CHAPTER SIX

Visualizing Exploration

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The camera is often aligned to the probing eye, an instrument combining revelation, discovery, and voyeuristic fascination. Such associations took shape early on, as in the pioneering work of Jacob A. Riis, the police reporter who used the powers of photography and the mercury flash to expose private worlds of impoverished New Yorkers in *How the Other Half Lives: Studies Among the Tenements of New York* (1890). In the twentieth century, this probing lens was partnered with a vast array of advancing modes for travel and exploration, from steamship technologies to the motor car, the airplane, and the diesel-electric propelled submarine. These evolving modes would enhance human mobilities and provide faster and more efficient means for witnessing, mapping, and patrolling the expanses of the globe. At the same time, technologies for visually documenting exploration across lands, seas, and skies included faster exposure times, more sensitive film stock, color emulsion processes, and increasingly lightweight cameras, offering greater flexibility and ease of use, finally transitioning towards the digital era. In the later decades of the century, light detection and ranging (LiDAR) technologies were allowing for minute three-dimensional documentation of the Earth's surface, atmospheric stratification, and topographical details beneath the oceans, while ground-penetrating radar could reveal structures hidden below ground.

What these technologies held in common was a growing reliance, as the century progressed, on mechanized exploration, photographic capture, and virtual witnessing: employing technology for primary analysis, such as computer software in the later decades of the century, and visually registering factual data that could serve as hard evidence for researchers, enhancing perceptions

of scientific objectivity while relying less on the limits of embodied vision or on written and personal accounts. Arguably, the twentieth century saw the ascendency of the visual and virtual over first-hand discovery, following what historians have characterized as shifts from the "Heroic" to "Mechanical" ages in Antarctic exploration. Indeed, over the course of the century, as Paul Virilio has argued, a critical period in modernity emerged when "the image was starting to gain sway over the object" (Virilio 1989: 1). By the 1970s, NASA's space probes *Viking 1* and *Viking 2* (launched 1975) were relaying communications from the surface of Mars, while more recently the remote-controlled Mars Exploration Rover (MER) used panoramic cameras (Pancams) to beam high definition 3-D color images of Martian topography. We find here that the roving camera now *is* the explorer, and stereoscopic images of land, soil, and sky are the virtual equivalents of direct witnessing (Bell et al. 2006).

With popular expansion, the production and consumption of technically reproducible images helped make and remake subjective relations to the world. Significantly, the twentieth century saw the "feverish production of views of the world" (Gunning 2006: 32). Tom Gunning points out that the consuming and interlinked passions of travel and picture-making intensified over the course of the century through a range of associated phenomena including travel by rail, balloon, airplane, ship, and automobile, and through virtual travels such as the simulated rail or airplane ride and global and ethnological displays at world fairs (Gunning 2006: 32). Complementing these experiences was a dizzying array of increasingly sophisticated photographic and motion picture views—snapshots, postcards, slide show projections, panoramas, and aerial photography—ranging from the railway and automobile cinematic subgenres of the early 1900s to the intense overseeing of the bird's-eye view. What was perfected over the course of the century was not just the visual capture and preservation of travel and exploration, but the production of the virtual traveler, making discoveries at a distance, witnessing and participating through a mechanized eye.

This chapter aims to engage not just with the visuality of twentieth-century exploration, but with shrinking perceptions of the Earth's vastness and wildness as technologies of visual reproduction and virtual access became more readily available. As important as first-hand experiences of traversing the globe—and beyond—were, the virtual experience would effectively come to define, justify, and even validate the journey itself: as processes of discovery were captured, reproduced, stored, and repeatedly re-viewed for scientific, commercial, entertainment, and personal uses.

VISIBLE EVIDENCE

The role of visual documentation in exploration was emphasized as far back as the Enlightenment when the development of scientific taxonomies called on

practices of accurate representation and verification. Captain James Cook's three circumnavigations, between 1768 and 1779, all included official illustrators, with Sydney Parkinson on the first voyage providing a visual account of Joseph Banks's specimens and Alexander Buchan taken on to make drawings of human figures, dress, and ornaments. William Hodges, on the second circumnavigation, was employed to boost the voyage's scientific credentials, with his Admiralty brief specifying he was needed to "give a more perfect idea thereof than can be formed from written descriptions only" (quoted in Bonehill 2004: 74). As Bernard Smith asserted, Cook's practices affected an important shift in terms of the use of visual records on voyages of exploration. In particular, Smith isolated an emerging category of "documentary drawing" (as opposed to "inventive drawing" or "illustrative drawing") that might best describe the kinds of images that Cook's artists strove for. Documentary drawing works to replicate what the draftsman sees, to "suppress the inventive and illustrative components" of perception; moreover, documentary drawing tends to take place on-the-spot, or at least very close to the time that events are observed (Geiger 2007: 32; Smith [1960] 1992: 54). Documentary sketching and drawing continued to act as essential tools for many twentieth-century expeditioners and were used strategically by ethnologists such as Leo Frobenius, discussed below. Eventually, the camera would assert its place in lending evidential value to the image.

By the late nineteenth century, with the invention of faster and more durable photographic methods, the photo record was becoming a tool not only for science, but for gaining sponsorship and wider public interest in expeditions. As Liz Watkins observes, the Royal Geographical Society (RGS) heightened the importance of photography in promoting exploration with the founding of their photography collection in 1884, investing in lantern slide lectures as means to appeal to popular tastes in edifying entertainments (Watkins 2018: 52; Thomas, Chapter 5, this volume). Advances in photographic technology (including dry plates in the 1870s and, significantly, celluloid or "rollable transparent" film produced and marketed by Eastman Kodak from 1888 onwards) enhanced the value of photography during the second half of the nineteenth century, a period when the figure of the explorer "assumed its most potent form" in the popular imagination (Ryan 2013: 8).

As early as 1891 John Thomson, photographic instructor for the RGS, was arguing (in a presentation to the British Association for the Advancement of Science) that researchers needed to recognize "the growing importance of photography in its application to science, notably to geography"; he also wanted to "urge explorers to avail themselves more fully to the great advantages which a knowledge of photography secures, in enabling them to illustrate their route and register their observations." Photography was already becoming the prosthetic eye of discovery, an enhancement to the scientific process; as Thomson notes: "the camera provides the only means … of

portraying visible objects with scientific accuracy" (1891: 669). Such claims, as James R. Ryan and Simon Naylor contend, were, however, even then thought to be unstable: "the cultural currency of photography as an objective or truthful medium was culturally constructed and the use of photography as evidence in science was, from its earliest application, invariably contested" (2010: 7). Moreover, while offering a compelling method and medium in theory, photographic documentation was still demanding, complicated, and often inconvenient, with the use of emulsion-coated glass plates and heavy equipment hindering its rapid uptake in the field. Obtaining the finest quality images was a key challenge: it was 1925 by the time the high-end Leica 1 appeared on the market, introducing a compact camera for 35-millimeter enlargements that could capture both the sweeping expanses of the local scene and provide the minute details needed for visual recording and study.

Despite challenges, photographing and filming explorers' findings were getting integrated into expeditionary practice: the photographic image could serve as evidence and validate the act of exploring. The work of photographers and filmmakers, it was hoped, could encourage sponsorship and potentially generate income in its own right. For instance, Hiram Bingham's stunning images of Machu Picchu—taken in 1911 on a specially adapted Kodak 3A camera—were published in *National Geographic* in April 1913, leading not only to the myth of Bingham's "discovery" of the site (though he was "not the first to visit the ruins"), but to an instant public fascination with the "lost city of the Incas" (Bingham [1952] 2003; Thomson 2003: 10). The photos and triple fold-out poster in the magazine underscored photography's function as publicity and reinforced an idea that to photograph was tantamount to discovery. Indeed, attaining rights to the photos was key to the National Geographic Society's sponsorship of Bingham's Peru expeditions (Hall 2017: 21; Thomson 2003: 18).

When Captain Robert Falcon Scott organized the British Antarctic Expedition (also known as the *Terra Nova* Expedition) of 1910–13 to the South Pole, the journalist and travel lecturer Herbert Ponting was taken on as an essential crew member, his sled holding 400 pounds (over 180 kg) of photographic and camping equipment (Murray-Brown 2015: 10). The resulting evocative photographs have come to define Scott's doomed mission while also demonstrating, as Ryan suggests, "the central place that photography—as both an artistic and scientific medium—had assumed within cultures of exploration by the early twentieth century" (Ryan 2013: 7) (see Figure 6.1). In fact, it was Norwegian Roald Amundsen and his party that first reached the South Pole in December 1911, ahead of Scott (who arrived in January 1912 only to find, to his great shock, Amundsen's abandoned tent still standing at the pole). Though the harsh conditions had foiled Amundsen's attempts to document the feat via the kinematograph and high-quality photographic plates, one of his group

FIGURE 6.1 Herbert Ponting (photographer), *Terra Nova* taken during the British Antarctic Expedition 1910–13. Courtesy of the Alexander Turnbull Library, Wellington, New Zealand. /records/23048324.

salvaged the photographic record with the help of a Kodak camera. Ponting, initially overshadowed by Amundsen's success, found his fortunes altered, albeit through tragedy, after the bodies of Scott and his companions Edward Adrian Wilson (whose on-site drawings and watercolors provide another visual archive) and Henry Robertson Bowers were located in November 1912. The sublime of Ponting's Antarctica would subsequently feature in the press and in illustrated lectures, not only chronicling key parts of the arduous expedition but helping to burnish myths of Western heroism and sacrifice in encountering and uncovering the obscure corners of the Earth (see Thomas, Chapter 5, this volume).

Alongside still photography, Ponting was taking motion pictures using two cameras—a Prestwich Model 5 Kinema Camera and a Newman Sinclair—to further document the imperial goal of flying the Union Jack over the South Pole (Scott [1913] 2004). With Gaumont's backing, the first public screenings took place at the London Coliseum in November 1911, Ponting having left Scott's party in order to show the footage in Britain and secure further funding. After

the sensational news of Scott's death, Gaumont's re-releases of the footage generated "some thousands of pounds" for public appeal funds (Murray-Brown 2015: 5), with Ponting later reworking the material as the film lecture *With Captain Scott in the Antarctic* (1914). This version incorporated Bowers's last photographs of Scott and the polar party, recovered after rolls of negatives were found with the bodies (Murray-Brown 2015: 6). Ponting's silent feature *The Great White Silence* (1924) included color and used intertitles to free the film from the lecture format, as well as featuring a diorama for special effects, while his final version of the material, *90° South* (1933), included spoken narration by Ponting himself and elements such as animated charts and maps (Watkins 2013: 232). While commercial success was often elusive, Ponting's film work managed to encapsulate the combined sensations of wonder and incipient menace that mark so many exploration accounts. But it also suggests a difficult negotiation between furnishing factual evidence and storytelling, or "between the film negatives as both a mode of scientific exploration and historical record, and the demands of producing a coherent and captivating narrative" (Watkins 2013: 232). They indicate not only the importance placed on photography and film for documenting and promoting expeditions, but the ways in which the expedition, with its hard journeying, perils, and revelations, could form the narrative bedrock of an evocative motion picture experience, transporting armchair travelers to distant lands and climes.

A little over a year after Ponting set out with Scott for Antarctica, James Francis "Frank" Hurley was taken on to document Douglas Mawson's 1911–14 Australasian Antarctic Expedition. Mawson himself had an early interest in photography, having helped to photograph Ernest Shackleton's 1907–9 British Antarctic Expedition (also known as the *Nimrod* Expedition), considered the first, though now lost, filmic record of any Antarctic expedition (Turnour 2012). Hurley's central role in creating the footage chronicling Mawson's trek (known as *Home of the Blizzard, Life in the Antarctic*, *c*. 1916) is now contested, though his later work, *South: Ernest Shackleton and the Endurance Expedition* (1919), made during Shackleton's Imperial Trans-Antarctic Expedition (1914–16), with its risk-taking shots and dramatic panning across frozen seas, would rival Ponting's careful documentation and aesthetic composition, all performed under extreme conditions.

As cinema advanced from the nickelodeon toward the "picture palace" era (1914 onwards), nonfiction moving images were serving not just as documentation but offering modes of audience participation. Films attached to high-profile explorers were seen as both thrilling and edifying entertainments. Captain Frank E. Kleinschmidt's six-reel (about 60 minutes) *The Alaska-Siberian Expedition* (1912) drew fashionable crowds in New York, giving an up-close view of "Eskimo life and customs," the "roping of a polar bear cub," and "a walrus hunt close at hand" (Anon. 1912b: X8). Vilhjalmur Stefansson, whose

quest for an "unknown continent" and "blonde Eskimos" in the Arctic had garnered press attention, featured in *Rescue of the Stefansson Arctic Expedition* (1914), documenting the rescue of the exploration party, feared lost when their ship the *Karluk* was crushed by the ice (Anon. 1912a: 5; Anon. 1914: 9). Like Ponting's work, these releases helped to hone the exploration-on-film format, anticipating its broad popular impact in the 1920s.

World War I paused expeditions, though those lucky enough to evade the war zones could still travel to semi-real fantasy worlds, with films such as Universal's submarine odyssey *20,000 Leagues Under the Sea* (1916) providing highly popular means for virtual discovery and escapism. Some real-life expeditions, such as Shackleton's, did go ahead, with the *Endurance* leaving Plymouth just days after war was declared. The crew was stranded for ten months after the ship was trapped and crushed by ice. All were safely rescued by Shackleton in 1916, an event reported widely in the press and dramatically shown in Hurley's photographs and film released after the war. Shackleton's parallel mission on the other side of the Antarctic, the Ross Sea Party—tasked with setting up supply depots—suffered a worse fate and lost three men.

At the start of the war, practical uses of photography and film in the field were initially hindered, with photography restricted by censorship that all but excluded professional photographers from capturing images of war zones. Soon, however, photography was boosted by the widespread use of amateur cameras among soldiers, and photography and filming significantly increased when warring nations came to realize their value for military purposes, with panoramas and stereoscopic views documenting fields of battle and aerial reconnaissance gaining a strong foothold, hastening the prevalence of aerial perspectives in the coming decades (Streckfuss 2016: 117).

By 1917, photography and moving images had become a focus for promoting the war effort via propaganda and popular media. Film's mass coordination during the war, especially by Britain and the United States, reinforced an impression that photographic media captured the essence and impact of real events, even if reenactment and staging were still common practices. The visual capture and dissemination of the conflict's carnage were more widespread in the war's later years and, while still heavily regulated and focusing on scenes of aftermath rather than on "action-as-it-happened," war photographers such as Frank Hurley (who also controversially relied on photomontage techniques) arguably gave rise to a "new visibility" of the scale of war's destruction (Chouliaraki 2013: 319). This visible evidence of technological mass killing, registering the "incongruous co-existence of inhumane violence with visions of humanity" (Chouliaraki 2013: 317), was unprecedented, and in the war's wake there was a social climate of postwar malaise and uncertainty about the West's "civilized" advancement over "savagery." By the war's end, with a public eager to recover mobilities halted by conflict, tourism, travel books, and

travelogue films would come into their own as mass-marketed pastimes, with escape from fallen, mechanized, and urbanized modern life a key motivation and theme for travel.

VIRTUAL TRAVELS

In the years following the war, field photography was an increasingly sought-after skill, as visual documentation of expeditions became *de rigueur*. The authority of photography in its own right was further valorized with the rise of photojournalism, when photo-magazines such as *Berliner Illustrirte Zeitung* (launched in 1901), *National Geographic* (which shifted from text to pictorial content in the early 1900s), *Life* (relaunched as a photo-journal in 1936), *Look* (launched in 1937), and *Picture Post* (launched in London in 1938) became household resources, read internationally for news and information. "Not inconsequentially," as Maren Stange explains, "the camera, with its image both realistic and mass-reproducible, rose to become [as James Agee wrote] the 'central instrument of its age'" (Stange 1989: 107). The photograph could also serve as an unsettling indexical point of contact, ghost, and *memento mori* of the doomed expedition, as in Bowers's final snapshots taken of himself with Scott and his fellow explorers, or the last photos of George Mallory and his climbing partner Andrew Irvine before their mysterious disappearance on Everest in 1924.

Travel and exploration motion pictures added to the authority and apparent indexical authenticity of the photograph an "I am there" kinesthetic immediacy and audience engagement through movement and narrative. They emphasized not just an ability to show life in motion, but created an illusion of the cinemagoer's own mobility, altering everyday experiences of the world and making accessible new sites and situations that would be impossible to encounter first-hand. Cinema, then, might be characterized as a "machine for travel" (Ruoff 2006: 1). Even from their earliest inceptions, films were contrived to enhance audience impressions of being a body in motion, mimicking modes of transportation. This can be seen in phantom rides such as Biograph's *Through the Haverstraw Tunnel* (1897), which shows the view from a front-mounted camera on a train, entering and then being consumed by the tunnel, yielding an immersive experience that can sensibly and perceptually break through the physical bounds of static viewership.

Along with phenomena such as the phantom ride, improvements to smooth camera movement could produce panoramic views that placed spectators "in the midst of a fully described space" (Strain 2003: 118). The panning camera could trace a complete, circular panorama of a locale, or more subtly imitate the movements of individuals turning their heads or eyes to look left or

right, up or down, surveying the scene. Such effects offered the illusion of the "spectator put into motion." As Ellen Strain states: "the moviegoer was mobilized and transported across a globe whose minute motions are rendered insignificant in comparison to the limitless mobility of the armchair traveler" (2003: 119–20). In this sense, the cinema was perfecting modes of illusory mobility and mastery, imparting a privileged gaze over the filmed scene as well as over the wider world itself. As Giuliana Bruno contends, the virtual traveler's gaze "was not always a mere expression of curiosity, for it was also complicit with the aggressive desire of 'discovery'" (Bruno 2002: 77). This imaginative taking possession of sites and, often, their inhabitants fed not only into growing tastes for tourism, but into the imperial imaginings and self-perceptions of western audiences. As commercial products, films also gave currency to forms of commodified ethnocentrism, "making faraway cultures into commodities that could be enjoyed for the price of admission" (Rabinovitz 1991: 85).

As the probing eye of the camera moved in tandem with advancing mobilities, photographers sought more lightweight cameras that could produce quality images. The Lumières' *cinématographe*, at 5 kilograms (one-hundredth of the weight of an Edison camera), was not featherlight, but could be transported by the photographer and required a relatively basic set-up; Ponting's Prestwich Model 5 camera was slightly heavier, at 8 kilograms, yet durable and portable enough to move into position to catch the exploits of Antarctic fauna, Scott's crew playing football, wrangling dogs, and arduous trekking across snow and ice. When Robert Flaherty organized the filming for *Nanook of the North* (1922), he chose Bell & Howell and Akeley cameras (at about 7 kg) for flexibility of shooting along the coasts of Canada's Hudson Bay. Even so, this equipment could be difficult to master, with sub-zero temperatures causing the negative to freeze and shatter in the camera, "like so much wafer-glass" (Flaherty 1926: 87) (see Figure 6.2).

Travel and exploration accounts were moving from being tied to personal appearances, lectures, and independent distribution to being self-contained industrial products available for mainstream audiences. The explorer Edward A. Salisbury's expeditionary films *On the Spanish Main*, *Pirate Haunts*, and *The Footsteps of Capt. Kidd*, shown with only intertitles at New York's Rialto Theatre in 1917, signaled, as Rick Altman puts it, the "wrenching of documentary films out of the live performance lecturing world" (Altman 2006: 75–6). Nonfiction films were in the process of becoming self-contained narrative vehicles: fine-tuned machines for virtual travel and exploration.

Often referred to—somewhat misleadingly, if figures such as Ponting and Hurley are taken into account—as the "father" of exploration documentary, Robert Flaherty began experimenting with film in the northern reaches of Canada in 1913. He worked for the industrialist Sir William Mackenzie—who Flaherty referred to as "the Cecil Rhodes of Canada"—mapping and searching

FIGURE 6.2 Robert Flaherty (director), Filming *Nanook of the North* (1922). Photo by Historic Collection/Alamy Stock Photo.

for iron ore (Flaherty quoted in Rotha 1980: 35). When Flaherty's most popular and best-known work, *Nanook of the North*, premiered on June 11, 1922, alongside the adventure short *My Country* (1922) by Robert Cameron Bruce, it in many respects revolutionized the exploration format. As Richard Koszarski notes, audiences coming to *Nanook* were "attuned to the usual Burton Holmes travelogue, a home-movie style ramble in which the Western adventurer situates himself in exotic climes" (1990: 243). The lecturer's narration normally stressed the authority of the explorer-adventurer as witness, grounding images of distant places in a first-person point of view. Audiences were guided by the traveler/presenter while experiencing vicarious thrills of discovery. Film clips tended to feature point-of-view traveling sequences, such as shots from the front of a train or from a car window—strategic techniques instilling a sense of virtual travel that persevere in first-person celebrity travelogues and adventure programming on National Geographic network or the Discovery Channel (Altman 2006: 61–76; Griffiths 2002: 203–13).

Nanook of the North moved beyond these conventions towards a narrative framework where filmgoers encountered a fleshed-out "native informant" character, an indigenous patriarchal "hero" (Allakariallak, taking the role of

Nanook the hunter) with whom they might identify. This strategy coincided with the increasing post-war curiosity among westerners about other seemingly more "innocent" cultures that might offer escape from memories of the war's mechanized brutality, and from what were then perceived as increasingly automated daily routines cut off from the natural world. The film's intertitles begin by revealing a space of wildness open to the explorer's, and camera's, revelatory gaze: these are "mysterious Barren Lands—desolate, boulder-strewn, wind-swept—illimitable spaces which top the world." The intertitles introduce an otherworldly scene and virtual movement enhances the drama, driven by a sense of the unseen and soon-to-be-encountered lingering just beyond the space of the frame. A traveling shot from shipboard across icy seas creates a sublime aesthetic, where the orthochromatic black-and-white stock engages with the Arctic's limited chromatic range, conjuring vast expanses of bare land, rock, water, and ice. Journey and discovery are established as central themes; journey not only through space—as suggested by the shipboard phantom ride—but through time. The physical journey becomes metaphoric as the film progresses, taking the viewer to an idealized "primitive" world untroubled by money, machines (only one machine is encountered in the film, a phonograph, which is treated by Nanook as alien, though the Inuit cast were themselves acting as Flaherty's film crew), and any other trappings of modern life. This strategy of withholding the present mirrors the circumscribed spaces of cultural nostalgia and salvage, inscribing what Johannes Fabian characterizes as an "allochronic" ethnographic discourse (Fabian 1983). Still, Flaherty was influenced by working closely with Inuit subjects and crew, and drew on a form of indigenous storyboarding, with several scenes recalling drawings and carvings done by Inuit artists, particularly the evocation of "small figures in action surrounded by large amounts of white, negative space" (Zimmermann and Auyash 2022).

On its release the film received very positive reviews, with the *New York Times* stating that the movie brought "life itself" from Hudson Bay directly into New York's Capitol Theatre: "beside this film the usual photoplay, the so-called 'dramatic' work of the screen, becomes as thin and blank as the celluloid on which it is printed" (Anon. 1922: 3). Questions about authenticity, however, would quickly circulate. Vilhjalmur Stefansson argued that Inuits had for generations hunted with guns, though Flaherty portrayed them as only having premodern weapons (the intertitles stating that the Inuit hunt with harpoons). Stefansson also pointed out that Nanook's battle with the seal was obviously a reenactment, since the animal pulled from the ice was, clearly, "still and dead" (Murphy 1978: 57). Flaherty's background as an explorer and prospector for Mackenzie led to further concerns about his relationship to imperialist ideologies and practices, and how these might be manifested in the film. Although Flaherty saw himself as combatting blatant forms of cultural

hegemony, the film does conjure up a little-known world on the frontier of "civilization," helping feed fantasies of distant peoples existing uncorrupted in nature.

SALVAGE

Overall, Flaherty's approach was viewed as both largely faithful to its subjects as well as being an artistic success, explicitly and implicitly influencing a range of subsequent productions. *Voyage au Congo* (1927) documented Marc Allégret's journey with his uncle, the renowned author André Gide, into what was then known as French Equatorial Africa. Hoping to retrace the steps of Joseph Conrad's *Heart of Darkness*, the expedition wound its way up the Congo River, then moved northwards towards the current Central African Republic, extending finally to Chad and Cameroon. The resulting film is neither a simple travelogue nor an ethnographic study, but an experimental mixture of approaches loosely organized around the theme of the journey. It includes images of travel, staged reenactments of indigenous daily life, actuality scenes of local performances, games, and customs, as well as shots of landscapes and exotic flora and fauna. The film rarely achieves the sort of sensitivity to the colonial setting found in Gide's writings, or in Conrad's novel; indeed, Allégret's picturing of the primitive shares with Flaherty the romantic idealism of cultural salvage, largely concealing the colonial framework within which the film operates and the effects of that colonial system.

Related desires for salvaging an unspoiled past marked one of the most ambitious and long-running expeditionary projects of the period, the Deutsche Innerafrikanische Forschungs-Expeditionen (German Inner Africa Research Expeditions), a series of fourteen expeditions that took place between 1904 and 1955. The ethnologist Leo Frobenius, Germany's "most famous anthropologist in the first half of the twentieth century," was the key figure behind the research and led twelve of the expeditions, covering the length and breadth of the African continent (Kuba 2018: 109). Destinations included Senegal, the Niger, Togo, and Mali (1907–9). They made extensive treks across the Sahara region (1912–14), Sudan and the Nubian desert (1926), and a vast swathe of Southern Africa (1928–30). Scientific exploration was hardly politically or ideologically neutral in this case. Indeed, the seventh expedition to Eritrea in 1914–15 served as a front for German espionage aimed at destroying British influence in the region, and when this was discovered Frobenius was prevented by Italian authorities from entering Ethiopia (Da Riva and Biocca 2016: 1; Kuba 2020: 10).

In his attitudes towards African cultures, Richard Kuba notes that Frobenius was a "true romantic," looking for ancient origins and what the anthropologist called the "old original African warm-blooded culture" (Kuba 2018: 110;

Frobenius 1933: 15). Working amidst the frameworks of so-called salvage ethnography and what James Clifford has called "culture collecting," Frobenius believed that African cultures were "ruins" that were "doomed to extinction by, above all, the onslaught of modernity and colonialism" and that his would be the final glimpses of "old Africa" (Clifford 1988: 230; Kuba 2018: 110). The visual record and the camera were primary agents for making possible this rescue and capture of what were perceived as dying cultures; Frobenius took with him field artists as well photographic equipment, leaving behind vast catalogues of visual documentation.

The case of Frobenius's visual documentation of the African expeditions has become a focus for examining possible uses and pitfalls of cataloging, reproducing, and scientifically analyzing images of indigenous peoples and artifacts taken in the contexts of colonial and imperial structures of power. Kuba addresses the potential of such an enormous visual archive:

> An expedition thus could yield several thousand images, photographs as well as drawings, covering vast regions and showing a large variety of motifs, from landscape and everyday scenes, cultural displays such as mask dances or wrestling scenes, to portraits, architecture, and ethnographic objects. (2018: 114)

Yet, like Flaherty, Frobenius elided the modern world from these images in order to present a "purer" and more "unspoiled" vision of the cultural scene. In addition, permission for capturing images was rarely if ever sought, while the images' interpretation in subsequent years included taxonomic labeling that reduced the individuals in the images to "types"—standing in as whole representations of an ethnic "people" or "tribe"—a process that Fatimah Rony characterizes as ethnographic taxidermy, where individuals are treated as cultural specimens (Kuba 2018: 120; Rony 1996: 102). Testifying to the ways that this documentation continues to potentially manipulate and be manipulated, Kuba relates that online images posted from the collection were used, without consent and with the watermarked assertion of copyright photoshopped out, by the German tabloid *Bild-Zeitung*, appearing under the headline "This is how Africa looked 100 years ago." The article appropriated the photo collection merely to perpetuate stereotypes.

Another effort at cultural salvage—in this case recovering and recording the past—was made by Roy Chapman Andrews (sometimes called "the real Indiana Jones"). He worked with New York's American Museum of Natural History, staging ambitious and well-funded expeditions in Mongolia, known as the Central Asiatic Expeditions (1921–30). The adventurer-cinematographer James B. Shackelford would produce extensive documentation, with Andrews's use of the motor car providing Shackelford's film with a swashbuckling and

kinesthetic visual impact, as the convoy of automobiles and camels pushes its way through harsh landscapes of boulders, ravines, and mud-filled crevasses. The heavy-duty vehicles produced by Dodge Brothers prominently feature from high and low angles, seen close at hand or swiftly moving across the horizon. Navigating northwestwards from Peking (Beijing) the caravan crosses the Great Wall and enters the rough terrain of the Gobi Desert, where Andrews aimed to conduct geological surveys and collect early human remains.

In spite of political unrest, bandits, windstorms, and intense heat, and with Shackelford's camera recording each development, Andrews discovered dinosaur fossils and claimed to be the first to uncover dinosaur nests, confirming theories that dinosaurs hatched from eggs (see Figure 6.3). "We had discovered the first specimens known to science," Andrews would state (1932: 208) (somewhat overwriting Philippe Matheron's and Paul Gervais's work with dinosaur eggs in France in the nineteenth century). Andrews and Shackelford were certainly the first to capture the moment as visible evidence on film, and Andrews would appear on the cover of *Time* magazine in 1923, while

FIGURE 6.3 James B. Shackelford (photographer), "At nest of the even dozen dinosaur eggs, with George Olsen, who found them, at left, and Roy Chapman Andrews at right, Mongolia, 1925." Courtesy of American Museum of National History Library.

Shackelford continued doing challenging photographic work for adventurers such as George C. Dromgold in Papua New Guinea and Fiji, as well as for the hunter and celebrity Frank Buck in the Amazon region.

THE EXPEDITIONARY MODE

The work of filmmakers such as Flaherty and Shackelford fed into what came to be known as the expeditionary mode: films of discovery and adventure that were produced and marketed, often by major studios, on a much larger scale than previously seen. By the 1920s and the era of grand picture palaces, movies had become not just popular, they were arguably altering modern perception itself. Operating alongside media such as radio and photojournalism, motion pictures were a key means for the public to garner facts and information about the world. Films entered into the lifeblood of the public imagination: an intimate counterpart to—rather than just an abstract reflection of—direct experience.

The enhanced scale and popular reach of the cinema was reflected in representations of exploration on film. Thomas Doherty explains the emergence of what he calls the expeditionary mode.

> A travelogue is the cinematic equivalent of the act of tourism, a film that provides a comfortable berth for seeing the sights and gawking at the natives … In contrast, the expeditionary film demands hard traveling. No packaged tour but an adventure in cinema at feature length, it possesses the immediacy and intensity of on-location shooting and spontaneous action, a sense of wonder mixed with the adrenaline rush of fear. The expeditionary film promised a true voyage of discovery. (Doherty 1999: 222–3)

These films tend to be organized around a narrative of rugged journeying with the explorers and their cameras present in the mise-en-scène. Situated amidst the drama, the explorer's presence could heighten the emotional peaks and sense of danger and achievement during the trek; when necessary, scenes were staged for greater impact. Like *Nanook*, these features incorporated the journey as a slight narrative device, along with candid footage and tightly edited sequences. Yet they tended to eschew one of *Nanook*'s key elements, the focus on a "rounded" indigenous character, preferring to stay closer to the format inherited from illustrated travel lectures.

Martin Johnson was one of these adventurer-filmmakers who retained the lecturer's function as mediator and arbiter of the point of view, later working alongside his wife and filming partner Osa Johnson. Martin Johnson initially worked on the lecture-and-film circuit, releasing *Among the Cannibal Isles*

of the South Seas (1918), made in Vanuatu, and the Solomon Islands, *Jungle Adventures* (1921), and *Headhunters of the South Seas* (1922). Working together, the Johnsons would carve a specialist niche in safari and exotic wildlife films, as in *Trailing African Wild Animals* (1923), based on their expedition to Africa in 1921–2. After garnering support from figures such as Carl Akeley of the American Museum of Natural History and George Eastman at Kodak, the Johnsons went on a major expedition to Kenya, which yielded the box office hit *Simba, the King of the Beasts* (1928). *Simba*'s successful formula lay in its spectacular views and technical virtuosity, but it also owed a debt to the *Nanook* effect, which had whetted popular tastes for expansive travel scenarios and helped convince studios and exhibitors that these subjects could make money. Indeed, writing to Will Hays, head of the Motion Picture Producers and Distributors of America (MPPDA) a few years later, renowned Columbia University anthropologist Franz Boas suggested that "it might be possible for anthropologists and filmmakers to make films collaboratively that would be both 'scientifically' useful and popular at the box office" (quoted in Ruby 2000: 84). Still, while they aimed to capture and salvage what Martin Johnson called the "beauties" of "untouched Africa," *Simba* is also a colonizer spectacle, featuring not only exotic animals but their killing at the hands of white adventurers (Pierce 1992). The "nature" and "natural" featuring in the film formed part of what "had long been the stuff of an imperial imaginary that facilitated metropolitan consumption of colonial spectacle in museum exhibitions and world's fairs" (Ahrens, Lindstrom, and Paisley 2016: 9).

Also mining the explorer-as-adventurer format were Merian C. Cooper and Ernest Schoedsack, whose first feature, *Grass: A Nation's Battle for Life* (1925) was made in collaboration with the heiress and former US spy Marguerite Harrison. The film portrayed the epic migration from modern-day Turkey to Khuzestan in Iran of the Bakhtiari Lur people. The topic was suggested when the filmmakers met up with Sir Arnold Wilson, then chairman of the Anglo-Persian Oil Company, and Gertrude Bell, the influential British explorer and Middle East policymaker. The Bakhtiari territory was within the area that Anglo-Persian Oil had been permitted to drill, and Wilson was able to attain permits for Cooper and the team from government officials (Henley 2020: 87). The three adventurers intended to follow the Bakhtiari group's journey from winter to summer grazing grounds, then document some intimate scenes of daily life as they paused between the outward and return migrations, and finally accompany the group on the return journey. Due to budgetary limitations, however, the film ended up chronicling just half of the migration and was ultimately lacking in personal detail about the tribespeople. In his classic history of documentary, Erik Barnouw criticizes the film, stating that the Bakhtiari people in *Grass* remain "a mass of strangers to the audience," and the final emphasis is not about the Lur people's endurance, but "a brash

display of egotism" featuring "the heroic accomplishment of the filmmakers" (Barnouw 1983: 48) (see Figure 6.4).

In Cooper and Schoedsack's follow-up, *Chang: A Drama of the Wilderness* (1927), and later in Schoedsack's *Rango* (1931), the narrative of the journey meets mobile camerawork and panoramic views which together engender a sense of voyeuristic mastery. Heightened events and the photographer's efforts to capture them take center stage, such as the dramatic river crossing in *Grass*, and the elephant ("chang") stampede in *Chang*. Cooper and Schoedsack's *King Kong* (1933), while sheer fantasy, brought the expeditionary mode full circle to a fictional narrative of pure adventure and conquest: the heroic explorer-cameraman Carl Denham (resembling and referencing Cooper) enters uncharted regions, discovers a primitive island, and returns to civilization with a physical specimen and dramatic evidence of his exploits.

The beginning of the synch-sound era saw travel-adventure films dominating the non-fiction output of studios and smaller production companies. Dana Benelli notes that in four years, between 1930 and 1933, of the sixty documentaries reviewed in the *New York Times* most were related to the expeditionary mode (2006: 180). One of these, *Ingagi* (1930), made by Nat Spitzer's Congo Pictures

FIGURE 6.4 Ernest Schoedsack (photographer), Still from the filming of *Grass: A Nation's Battle for Life* (1925). Courtesy of Masheter Movie Archive/Alamy Stock Photo.

which was formed to produce the film, went to the extremes of packaging scientific travels within popular entertainment by quite openly exploiting cultural projections, desires, stereotypes, and fears of the foreign, conjuring up exotic dangers lurking beyond the western horizon. *Ingagi* advertised itself as "an authentic incontestable celluloid document showing the sacrifice of a living woman to mammoth gorillas!" Interestingly, though the film was banned by the MPPDA, it was not for its lurid content (which at first prompted an investigation for "sexual perversion"), but for deceptive presentation and advertising that attempted, among other things, to pass off a Los Angeles zoo as Africa (Erish 2006: 6). Efforts to stop the film failed, and even the new Advertising Code of Ethics adopted in the wake of the *Ingagi* scandal failed to staunch the increasing stream of fakery flowing into the expeditionary mode. The singular success of *Ingagi*, in spite of lawsuits and sanctions, was said to have helped greenlight *King Kong* soon afterwards.

During World War II, global tourist trade and major expeditions were largely shut down, with much of Europe, the Pacific, North Africa, and the Far East becoming zones of total militarization, and high-profile adventurers such as Merian C. Cooper enlisting for war service. Some "exotic" productions still appeared, such as *Jacaré, Killer of the Amazon* (1942), shot along the lower reaches of the Amazon in early 1942 with cinematographer James B. Shackelford, and featuring "cold-eyed serpents," "clownish monkeys," and big cats, as well as an appearance by the famous animal wrangler Frank Buck. Obliquely acknowledging the anxieties of war, the opening credits refer to the "great Brazilian jungle" where "relentless nature wages eternal war for survival" and "screaming parrots fill the air with noise." After the war, the lure of the expeditionary mode and its adventurer-explorer guide would never really disappear, continuing to draw audiences while diversifying into productions ranging from Thor Heyerdahl's *Kon Tiki* (1950), filmed in 16 millimeter as Heyerdahl navigated the Pacific, to Jacques-Yves Cousteau's enormously popular underseas color odyssey, *Le monde du silence* (released in English as *The Silent World*) (1956). Ultimately, figures such as Steve Fosset, Steve Irwin, and Bear Grylls, and explorer-led series such as Victor Vescovo's *Expedition Deep Ocean* (2021) have continued to usher audiences into virtual encounters with the globe's remoter realms and "peripheral" spaces.

AERIAL VIEWS

If the expeditionary mode tended to make a virtue of hard traveling and gritty determination, the coming of the airplane promised escape from earth-bound limitations and a new perspective over the far-flung reaches of the globe. Figures such as Amelia Earhart and Charles Lindbergh captured the popular

imagination, becoming emblematic of the advances of modern mobility. The 1930s saw many flight records being broken, with the exploits of aviators and scientists such as Ruth Nichols and the Piccards (Auguste, his brother Jean, and Jean's wife Jeannette) widely reported in the press. At the same time, commercial air travel became a feature of modern life: in 1935 Pan American Airlines initiated scheduled services between San Francisco and Manila, with the *China Clipper* "an object of widespread publicity and American pride" (Cosgrove 2008: 195).

Shot in November 1935 and published in 1936 in the pages of *National Geographic*, aerial photography pictured Earth as never before seen. A pull-out supplement revealed a "global panorama" of the Black Hills of North Dakota, shot from the Explorer II balloon flight at an elevation of 72,395 feet (over 22,000 meters), showing "the boundary between the troposphere … and the stratosphere" (Stevens 1936: 90). Manned by Captains Albert Stevens and Orvil Anderson, the flight captured images of "the actual curvature of Earth—photographed from the highest point ever reached by man" (Stevens 1936: 90). The feat would not be matched for the next twenty-one years (see Figure 6.5). As seen in the gargantuan scale of photogrammetric topographical surveys that were finally being realized in the 1930s, viewing the world from the air was a "new perception and experience of landscape hitherto unknown" (Hüppauf 1995: 105).

Indeed, the airplane, as Denis Cosgrove asserts, "is the most visible of a great range of modern technologies that … progressively annihilated space and time" over the course of the twentieth century (2008: 88). The development of what Paul Virilio called "global vision" was realized through innovations both in photography and flight, breaching aeronautical and topographical limits in a way that once seemed impossible (1989: 1). Aerial views could not only reveal the distant corners of the Earth but fuel notions of global engagement and impart impressions of global mastery. Like the map, the photographic aerial view is a graphic representation that offers "an Apollonian perspective of the wide earth," encouraging "visions of rational spatial order to be written across the land." These kinds of visions animated not only modernist planners and architects, but imperialist and military tacticians (Cosgrove 2008: 89).

Aerial views might appear to have afforded a newfound Apollonian perspective, unveiling a world of pure geography, a world without borders, but historically the space of the air quickly became territorialized with the arrival of the airplane. By the 1920s, the nationalization of the skies was well underway:

> after four years of war and another demoralizing year of demobilization, the Versailles victors sat down to carve up the world's sky, just as they had carved up the world map, and produced the Convention Relating to the Regulation of Aerial Navigation. This Convention formed the basis of international air

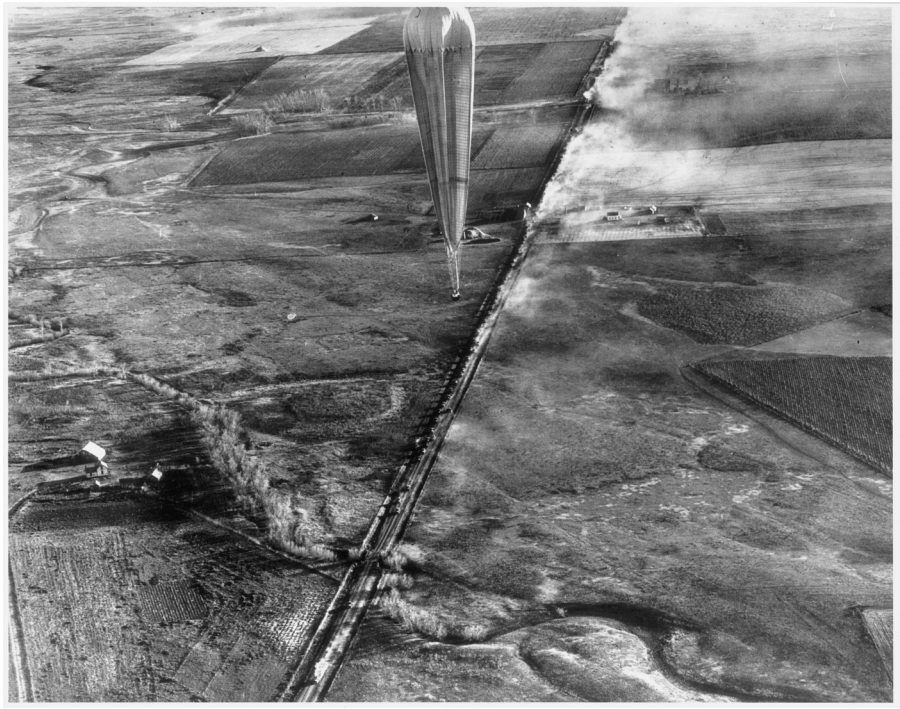

FIGURE 6.5 The Explorer II balloon, under the command of Albert W. Stevens, returns safely after reaching an altitude of more than 22,000 meters, a record at the time. Photo by Bettmann/Getty Images.

> regulations during the interwar period, including the recognition that "every Power has complete and exclusive sovereignty over the air space above its territory." (Millward 1998–9)

Mirroring the territorializing of land and sea, airspace was progressively appropriated towards political ends. The aerial viewpoint therefore might provide forms not just of spatial orientation but of ideological authority (Geiger 2013: 143).

Such an ideological positioning of aerial mobility can be found in publicity and film of Admiral Robert Byrd's expeditions, which highlighted the role of the airplane in undertaking polar explorations. Manifesting links between exploration and military patronage, Byrd had been promoted to the rank of commander and awarded a US Armed Forces Medal of Honor after his 1926 expedition, which was widely accepted to have culminated in a successful flight over the North Pole (a claim now disputed). For his 1929 South Pole attempt, Byrd set up the "Little America" scientific base on the Ross Ice Shelf, with

a large crew that included cinematographers Joseph T. Rucker and Willard Van der Veer, "buried under a mass of photographic gear" (Byrd [1935] 2015: 56). The feature that resulted, *With Byrd at the South Pole* (1930), was produced from 16,000 feet (over six hours) of film, made under extremely trying conditions. As observed in other Arctic accounts, Byrd recalled that stock in the camera would freeze, rupturing and breaking at -25° Fahrenheit, and that Rucker and Van der Veer "suffered tortures to carry their heavy camera to the top [of a ridge] for the sake of a novel 'shot'" ([1935] 2015: 232, 271). Polar exploration was closely tied to images of national heroism and conquest: the opening of *With Byrd at the South Pole* features the expedition leader in full military regalia speaking directly to the camera. As a fanfare plays on the soundtrack, the titles announce Byrd as, "Rear Admiral Richard E. Byrd U.S.N.—conqueror of the North and South Poles, the only man to fly over the top and bottom of the world." The airplane takes a starring role, early on providing emergency supplies to stranded members of Byrd's crew (to the jaunty tune of John Philip Sousa's "Stars and Stripes Forever") and culminating in the dramatic Great Polar Flight of November 28–9, 1929.

The climactic images of the plane *Floyd Bennet* on its Polar Flight commence with Rucker and Van der Veer filming from a smaller escort plane, with Byrd's plane outlined against a vast backdrop of whiteness, after which the point of view shifts to inside the *Floyd Bennett*. When radioman and co-pilot Harold June takes over filming, the escort plane turns back. Now situated right amidst the action, the audience occupies a space alongside Byrd and the crew. The voiceover (by the famous war correspondent Floyd Gibbons) emphasizes the novelty of the scene: "for the first time, man views the South Polar Plateau from the air." The audience witness a bird's-eye view over the "stark expanse of frozen silence that extends for thousands of square miles, at an altitude of 10,000 feet above sea level." Such elevated motion picture views, as Teresa Castro suggests, align not only with a mapping impulse—which strives to "create an image of the totality of the world … a means to organize visual knowledge"—but also afford a stimulating "cinematographic sensation": a kinesthetic experience of mobility, spatial mastery, and virtual flight (2009: 13–14).

As the plane dramatically crosses the South Pole, Byrd releases an American flag, taken from the grave of Floyd Bennett, Byrd's partner on the purported—and widely celebrated—first flight over the North Pole. As the flag sails downwards, fluttering against a backdrop of glaring white negative space, "The Star-Spangled Banner" dominates the soundtrack. This is both "a glorious adventure and scientific achievement," the voiceover asserts. The closing image shows Byrd framed against a striking skyscape, completing the mission and driving home the message of national achievement. When it won best cinematography at the third annual Academy Awards, *With Byrd at the South*

Pole became the only documentary in history to win in this category (a record that still stands). The film testifies to the ways that a potent combination of sublime aesthetics, adventure narrative, and immersion in aerial exploration captured the public imagination.

As the century progressed, aerial perspectives were producing new means of coming to terms with an increasingly shrinking, globalized world. By 1936, the inventor Sherman Fairchild was photographing areas of 1,500 square kilometers from heights of 9,000 meters; Fairchild's inventions would later be used on the Apollo space missions. The expanded aerial view was transforming social perceptions of space and terrain and influencing how those spaces were managed and controlled. According to M. Christine Boyer,

> the rapid growth of aviation during the interwar period was mercurial, dramatically reshaping perception of the world and of space. There were daring flights of aviators challenging the breadth of oceans and deserts, the heights of Everest, the length of Africa, the uncharted terrain of the North and South Poles. The airplane not only internationalized cartography; it was a tool for exploring and controlling the colonies. (2003: 94)

In this sense, an aerial point of view could emblematize the paradoxes of an increasingly global sense of the world: at once seeming to challenge and potentially break down established perceptions of earth-bound spatial limits and boundaries while at the same time reinforcing national and colonial accessions and divisions (Geiger 2013: 143).

During World War II aerial photography would reach its apex; indeed, the war is often referred as the first to display an exhaustive spectacle of aerial warfare, reflecting military and public obsessions with war being fought in and from the skies. Wartime saw extensive developments in aerial photography, widely relied upon for mapping, reconnaissance, and combat training, and featuring in films such as *The Memphis Belle* (1944), which aimed to rouse public support for the war effort. The aerial war was both thrilling and disturbing, as the kinesthetic rush of air travel and its views over the Earth's surface were met with facts and images of bombing and destruction on an unprecedented scale. After the war, aerial images of the nuclear bombing of Hiroshima and Nagasaki would intensify the jarring revelation of technological mastery engendering carnage, while the Cold War would further perpetuate imagined terrors raining from the skies.

During the 1950s and 1960s, aerial views increasingly became means to see from beyond Earth's atmosphere and to open up the mysteries of outer space. The Soviet Sputnik satellite was launched in 1957, ushering in an era when the remote satellite would become a key tool for surveying continents, oceans, and hard-to-access polar regions. As Ryan and Naylor note:

> satellites became central to geodesy—the science of measuring the Earth—from the 1960s and from the 1980s superseded traditional methods of surveying. Modern-day explorers would probably be lost without the satellites wheeling around far above them—global positioning systems, or GPS, technologies rely on them to determine their user's location. (2010: 20)

And while manned space flights continued to signify the pinnacle of human scientific discovery and achievement, the satellite reflected the growing reliance on remote witnessing and imaging in charting, measuring, and verifying phenomena beyond the reach of the embodied human eye: mechanically overseeing the Earth's surface from space and glimpsing beyond into the reaches of outer space. Here the visualization of human exploration begins to give way to exploration and analysis of the visual medium itself.

A watershed moment occurred in 1969, when the world was captivated by images taken from the moon during the Apollo 11 mission. Here an embodied point of view humanized the technology of the spacecraft and the photographic apparatus: the Earth appeared fragile and solitary amidst the black void of space. In 1972, NASA released perhaps its most famous image of Earth, the so-called "Blue Marble" photo, taken by Apollo 17 from 29,000 kilometers above Earth, a view that has, remarkably, never been replicated since. Earth was finally witnessed as what Archibald MacLeish imagined as a "single sphere" (quoted in Cosgrove 1994: 286), captured by human ingenuity and the visible evidence of photographic technology; alone amidst the emptiness of space it became a powerful icon and emotional site for meditating on holistic and ecological issues, for pondering fears about total warfare and nuclear threats. In short, the Earth visualized as a whole signaled the precarity of humanity and the ecosphere (see Figure 6.6).

In the digital age, the globe as "single sphere" is often represented in terms of individual perception and ease of access—global stewardship equals access to information networks, heralded in marketing campaigns and apps promising the capability of grasping the world in the palm of one's hand. These offerings underpin the modern world picture and its technologies of universal access and vision: aerial surveillance, GPS, Google Earth. Google's stated mission is "to organize the world's information and make it universally accessible and useful" (Google Mission Statement 2022) and is often accompanied in advertising with an image drawn from the famous "Blue Marble" photo. The world becomes defined through its relation to human thought and information, and the moving world is set forth, seen, and grasped as a tactile held object, secured in digital space. But what Martin Heidegger called the modern "world picture"—or the world transformed, from concrete space and that which lies beyond ordinary reach, into an all-accessible image of the world—is defined not just by the universally visible, but by the invisible. The conjuring of the world as a

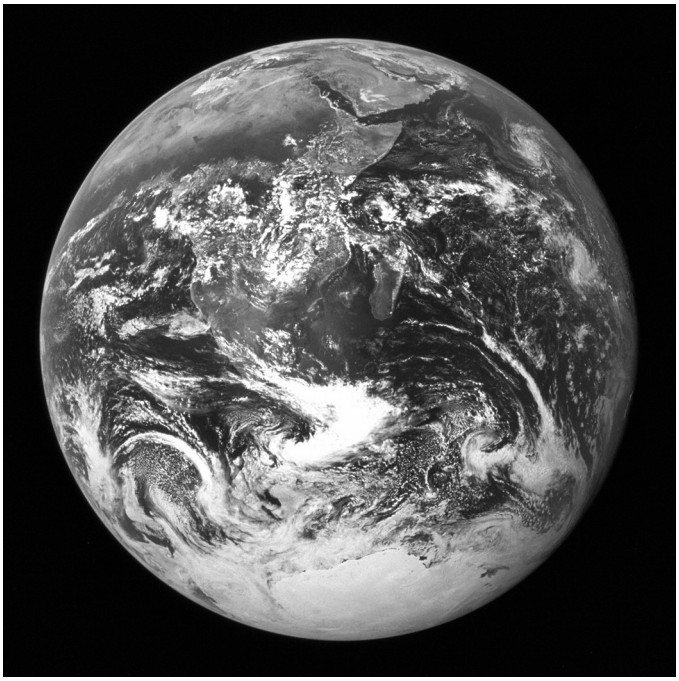

FIGURE 6.6 Harrison Schmitt or Ron Evans (photographer), "The Blue Marble" taken from Apollo 17 (1972). Courtesy of NASA, Wikimedia Commons.

graspable picture also reveals the "shadow of the modern world that extends itself out into a space withdrawn from representations" (Heidegger 1977: 136). For among a world that humans believe has been mastered as a system, as more recently manifested in the Janus-faced image of the drone, there remain those dark or shadow worlds, networks, and technologies redacted from presumptions of global vision.

CONCLUSION

Escaping Earth's atmosphere and investigating phenomena in outer space became a key focus for modern exploration, accelerating towards the moon landings and human-inhabited orbiting space stations. But in recent decades it has been unmanned space probes, such as NASA's *Mars Odyssey* (2001) and China's *Tianwen 1* (2021), that have become emblematic of the ascendency of remote witnessing in exploration. While material evidence remains central to scientific discovery, there has been a decisive movement, with the perfection of remotely operated vehicles (ROVs) and camera feeds, towards explorations

that are mechanized and virtual. This shift has also been seen in exploration of the deepest parts of the Earth's oceans, where first-hand exploration was long hampered not only by extreme depths but by the crippling effects of water pressure (see Antonello, Chapter 2, this volume).

When *Alvin* was launched in 1964, it was among the first human-operated submersible vessels to allow for lengthy dives of up to 4,500 meters. *Alvin* was responsible for images of the wreck of the *Titanic* at 3,800 meters underwater in the North Atlantic. In perhaps its most celebrated feat, *Alvin*, during a dive near the Galapagos Islands in 1977, provided the first direct evidence of hydrothermal vents and the ecosystems that thrive on them. Human-occupied dives of this period might be described as transitional in terms of first-hand versus remote or virtual witnessing, with ocean explorations relying on mechanized reconnaissance to map and identify sites of interest. Hydrothermal vents may have been "discovered" by the manned *Alvin*, but they were found thanks to the unmanned *ANGUS* (Acoustically Navigated Geophysical Underwater System), equipped with color film cameras and powerful strobe lights, taking pictures every ten seconds at a depth of 2,500 meters and finally running out of film after 3,000 photos. After development, scientists spotted an "anomaly" in just thirteen frames among the thousands, showing what appeared to be live clams and mussels where the sea floor should have been "barren of life" (Ballard 1977: 38–9). *Alvin*'s subsequent descent confirmed the presence not only of hydrothermal vents, but of life flourishing at extreme depths. This kind of collaboration between remote witnessing and manned exploration has become dominated by the former; by the end of the century, human-operated missions were becoming increasingly rare, while ROVs were proving the primary means for deep-ocean discovery. The combination of expense, safety issues, and ability to range more widely has seen the dominance of ROV missions equipped with sophisticated high-definition digital cameras capable of panning and zooming in on details that would escape a human eye (Standen 2012). With notable exceptions, such as biologist Laurent Ballesta's award-winning images taken from beneath the Antarctic ice in 2022, ROVs are now recognized as able to gather more data, more efficiently, than dives directly involving humans. As suggested at the start of this chapter, the robot and camera have engendered a virtual explorer that might transcend the limits of human, embodied vision.

The fuller contours of how modern exploration has been visualized are far too broad to contain in a single chapter. And while there has been too little space here to discuss, for instance, the persistence of drawing and painting as scientific visual tools, the intent has been to highlight how travel and discovery have been captured via visual technologies, with a focus on constructing the virtual voyager and shifts towards mechanized discovery. Certain key twentieth-century approaches, many inherited from nineteenth-century practices—travelogues,

illustrated lectures, expeditionary features—have never really disappeared, but inhere in scientific and educational media, and in more popular diversions. Illustrated travel lectures have moved towards enlightening entertainments such as David Attenborough's *Planet Earth* (2006) and *Blue Planet* (2001) series, as well as into the 'show and tell' approaches in the cavalcade of virtual discoveries on the Discovery Channel, Travel Channel, National Geographic network, and elsewhere (Ruoff 2006: 235). IMAX releases are typically designed as virtual voyages; audiences might go on "an epic adventure to places unknown, seemingly unattainable and beyond imagination" in *Antarctica* (1991), where participants can "vividly experience what life is really like" on the planet' s largest, driest, windiest continent (Anon. 2009).

If many of these productions continue to rely on identification with mastery and control over the wild spaces of the world (*Running Wild with Bear Grylls*, 2014–present), others, such as *Anthropocene: The Human Epoch* (2018) engage with the precarity and vulnerability of Earth: a persistent and unsettling narrative that marks the age of anthropogenic change. Here, environmental crisis might be summed up in the ways that thrilling discoveries of what seem to be "untouched" new worlds inevitably collide with discovering disturbing facts of pervasive environmental degradation due to human activity. In 2019, having reached the deepest point yet achieved by a human in a submersible, Victor Vescovo surveyed the Mariana Trench at a depth of 10,928 meters; but the most publicized images of the dive were not those of the unusual sea life or geological finds, but what appeared to be plastic waste visible on the ocean floor.