "printing-press-in-the-field" (Ryan 1997, 79). This was a deliberate and regular practice on the *Challenger*: Willemoes-Suhm claimed in a letter to his mother "The artist Mr Wild has drawn the laboratory, which was then photographed, but I do not send it to you because it will soon be displayed in Thomson's letter to 'Nature.'"[39] Wild's drawing of *Euplectella subarea,* which was printed as a reproduction in *Nature* (Fig. 9.6), is identical to one of the *Challenger* photographs, further revealing the use of photography as a "printing-press" to be a functional benefit that was deliberately utilized on the voyage for replicating and circulating visual evidence for wider scientific use both during and after the expedition.

Although traditional means of visual depiction including drawing and painting were utilized for depiction of scale, perspective, color, and inaccessible specimens, by functioning as a speedy method of capturing and reproducing scenes for circulation, and as a "printing-press-in-the-field" for drawings, photography offered additional flexibility for the purposes of scientific evidence during and after the expedition. This leads this chapter to its next question: Did the purpose and success of photography on the *Challenger* even extend past both the "artistic" and "scientific"?

9.6 Personal Circulation and Use of the *Challenger* Photographs

The quick and simple replicability of photographs, as highlighted earlier in this chapter, provided not only scientific benefits: it also enabled multiple individual copies to be printed on board the *Challenger*. The photographs were distributed to crew members during the voyage for their personal use, as single copies at sixpence

[39] Translated from German: "Das Laboratorium hat der Artist Mr. Wild gezeichnet, und dasselbe ist dann photographiert worden; ich sende es Euch nicht, weil es demnächst in einem Briefe Thomsons in»Nature« abgebildet wird" (Willemoes-Suhm 1877, 21). Author's translation.

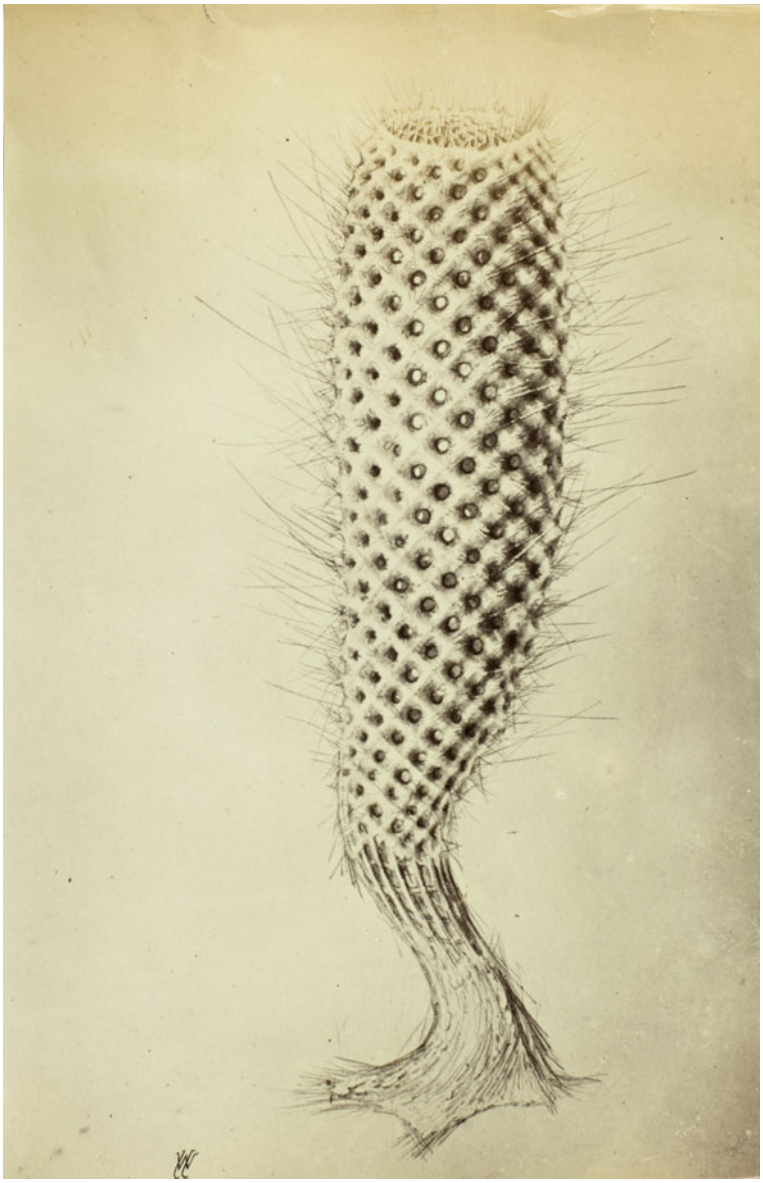

Fig. 9.6 A drawing by Wild of "Euplectella subarea" (Drawing in Anon, "The Cruise of the Challenger" 1876, 93–94. Corresponding to photograph ship no. 28, original in Album one of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0174, n.p.)

Fig. 9.7 Photograph of Captain Thomson with people from the Admiralty Islands (ship no. 349, original in Album two of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0175, n.p.)

each, or one shilling for a second copy.[40] Schwartz has detailed how photographs were used in the nineteenth-century as a means of narration, personal memory, and for sharing experiences with friends and family, which is also something that we see in these photos collected on the *Challenger* expedition (Schwartz 2000, 19–21). Narrative accounts in the crew's journals correlate with much of the photographic content, the range of subjects of the photographs revealing a chronological visual representation of the expedition. A photograph of Captain Thomson with people of the Admiralty Islands (Fig. 9.7) can be viewed in this way since its composition provides limited basis for comparative anthropological analysis, instead appearing more to be a narrative or novelty photograph. That Willemoes-Suhm sent home photographs of Malaysian huts and people to narrate his experiences to his family also demonstrates their wider subjective interpretation and function as personal souvenirs from the expedition, in addition to highlighting their advantage of replicability for wider circulation.[41]

[40] Letter from Henry Moseley to Joseph Hooker 3 Aug. 1873, f. 82rv. See (Brunton 2004, 15).

[41] For example on staying with indigenous people in the Malaysian Archipelago, describing staying in a 'camp' in the forest, at the foot of a small hill, where mats were spread out among huge palm leaves (Willemoes-Suhm 1877, 108–177).

9.6.1 Personal Albums and Journals

A number of the *Challenger* photographs were used in the personal albums and journals of several of both the naval and civilian scientific staff, including those of botanist Moseley, naturalist Willemoes-Suhm, chemist Buchanan, assistant paymaster John Hynes, Navigating Lieutenant Tizard, ship carpenter Robert Higham, and Lieutenant Carpenter. Many of the photographs also appear in more than one of the albums, again demonstrating the advantage of replicability that made photography such a successful visual strategy on the *Challenger* expedition. In these albums the photographs were also flexible enough to take on a multitude of meanings and uses: the personal use of the *Challenger* photographs was varied in these albums and journals, and included those purchased or received as gifts as well as those taken by the official expedition photographers.[42] Some front-and-profile portraits were used specifically to describe "types" of male and female indigenous people from and anthropological perspective, as can be seen in the album of Lieutenant Carpenter (Willemoes-Suhm 1877, 146–148).[43] In others they were used more decoratively, as in the album of Hynes, which combined front and profile portraits of Hawaiian and Japanese people at right angles to each other with no clear intention of anthropological comparison.[44] The photographs therefore took on a range of subjective meanings and interpretations once circulating for the personal use of those on board the expedition.

These case studies tell us that the *Challenger* photographs were manifestly valued as flexible material objects that were capable of multiple uses and interpretations. A recently-discovered photograph album and seven journals incorporating photographs belonging to expedition Paymaster Richard Routley Adams Richards—including new photographs not yet incorporated into the Brunton catalogue—reveal yet more about their use.[45] In Richards' album and journals the *Challenger* photographs did not necessarily replace other forms of visualization when it came to creating personal narratives of the expedition, but were used alongside drawings, paintings, and other visual items such as train timetables and tickets. The photographs were enclosed alongside annotations and written accounts as a means of illustrating a narrative of the expedition, and spanned a range of themes including people, landscapes and vegetation, Chinese architecture, and hieroglyphics on wood—indicating how the

[42] (Brunton 2004) has catalogued the albums, and further details can be found on pages 1–23. The photographs in these personal albums and journals do not display the government copyright stamp added after the expedition, indicating them to have been acquired during the voyage.

[43] Photograph album of Alfred Carpenter 1872–1876, n.p.

[44] Album three of Assistant Paymaster John Hynes 1872–1876, n.p.

[45] A photograph album belonging Bromley is also omitted from the Brunton catalogue, but its content and whereabouts are unknown (Logbooks, photographs and microscope slides kept by Bromley during Challenger's voyage, 1872–1876, Natural History Museum Library and Archives, London, Murray Col. MSS Bro 1, n.p.). For Richards photographs, see Journals 1–7 of Richard Routley Adams Richards on Board HMS *Challenger,* 1872–1876, Foyle Reading Room, Royal Geographical Society, London, RRR/1–7 and Photograph Album of Richard Routley Adams Richards, 1872–1876, Foyle Reading Room, Royal Geographical Society, London, RRR/8.

photographs could be used in varied ways depending on the person's preferences, memories, and creative agency.

Richards also included in his album a photograph of one of Wild's drawings of icebergs.[46] Other photographs of artist Wild's drawings, such as that of *Euplectella subarea* (discussed earlier in this chapter) were included too in Hynes' personal album.[47] For personal albums too the function of the *Challenger's* photography as a "printing-press-in-the-field" is evident as a benefit over drawing and painting that made it a worthwhile and successful visual strategy on the expedition. Looking at these personal albums and correspondences therefore shows us how the success of the *Challenger's* photographic practice can be attributed to the flexibility of photography and of the photographs themselves. Considering the even wider scientific, social, political, and economic context of the expedition in the next and final part of this chapter provides further insights into photographic strategies on the *Challenger* as well as their connections to each other.

9.7 Complex Interplays: The *Challenger*, Science, and Society

The photographs from the *Challenger* found themselves circulating even more widely than these personal and scientific circles, both during and after the voyage. This should come as no surprise: the use of photographs for public communication, education, and entertainment—in newspaper articles, popular accounts, public lantern shows, and museum exhibitions—was a common practice in Britain at the time of the voyage. Correspondingly, looking closely at photographic practices on the *Challenger* expedition begins to uncover a complex interplay between science, economy, imperial politics, and public communication—also revealing how science itself was embedded in its wider social contexts in the nineteenth century, and that "objectivity" was not necessarily the sole aim even of its scientific photography (Corbey 1993; Schwartz 1996, 33; Maxwell 2000, 27; Ryan 2013, 12–13).

9.7.1 Photography as a Printing Press for Public Communication

During the expedition, photography served as a "printing press" with which to replicate and disseminate drawings and paintings not only for private and scientific use but also into the British public sphere. The *Illustrated London News* is an example of

[46] *New Photograph of a Drawing of Antarctic Icebergs*, with the Signature of J.J. Wild (in Photograph Album of Richard Routley Adams Richards 1872–1876, n.p.).

[47] For example ship no. 28 in Album one of Assistant Paymaster John Hynes 1872–1876, n.p.

Fig. 9.8 "The Challenger at St. Paul's Rocks," in the *Illustrated London News* (ship no. 136, original in Album one of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0174, n.p.)

a national news outlet that published drawings accompanying accounts of the *Challenger* expedition throughout its voyage. One of these drawings was produced from a photograph taken of a sketch by Wild that depicted the ship at St. Paul's Rocks—part of the Atlantic's Saint Peter and Saint Paul Archipelago—in 1873 (Anon 1873, 412–414) (Fig. 9.8).[48] Another woodcut image of the ship amongst rocks at Christmas Island, Kerguelen harbor in 1874 was also printed in the newspaper, having been replicated through photography on the voyage—these are only two examples of the photographs' multiple uses and formats (Anon 1874, 505). The image of St Paul's Rocks was deliberately composed to illustrate the experience of boats being "sent off with a lot of whale line" for a loop "to be passed round one of the rocks" for landing (Anon 1873, 414).The drawing also illustrated the description of the "strong current" and "heavy surf…of from 5 ft. to 7ft." experienced by the ship's crew (Anon 1873, 414). These examples provide further reason to believe that drawing was useful as a visual strategy on the *Challenger* because the ship could not be depicted at sea through photography. What photography instead made possible was that both of these sketches would be *replicated* in order for Wild to disseminate them to newspapers to be published: the *Illustrated London News* claimed in its print to be "indebted to [Wild] for the photographs" and accompanying accounts (Anon 1875a, 590–591).[49]

[48] Photograph corresponds to ship no. 136, original in Album one of Assistant Paymaster John Hynes 1872–1876, n.p.

[49] Ship nos. 136 and 228c, original in Album one of Assistant Paymaster John Hynes 1872–1876, n.p.

Some of the photographs also reached the wider public sphere during the voyage as reproductions in Thomson's *Letters from H.M.S. Challenger* (1874), which appeared in the popular monthly anthology *Good Words*—a magazine directed at Britain's lower middle classes that included religious material, fiction, and science articles. This case can be seen as connected to the phenomenon of "armchair travel" that was popular in the nineteenth century, and of the increasing communication of science to a wider public (Schwartz 1996, 33). Reproductions of the photographs used in the publication ranged from scenes of vegetation, such as Kerguelen cabbages to depict botanical specimens, and of Thomson himself on Kerguelen Island.[50] The Bermudas, Azores, and other destinations were also featured to illustrate Thomson's narrative of the voyage, including anecdotes of indigenous people, findings of botanical specimens, and his own particular ventures during the expedition.[51] Photography on the *Challenger* thus functioned as a means of *reproducing* and *disseminating* illustrations for the public communication of the voyage to the British public during the expedition—not coincidentally at a time when its government also sought to communicate its exploration and colonial empire-building activities more widely.

9.7.2 Use in Popular Accounts of the Challenger Expedition

Such practices of dissemination continued after the *Challenger* expedition, when the photographs were used more extensively in popular accounts of the voyage. Once again photography functioned as a speedy method of capturing scenes to be used as templates for later artistic depiction: artist Wild's popular account of the voyage *At Anchor* (1878) included drawings of King George and Queen Charlotte of the Friendly Islands, which were unmistakably copied in pencil from the *Challenger* photographs (Wild 1878, 90) (Fig. 9.9). Since Wild had other responsibilities as the *Challenger* secretary, and as he seems to have utilized very little of his artistic skill or agency in these drawings, it can be assumed that some photographs were intentionally taken for his later use as a template, so as to prevent distortion of the view from his memory. This speedy capture and replicability further enabled other popular accounts to include reproductions of the *Challenger* photographs after the expedition, including Spry's *The Cruise of Her Majesty's Ship Challenger* (1877), which depicted the ship's workrooms, town architecture, and the people of the Polynesian island of Tongatabu.[52]

[50] Ship 220–221 and 223, 228a respectively in (Thomson 1874c, 744–745).

[51] See for example reproductions in (Thomson 1874a, 94–102; b, 381–387).

[52] Ship nos. 1, 33, 30, 91, 253 in (Spry 1877, 9, 25, 59, 61, 178) respectively. Originals in Album two of Assistant Paymaster John Hynes 1872–1876, n.p.

Fig. 9.9 Photographs of King George and Queen Charlotte (ship no. 247 and 248, original in Album two of Assistant Paymaster John Hynes 1872–1876, Historic Photographs and Ships Plans Collection, National Maritime Museum, London, ALB0175, n.p.)

9.7.3 Adding Popular Appeal to the Official Narrative

As well as using the *Challenger* photographs for its scientific purposes, the official Report's *Narrative* also printed them as plates, seemingly to convey a sense of adventure in the expedition that might have been intended to appeal to a more general audience. One photograph taken from on board the ship depicted indigenous peoples on a canoe, who had brought a gift of a green turtle to Captain Nares, whilst another was used to depict a "wide flat expanse of hardened lava" at the Kilauae volcano, Mauna Loa (Tizard et al. 1885, 506–507, 767).[53] The description of being "struck with the strange appearance of the wonderful termite hills" on approach to Albany Pass, Somerset, Cape York was also illustrated with a photograph, and another of Bisayan Houses, Samboangan was used to demonstrate the "condition" and "impossibility" of their architecture (Tizard et al. 1885, 532, 660).[54] The "unusual" Ki Doulan Mohammedan Mosque was similarly illustrated as an example of architecture through a *Challenger* photograph that was accompanied in the *Narrative* by the description of "a curious development of the high-peaked Malay roof into a sort of half tower, half spire" in Ki Doulan.[55] Further flexibility in the photographs' use can be seen in those of icebergs, which accompanied descriptions of the navigational

[53] Photograph ship nos. 269 and 400 on pages 508, 767, respectively.

[54] Ship nos. 270 and 337 respectively.

[55] Building in a Village in Ki Doulan; ship no. 279a (Tizard et al. 1885, 555).

problems that the captain experienced trying to get around them rather than communicating scientific information (Tizard et al. 1885, 396–405).[56] This ability to use the photographs to communicate the "wonder" of a scientific expedition to a wider audience was a particular benefit of the visual strategy on the voyage that further demonstrates the connection between the scientific value of the photographs with their popular use.

9.7.4 The Photographs as Commodities

Adding a further dimension of complexity to the story of visual culture on the *Challenger* is that the photographs from the expedition also functioned as saleable "commodities" to be used for economic benefit. During the voyage, 479 of the photographs were circulated as part of an Official Album, which was used to impress visiting dignitaries and circulated individually as gifts to onshore hosts, such as in New Zealand (Brunton 2004, 17–19). Following the voyage they continued to circulate as commodities through the Edinburgh photographic company J. Horsburgh and Sons by Her Majesty's Stationery Office (Ryan 1997, 33).[57] This circulation began in 1885—strategically in the same year as the publication of the *Narrative*, indicating a specific intention to capitalize on the photographs as the story of the *Challenger* reached a wider public audience.[58] Such "saleable" features included those of indigenous people in groups and as front and profile portraits, crew on board the ship, volcanoes, and icebergs, and local and colonial architecture including homes, temples, and churches.[59] The photographs adopted a range of formats: they could be purchased from the Horsburgh catalogue as single 8" × 6" unmounted copies, a set of "any 50" unmounted copies, and a complete set of 350 either unmounted, mounted on linen with alphabetical index bound in French morocco, or bound in Turkey morocco with "extra finish."[60] Purchasers also had the option of buying "outside size" copies of 15" × 11" and any photograph in platinotype for twenty-five per cent extra, in carbon for 33½ per cent extra, as enlarged or reduced copies, "or any special fancy" requested.[61] Individual photographs came at a cost of £0.1.0, or one could pay up to £18.18.0 for the complete set; they could also be purchased as transparencies "for Lantern Exhibitions" at an unspecified cost.[62] In being sold for economic means in such a wide variety of formats the *Challenger* photographs fit the earlier tradition of sketches and

[56] Ship no. 177a on page 404.

[57] Horsburgh catalogue of the photographic negatives taken during the challenger expedition, 1885, Natural History Museum Library and Archives, London, Murray Col. Section 5, No. 47, ff. 1–12.

[58] Horsburgh catalogue 1885, ff. 1–12.

[59] Horsburgh catalogue of the photographic negatives taken during the challenger expedition, 1885, Natural History Museum Library and Archives, London, Murray Col. Section 5, No. 47, ff. 1–12.

[60] Horsburgh catalogue 1885, ff. 1–12.

[61] Horsburgh catalogue 1885, f. 12.

[62] Horsburgh catalogue 1885, f. 12.

paintings being sold as prints to accompany scientific works and illustrated books of travel, whilst also being valuable themselves as commodities and making them adaptable to wider public and scientific use (Jacobs 1995, 16).

9.7.5 Subjective Interpretations: The Commodified Photographs Return to Science and the Public

Intriguingly, through their commercial circulation through the Horsburgh catalogue the *Challenger* photographs found themselves additional scientific uses—where the scientific meaning attributed to them became further relative to the perspective of the observers in the different contexts in which they were used. A number of photographs purchased from the catalogue were published as plates in Alfred Russel Wallace's *Studies Scientific and Social* (1900) in which they were used to illustrate racial "types" of people at a time when "race science" (scientific racism) was being established as a discipline (Wallace 1900, 457).[63] Wallace acquired the photographs of indigenous Api, Hawaiian, and Tahitian men and women specifically for his study.[64] Despite taking them from a commercial catalogue, Wallace's use of the photographs for "scientific" purposes, which he utilized alongside photographs taken by the Anthropological Institute, indicates that he deemed them equally appropriate as scientific evidence: he declared alongside two of the *Challenger* of the photographs in the book their capacity to "sufficiently show the general character" of his subjects (Wallace 1900, 406). Owing to developments in printing technology by the date that *Studies Scientific and Social* was published, the photographs could be printed as plates rather than reproductions, which also arguably increased their value as evidence for racialized "scientific" thinking.[65] Here we see a multifaceted connection between the economic use of the *Challenger* photographs with their value as scientific evidence, which could be used to further investigate the use of science and visual culture to both rationalize and sensationalize British science, exploration, colonialism, and racism in the nineteenth century.

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[63] Including front and profile portraits of men and women on Tahiti, and a man from Api, New Hebrides corresponding to ship nos. 380, 383, 405, 403, 295 respectively. The photographs are likely to have been purchased from the Horsburgh catalogue since they were found stored in Wallace's personal archives with a translucent envelope printed "J. Horsburgh & Son." See Alfred Russel Wallace's papers re. Studies Scientific and Social, 1852–1905, Natural History Museum Library and Archives, London WP6/6/6, ff. 1–12; Alfred Russel Wallace's papers re. Studies Scientific and Social, 1852–1905, Natural History Museum Library and Archives, London, WP6/6/7, ff. 9–14.

[64] Russel Wallace stated this specifically in a letter to his daughter regarding the photographs he had collected for the book. In Letter from Alfred Russel Wallace to Violet Wallace, 18 Nov. 1899, Natural History Museum Library and Archives, London, WP/1/2/124, n.p.

[65] See (Hamber 1990) regarding the printing of photographs as reproductions. See also (Codling 1997, 205–206) relating to the improvements in printing technology.

9.7.6 Public Communication of Scientific Racism

Revealing further intricate connections between photographs as commodity, scientific evidence, and wider public communication in the nineteenth century, the *Challenger* photographs also reached the British Museum's (Natural History) exhibition "Races of Mankind" in the early twentieth century through the commercial route of the Horsburgh catalogue.[66] Used to legitimize scientific racism to the public, several front and profile portrait photographs of Polynesian, Fuegian, Melanesian, and Japanese men and women were displayed as framed exhibits, while others appeared in the exhibition guidebook to illustrate racial "types."[67] Their use in this way also placed the photographs in an "ethnographic showcase" context that was typical of the "edutainment" popular amongst the British public in the latter nineteenth and early twentieth centuries.[68] The exhibition received mixed responses: the *Museums Journal* praised the exhibition and guidebook's entertainment value on the basis of its "excellent" photographs on public display. On the other hand, *Man: A Monthly Record of Anthropological Science* criticized both the exhibition and guidebook for their scientific inaccuracy and irrelevance to anthropologists, nevertheless claiming "the plates are of considerable interest, and are worth preserving" (Anon 1909a, 1–2, b, 59). This suggests that the photographs themselves were considered valuable for use as scientific evidence, but that their interpretation and use in this context of public education and entertainment that *Man* considered to not be sufficiently scientifically rigorous. Again we see here how the *Challenger* photographs were able to take on different subjective meanings and uses following their circulation.

Through their distribution through the Horsburgh catalogue the *Challenger* photographs undoubtedly reached other destinations—homes, "scientific" research, public display—and will have been used and interpreted in a multiplicity of ways. In addition to the various visual strategies and scientific and personal uses, this further reflects the multiple functions of the *Challenger* photography and its complex interplay between science, society, and visual culture in the nineteenth century that extends past photographic "objectivity."

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[66] Some of the exhibition photographs attributed to the *Challenger* are not in the Brunton catalogue, and may be further additions to the photographic collection. The photograph exhibits are labeled 'Challenger Expedition,' therefore linking them to the collection. It might be that the photographs were mislabeled as such, and their identification should be an area of further research.

[67] Ship nos. 354, 377, 382, 404, 435, 436, 436a, and photo no. 769 in Photographic Collection, Undated, Natural History Museum Library and Archives, London, DF PAL/143, ff. 112–115, 121, 123–124, 151, 162–163r; Ship no. 435 and 435a in Richard Lydekker's guide to the specimens illustrating the 'Races of mankind,' 1908, Natural History Museum, London, DF PUB/516/1/1, n.p.

[68] The government copyright stamp is not visible on the photographs, which have been cropped, but on account of the increased size and format for display they were likely to have been purchased through the Horsburgh catalogue for this purpose (Photographic Collection, Undated, ff. 112–115, 121, 123–124, 151, 162–163r).

9.8 Flexibility: *Challenger* Photographs, Science, and Society in the Nineteenth Century

This chapter has highlighted how a historiographical theory that nineteenth-century photography became important for science due to its perceived potential as "objective" visual evidence is not strictly supported by the *Challenger*'s maritime experience, nor is it evident in the expedition's extensive written and published record. The background to the expedition demonstrates that photographic practice on the voyage was not conducive to "objective" scientific image-making: the *Challenger* utilized several official photographers, none of whom were known to be trained for scientific purposes (but some who were trained by the military), and photographs acquired as gifts and purchases were also incorporated into the collection. In fact it was incredibly difficult to make objective photos on the *Challeng*er due to the conditions of the voyage. Traditions in art also shaped the *Challenger*'s photographic aesthetics, giving them an epistemic authority that extended outside of the "scientific." This builds upon arguments as to the undue simplicity of defining photography's success in nineteenth-century science to have been on account of its perceived "objectivity."

The case of the *Challenger* expedition therefore shows that, for photography to be used in this context, it must have been valuable for other reasons. Photography was indeed a successful method of visual depiction as scientific evidence on the expedition, despite the fact that drawings and paintings were used to serve a multitude of scientific functions including depicting scale, color, patterns, and objects in difficult-to-reach places such as specimens from under the sea, which photography was unable to achieve. The functional benefits of photography instead included speed of capture, reproducibility, and as a "printing-press-in-the-field" for drawings and paintings. All of these functions were advantageous in the creation and circulation of the *Challenger*'s visual scientific evidence.

These functional benefits of photography also applied to non-scientific contexts—including their personal uses and in popular written accounts, and for public entertainment and education. In some cases the photographs themselves were used, but they also served as visual templates for drawing and painting. Utilized too for economic benefit, upon their commercial circulation they went on to find multiple additional uses and interpretations, as scientific books, public entertainment, and exhibitions. Photography on the *Challenger* therefore achieved success not only on account of its supposed "objectivity," but owing to its *flexibility* as a visual strategy, also revealing a multiplicity of connections between visual culture, science, economy, imperial politics, and British society in the nineteenth century.

The *Challenger* expedition therefore serves as an excellent case study towards a deeper understanding of visual culture in science, exploration, and society in the nineteenth century. Additional research should be directed towards the many other photographs from the *Challenger* not referenced in this chapter, and incorporating the new photographs found through this study into the catalogue. Other questions include: How does the *Challenger*'s visual strategies compare to those of other voyages of exploration, in the nineteenth century and during other time periods? Did

changing technology alter the possible uses and interpretations of the expedition's photographs? How were the photographs further used for legitimizing and communicating scientific ideas to the public and within research communities—and how were they then interpreted? Taking a broader perspective: What more can photographic practices, including those on the *Challenger*, tell us about the complex relationships between visual culture, science, exploration, economy, politics, and society in the nineteenth-century?

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