Contemporary European History (2023), **32**, *475–488*
doi:10.1017/S0960777321000813

CAMBRIDGE UNIVERSITY PRESS

REVIEW ARTICLE

Europe's Final Frontier: Astroculture and Planetary Power since 1945

Benjamin W. Goossen

History Department, Harvard University, Robinson Hall, 35 Quincy Street, Cambridge, MA 02138, United States
bengoossen@g.harvard.edu

Alexander C.T. Geppert, ed., *Imagining Outer Space: European Astroculture in the Twentieth Century* (London: Palgrave Macmillan, 2012), 476 pp. (pbk), £28, ISBN 978-1349953387.

Alexander C.T. Geppert, ed., *Limiting Outer Space: Astroculture After Apollo* (London: Palgrave Macmillan, 2018), 391 pp. (pbk), £25, ISBN: 978-1349676606.

Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner, eds., *Militarizing Outer Space: Astroculture, Dystopia and the Cold War* (London: Palgrave Macmillan, 2021), 469 pp. (hbk), £78, ISBN 978-1349958504.

Teasel Muir-Harmony, *Operation Moonglow: A Political History of Project Apollo* (New York: Basic Books, 2020), 384 pp. (hbk), £18, ISBN 978-1541699878.

Serhii Plokhy, *Nuclear Folly: A History of the Cuban Missile Crisis* (New York: W.W. Norton, 2021), 464 pp. (hbk), £17, ISBN 978-0241454732.

The main landmass of Europe does not appear in the iconic *Blue Marble* photograph of earth, taken from space on the final Apollo mission to the moon in December 1972. Europe as a continent remains out of frame, hidden north beyond the curvature of the planet. Viewers instead see swirling clouds, vast expanses of the world ocean and the partially obscured forms of Africa, Antarctica and the Arabian Peninsula. Decentring the Global North was crucial to the charisma of this image, which for half a century has been a symbol of human unity and a staple of appeals to protect the only planet we have ever inhabited. The universality of the photograph contrasted with the frictions of the Cold War and decolonisation that peaked in the 1960s. *Blue Marble* is nonetheless deeply ambivalent. Its extraterrestrial vantage was possible thanks to the space race between the United States and the Soviet Union. And the implicit message of the photograph – that the benefits of spaceflight and other advanced technologies would be shared with all peoples as a contribution to global economic development – simultaneously invoked legacies of inequality from the epoch of formal imperialism, itself not yet at an end. Regions visible in *Blue Marble*, in fact, included territory still administered at the time by Britain, France, Norway, Portugal and Spain.[1]

The histories of Europe and of space are intertwined, even if connections have not always seemed obvious. From the 1985 publication of Walter MacDougal's Pulitzer Prize winning … *the Heavens and the Earth: A Political History of the Space Age*, long the standard work on the history of the space race, scholars of outer space have concentrated on transformations in and of the United States and, to a

[1] On the history of imagining earth from space, see Denis E. Cosgrove, *Apollo's Eye: A Cartographic Genealogy of the Earth in the Western Imagination* (Baltimore: Johns Hopkins University Press, 2001); Robert K. Poole, *Earthrise: How Man First Saw the Earth* (New Haven: Yale University Press, 2008); Benjamin Lazier, 'Earthrise; or, The Globalization of the World Picture', *American Historical Review* 116, 3 (2011), 602–30.

lesser extent, the Soviet Union.[2] Historians of Europe, for their part, have paid little attention to space (assuming Europe is defined to include present-day members of the European Union, but not Russia).[3] One recent study of European integration unfolds without mentioning the European Space Agency or spaceflight at all.[4] Space has not needed Europe, it seems, and Europe has not needed space. Yet tensions encapsulated in the *Blue Marble* photograph suggest a more complex story. The technological utopianism often associated with human spaceflight is shot through with problems of modernity and power closely identified with Europe. Scholars of Europe have linked the continent and its people with processes of globalisation, with all its promise and perils, by pushing boundaries of analysis in multiple geographic directions. Our understanding of the impact of Europeans in the world reflects innovative enquiries into European arctic exploration, transatlantic exchanges, entanglements to the south and east, and even the pursuit of natural resources underground.[5] But looking up is arguably a trickier endeavour. After all, most objects in orbit do not stay above a given place, raising the question: where is Europe in outer space?[6]

A new historical book series of three volumes considers this subject through the lens of 'astroculture'. The trilogy's principal editor, Alexander C.T. Geppert, defines astroculture as 'a heterogeneous array of images and artifacts, media and practices that all aim to ascribe meaning to outer space while stirring both the individual and the collective imagination'.[7] In short, it is how people think about space. The first volume, *Imagining Outer Space*, examines the period from 1945 to 1974, when space thought ignited passions across Europe but before Western European countries established a centralised space agency. Volume two, *Limiting Outer Space*, explores the 1970s as an 'in-between decade' in which an international lull in enthusiasm for spaceflight coincided with a quiet fusion of space technologies – especially communication satellites – with neoliberal globalisation.[8] The third and final volume, *Militarizing Outer Space*, assesses what editors Geppert, Daniel Brandau and Tilmann Siebeneichner call the 'dark side' of astroculture, its military dimensions.[9] Together, these three books offer a fascinating reevaluation of space history from European perspectives. The forty-four total essays, if eclectic in topic and approach, are connected through periodisation, geographic focus and the unifying concept of astroculture. They aim to situate Europe within the space age and bring space into European history.

My essay evaluates this European astroculture trilogy with attention to its implications for the further integration of European history and space studies. My critique unfolds in three steps. First, I consider these books in the wider context of scholarship on Europe and space, asking how the concept of astroculture adds to these literatures as well as what limits it might hold. Second, I trouble the category of Europe deployed in the astroculture trilogy. The authors position their vantage from

[2] Walter A. McDougall, … *the Heavens and the Earth: A Political History of the Space Age* (New York: Basic Books, 1985), 423–9, considers Western European space programmes after the book's main narrative has concluded.

[3] The historically fluid and uncertain relationship between Europe and Russia is broached in Martin W. Lewis and Kären Wigen, *The Myth of Continents: A Critique of Metageography* (Berkeley: University of California Press, 1997), 47–72.

[4] Kiran Klaus Patel, *Project Europe: A History* (Cambridge: Cambridge University Press, 2020).

[5] My thinking follows Alison Frank Johnson, 'Europe without Borders: Environmental and Global History in a World after Continents', *Contemporary European History* 31, 1 (2022), 129–141.

[6] David Armitage, 'The International Turn in Intellectual History', in Darrin M. McMahon and Samuel Moyn, eds., *Rethinking Modern European Intellectual History* (Oxford: Oxford University Press, 2014), 242, suggests that – in the context of an international turn in historical scholarship that has foregrounded questions of physical space – '*outer* space may be the truly final frontier for intellectual history'.

[7] Alexander C.T. Geppert, 'European Astrofuturism, Cosmic Provincialism: Historicizing the Space Age', in Alexander C.T. Geppert, ed., *Imagining Outer Space: European Astroculture in the Twentieth Century* (London: Palgrave Macmillan, 2012), 8.

[8] Alexander C.T. Geppert, 'The Post-Apollo Paradox: Envisioning Limits During the Planetized 1970s', in Alexander C.T. Geppert, ed., *Limiting Outer Space: Astroculture After Apollo* (London: Palgrave Macmillan, 2018), 12.

[9] Alexander C.T. Geppert and Tilmann Siebeneichner, '*Spacewar*! The Dark Side of Astroculture', in Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner, eds., *Militarizing Outer Space: Astroculture, Dystopia and the Cold War* (London: Palgrave Macmillan, 2021), 3.

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

Europe as 'an analytical "third way" or middle course between West and East'.[10] By focusing disproportionately on Western Europe, however, the trilogy in effect conflates this 'third way' with norms common across the US-led West. I moreover suggest that efforts to step outside Cold War binaries have an unintended consequence of obscuring North-South exchanges. The history of European imperialism and its space age legacies should invite postcolonial analysis of Europe's 'final frontier'. Third, I contextualise astroculture alongside 'planetary power'. The capacity of states and other collective actors to project influence across planet earth grew in the era of spaceflight. I develop this argument by engaging two new books, *Nuclear Folly* by Serhii Plokhy and *Operation Moonglow* by Teasel Muir-Harmony. The former reexamines the Cuban Missile Crisis, while the latter assesses the Apollo flights to the moon. These books illuminate the global push-and-pull dynamics of the Cold War and decolonisation in which European astroculture thrived. I conclude with the hope that recovering this history can offer resources toward addressing ecological crisis and social inequality in Europe and beyond.

European Astroculture

Foregrounding astroculture rather than technology or policy is a deft method of centring Europe in the history of space. If we accept the premise of the astroculture trilogy 'that "science fiction" and "science fact" are not contradictory but complementary', then Europeans can claim a founding role in the major space initiatives of the last century.[11] In a stage-setting chapter, former NASA historian Steven J. Dick portrays imagination as an indelible factor alongside funding and rocket fuel for extra-terrestrial exploration. Drawing on work by cultural anthropologist Clifford Geertz, Dick interprets spaceflight as 'a manifestation of culture'. He views space as being first and foremost a matter of imagination: 'This, in the end, is the great benefit of the Space Age, providing a much broader perspective, making us realize that all our earthly knowledge may be only a single instance of a much more generalized knowledge'.[12] And as dreamers of space, Europeans counted among the most inventive. Not all space boosters have been science fiction enthusiasts, but many were. Nineteenth-century European novelists inspired early space thinkers and rocketeers on both sides of the Atlantic. The Russian theorist Konstantin Tsiolkovsky reported that his interest in the heavens had first been awakened by the fantasies of Jules Verne: 'curiosity was then followed by serious thought'.[13] Tsiolkovsky's counterpart in the United States, Robert Goddard, also consumed the writings of Verne, H.G. Wells and others.

Europeans were not only early visionaries of space. They also produced the first means of leaving earth. Despite the later dominance of space programmes in the Soviet Union and the United States, it was Hitler's Germany that first rocketed human-made objects beyond the atmosphere. A Nazi-made V-2 missile first passed an altitude of 100 km (now a common definition of space's lower boundary) in 1943. The story of how conquering American and Soviet forces captured V-2 rockets and the engineers who had designed them is by now well known.[14] Missiles developed in the Third Reich formed a basis for space research by both Cold War superpowers. Yet the fascist origins of space technology

[10] Geppert, 'European Astrofuturism', 10.
[11] Ibid., 16.
[12] Steven J. Dick, 'Space, Time and Aliens: The Role of Imagination in Outer Space', in Geppert, ed., *Imagining Outer Space*, 34, 46.
[13] Howard E. McCurdy, *Space and the American Imagination* (Baltimore: Johns Hopkins University Press, 2011), 16.
[14] Michael J. Neufeld, *The Rocket and the Reich: Peenemünde and the Coming of the Ballistic Missile Era* (New York: Free Press, 1995); Michael J. Neufeld, *Von Braun: Dreamer of Space, Engineer of War* (New York: Alfred A. Knopf, 2007); Asif Siddiqi, *The Rockets' Red Glare: Spaceflight and the Soviet Imagination, 1857–1957* (Cambridge: Cambridge University Press, 2010), 196–289; Monique Laney, *German Rocketeers in the Heart of Dixie: Making Sense of the Nazi Past during the Civil Rights Era* (New Haven: Yale University Press, 2015). On space science and culture in Cold War Germany, see Daniel Brandau, *Raketenträume: Raumfahrt- und Technikenthusiasmus in Deutschland, 1923–1963* (Paderborn: Ferdinand Schöningh, 2019), 131–450; Colleen Anderson, 'Youth Space Education and the Future of the GDR', *Central European History* 53, 1 (2020), 146–67; Daniel Brandau, 'One Nation, Two Astrocultures? Rocketry, Security

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

remained controversial as a subject for research until the 1990s. Former Nazi rocketeers like Wernher von Braun – whose Alabama-based Army team placed the first US satellite into orbit, three months after Sputnik shocked the world in 1957 – were more likely to reminisce in public about their childhood fantasies of spaceflight than their past SS membership or use of concentration camp labour. The European origins of space technology often posed a liability. A chapter by von Braun's biographer demonstrates that astroculture was as much about erasing memory as preserving it. During the 1960s, a campaign in East Germany sought to discredit von Braun by publicising information about his Nazi ties.[15] The nearly complete non-penetration of these denunciations across the Iron Curtain may help to clarify the circumstances of Western Europe's longstanding marginalisation in histories of space.

The astroculture trilogy rehearses accounts of diffusion to the United States and the Soviet Union through the Second World War, but it sets itself a more ambitious task of proving European relevance to the history of space during the less expected years after 1945. The first volume, *Imagining Outer Space*, shows that popular excitement for space and spaceflight extended far beyond superpower borders during the early Cold War. Most chapters assess developments in France, Great Britain or West Germany, with Eastern Europe constituting a region of secondary enquiry. The authors critique bipolar frameworks, instead focusing on a 'European paradox of comprehensive space enthusiasm despite decades-long abstinence from manned spaceflight'.[16] Europeans loved space, even if few of them went there. No non-Soviet Europeans flew to space until 1978, when a small number began traveling aboard Soviet or US spacecraft, and to date, the European Space Agency has never sent spacefarers into orbit with its own rockets. Emphasis on astroculture nonetheless conjures a space age that was quintessentially European. *Imagining Outer Space* analyses a host of European novels, films and popular culture from David Bowie to the Astrosmurf. Its chapters wade into gravely serious West German educational TV and parse the sartorial choices of British space operas.[17] Readers consider extraterrestrial art.[18] We romp on the moon with Tintin.[19]

Spaceflight itself occupies a remarkably subdued place in *Imagining Outer Space*. The preferred ground of enquiry here is on the literal ground in Europe. The tremendous expense of space programs and their close connection to geopolitical competition precluded Western European states from rivalling the astronautical spectaculars of the United States or the Soviet Union. Their capacity to pool resources across borders to create viable spacefaring technology is nonetheless a valuable story. More sustained attention to international space science and technology could help to reveal how and why astroculture circulated in Europe and beyond. Readers seeking a detailed look at formal space programmes founded in Western Europe after the Second World War should consult the excellent two-volume assessment by John Krige, Arturo Russo, Michelangelo de Maria and Lorenza Sebesta.[20] *Imagining Outer Space* only cursorily treats the origins of the European Launcher

and Dual Use in Divided Germany, 1949–61', in Geppert, Brandau and Siebeneichner, eds., *Militarizing Outer Space*, 171–204.

[15] Michael J. Neufeld, '"Smash the Myth of the Fascist Rocket Baron": East German Attacks on Wernher von Braun in the 1960s', in Geppert, ed., *Imagining Outer Space*, 117–40.

[16] Geppert, 'European Astrofuturism', 10.

[17] Bernd Mütter, '*Per Media Ad Astra*? Outer Space in West Germany's Media, 1957–87', in Geppert, ed., *Imagining Outer Space*, 165–86; Henry Keazor, 'A Stumble in the Dark: Contextualizing Gerry and Sylvia Anderson's *Space: 1999*', in ibid., 209–30.

[18] William R. Macauley, 'Inscribing Scientific Knowledge: Interstellar Communication, NASA's Pioneer Plaque and Contact with Cultures of the Imagination, 1971–72', in ibid., 313–34; Tristan Weddigen, 'Alien Spotting: Damien Hirst's Beagle 2 Mars Lander Calibration Target and the Exploration of Outer Space', in ibid., 335–52; Philip Pocock, 'Look Up! Art in the Age of Orbitization', in ibid., 252–381.

[19] Guillaume de Syon, 'Balloons on the Moon: Visions of Space Travel in Francophone Comic Strips', in ibid., 187–208.

[20] John Krige, Arturo Russo, Michelangelo de Maria and Lorenza Sebesta, *A History of the European Space Agency: The Story of ESRO and ELDO, 1958–1973* (Noordwijk: European Space Agency, 2000); John Krige, Arturo Russo and Lorenza Sebesta, *A History of the European Space Agency: The Story of ESA, 1973 to 1987* (Noordwijk: European Space Agency, 2000). For an abridged but updated account, see John Krige, *Fifty Years of European Cooperation in Space: Building on its Past, ESA Shapes the Future* (Paris: Beauchesne, 2014).

Development Organisation (ELDO) and the European Space Research Organisation (ESRO) in 1964, as well as the establishment of the European Space Agency eleven years later. A brief primer reminds us that relationships with NASA were essential for early Western European space efforts. The United States and Britain jointly launched a satellite in 1962. A joint US-Italian launch followed in 1964. The next year, France became the first Western European country to launch a satellite with its own rocket.[21]

The trilogy's second volume, *Limiting Outer Space*, examines European astroculture in the 1970s, 'post Apollo'. Scholars have considered this decade a fallow period in space history. US voyages to the moon ended in 1972, and NASA's human spaceflight programmes scaled down until the agency's Space Shuttle programme came online in 1981. In the meantime, publics became comparatively disillusioned with space. 'The Apollo program of the 1960s and early 1970s', writes Roger Launius, 'cast a long shadow over expectations for the American exploration of space'.[22] In the context of American war-making in Vietnam, dissatisfaction with progress in civil rights legislation in the United States and growing concerns about the ecological sustainability of modern industrial societies, space appeared to lose its groove. For students of astroculture, the draw-down of space theatrics in the 1970s is less a problem than an opportunity. *Limiting Outer Space* treats this period as an era of self-reflexivity. The earth-centric gaze exemplified by the *Blue Marble* photograph signalled a reorientation from the stars to humanity and its planetary home.[23] This, in turn, offered Western Europeans fresh leverage to put their stamp on global space culture. The Danish toy company LEGO, for instance, issued a popular space-themed line that cast extraterrestrial travel as peaceful and creative, akin to Scandinavian social democracy.[24] Western European countries meanwhile collaborated to construct the landmark Spacelab, carried on some Space Shuttle missions to conduct experiments in the microgravity of low earth orbit.[25]

The highlight of *Limiting Outer Space* is a challenging but rewarding chapter by Martin Collins, who situates space history in recent literature on the global 1970s. Collins deviates from much of the historiography (and indeed from other contributions in the same volume) to argue that 'spaceflight as a period category and field of action became fundamental to the making of – and, thus, to our understanding of – the 1970s and after'. Far from constituting a low point in space history, the decade witnessed the full integration of space technologies into maturing (or metastasising) forms of global free market capitalism. Collins emphasises the structural impact of satellite-based communication systems. He especially considers the interpretation of satellites by critical theorists like Raymond Williams and Jean-François Lyotard. These thinkers advanced notions of postmodernity and late capitalism long before systematic historicisation of the 1970s. Space constituted 'a key imaginary for relating subjectivity, values and capitalism into a *literal* world view meant to bind together and make sense of individual, local and global registers of experience and action'.[26] For Collins, spaceflight has therefore long

[21] On Western European space cooperation with NASA, see also Brian Harvey, *Europe's Space Programme: To Ariane and Beyond* (London: Springer, 2003); John Krige, Angelina Long Callahan and Ashok Maharaj, *NASA in the World: Fifty Years of International Collaboration in Space* (New York: Palgrave Macmillan, 2013). On space cooperation between non-Soviet Europeans with the Soviet Union and, more recently, Russia, see Colin Burgess and Burt Vis, *Interkosmos: The Eastern Bloc's Early Space Program* (London: Springer, 2016); Brian Harvey, *European-Russian Space Cooperation: From de Gaulle to ExoMars* (London: Springer, 2021).

[22] Roger D. Launius, 'Responding to Apollo: America's Divergent Reactions to the Moon Landings', in Geppert, ed., *Limiting Outer Space*, 51. By contrast, British space culture and policy missed much of the Apollo-era upswing evident in the United States, making the 1970s less of a comparative low in the United Kingdom. Doug Millard, 'A Grounding in Space: Were the 1970s a Period of Transition in Britain's Exploration of Outer Space?', in ibid., 79–102.

[23] Florian Kläger, 'The Earthward Gaze and Self-Reflexivity in Anglophone Novels of the 1970s', in ibid., 131–54.

[24] Thore Bjørnvig, 'Building Outer Space: LEGO and the Conquest of the Beyond in the 1970s', in ibid., 155–82.

[25] Tilmann Siebeneichner, 'Spacelab: Peace, Progress, and European Politics in Outer Space, 1973–85', in ibid., 259–82.

[26] Martin Collins, 'The 1970s: Spaceflight and Historically Interpreting the In-Between Decade', in ibid., 31, 39. Collins and other contributors to *Limiting Outer Space* position space history alongside broader interpretive accounts of the 1970s including Thomas Borstelmann, *The 1970s: A New Global History from Civil Rights to Economic Inequality* (Princeton: Princeton University Press, 2011); Göran Therborn, Geoff Eley, Hartmut Kaelble, Philippe Chassaigne and Andreas

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

informed understandings of the late twentieth century even while receiving limited treatment by historians. His chapter raises the stakes for producing new empirical studies of space and capitalism. Although we learn that 7,600 satellites were launched by 1975, the precise relationships between orbiting technologies, state backers and rising forms of neoliberal globalisation in this period remain understudied.[27]

Militarizing Outer Space, the final instalment in the astroculture trilogy, supersedes the chronological progression of the first two books, spanning the entire Cold War. The volume also expands the original geographic scope beyond Western Europe, a trend already discernible in the second book. While this new entry begins by discussing President Donald Trump's programme to create a Space Force in the US military, the narrative climax lies with Ronald Reagan's Strategic Defense Initiative (SDI). Announced in 1983, SDI quickly became associated with the popular Star Wars film franchise. Reagan called for the establishment of a space-based defensive shield against incoming ballistic missiles from the Soviet Union. It ostensibly would have made nuclear war impossible. Although SDI (based in part on fantastical technologies first pitched by science fiction authors) petered out by the 1990s, it nicely illustrates the authors' collective depiction of space as fodder both for peaceful utopianism and persistent militarism. The book correctly treats early space science during the Cold War as an extension of the superpowers' nuclear arms race.[28] Space, in this sense, had been militarised from the beginning. Only following Sputnik's launch and NASA's founding was space 'partly "civilianized" after 1958, as non-military space agencies and corporations began to launch payloads'.[29] Western Europeans largely followed NASA's lead in publicly depicting extraterrestrial endeavours as civilian, claims challenged in multiple chapters. Merely calling space agencies 'civilian' fulfilled security aims by assuaging external suspicions.

More than its predecessor volumes, *Militarizing Outer Space* draws distinctions between popular astroculture and the technological realities of spaceflight. In contrast with the ray guns and laser blasters of science fiction, space was never meaningfully weaponised.[30] This is not to say it was irrelevant for warfare. To the contrary, space-based communications and navigation systems such as GPS are now components of all military conflicts worldwide.[31] Defense officials have tended to oppose the weaponisation of space because they have feared upsetting the international legal consensus (codified in the 1967 Outer Space Treaty) that allows extraterrestrial regions to be used for security purposes, as long as these are not weapons-based. Reconnaissance satellites have been among the most important military technologies in orbit. The United States and the Soviet Union began sending spy satellites

Wirsching, 'The 1970s and 1980s as a Turning Point in European History?', *Journal of Modern European History* 9, 1 (2011), 8–26; Niall Ferguson, Charles S. Maier, Erez Manela and Daniel J. Sargent, eds., *The Shock of the Global: The 1970s in Perspective* (Cambridge, MA: Harvard University Press, 2010).

[27] On satellites and globalisation, see also Hugh Slotten, 'Satellite Communications, Globalization, and the Cold War', *Technology and Culture* 43, 2 (2002), 315–50; Lisa Parks and James Schwoch, eds., *Down to Earth: Satellite Technologies, Industries, and Cultures* (New Brunswick, NJ: Rutgers University Press, 2012); Martin J. Collins, *A Telephone for the World: Iridium, Motorola, and the Making of a Global Age* (Baltimore: Johns Hopkins University Press, 2018).

[28] Christopher Gainor, 'The Nuclear Roots of the Space Race', in Geppert, Brandau and Siebeneichner, eds., *Militarizing Outer Space*, 69–92.

[29] Michael J. Neufeld, 'Cold War – But No War – in Space', in ibid., 47.

[30] Chapters treating space war in fiction include Natalija Majsova, 'In Space, Violence Rules: Clashes and Conquests in Science-Fiction Cinema', in ibid., 119–46; Oliver Dunnett, 'C.S. Lewis and the Moral Threat of Space Exploration, 1938–64', in ibid., 147–70; Philipp Theisohn, '*Starship Troopers*: The Shaping of the Space Warrior in Cold War Astroculture, 1950–80', in ibid., 233–56.

[31] Paul E. Ceruzzi, 'Satellite Navigation and the Military-Civilian Dilemma: The Geopolitics of GPS and Its Rivals', in ibid., 343–70. Cold War-era military technologies and their legacies are further considered in Patrick Kilian, 'Participant Evolution: Cold War Space Medicine and the Militarization of the Cyborg Self', in ibid., 205–32; Anthony Enns, 'Satellites and Psychics: The Militarization of Outer and Inner Space, 1960–95', in ibid., 257–84; Regina Peldszus, 'Architectures of Command: The Dual-Use Legacy of Mission Control Centers', in ibid., 285–312. See also Regina Peldszus, 'Architectural Experiments in Space: Orbital Stations, Simulators and Speculative Design, 1968–82', in Geppert, ed., *Limiting Outer Space*, 237–58.

over each other's territory in the 1960s. These eyes in the sky were more reliable and less diplomatically offensive than high-altitude airplanes. John Gaddis suggested decades ago that spy satellites helped keep the Cold War cold by enabling each superpower to verify that its counterpart was not preparing to launch a surprise nuclear attack, a view echoed in *Militarizing Outer Space*.[32] Attention to US and Soviet hard power in this volume underscores the limits of analyses confined to Western Europe. The myriad entanglements of space endeavours across continental boundaries raise intriguing new questions about the place of Europe in space.

Situating Europe

Europeans produced astroculture, but astroculture was never restricted to Europe. In his introduction to *Imagining Outer Space*, editor Alexander Geppert outlined his hope that studying European space culture would 'expand contemporary understandings of "outer space" such that astroculture becomes a new field of modern European historiography'.[33] Three books and nearly a decade later, this undertaking has enjoyed success. Already, the term astroculture has found resonance in the broader literature on space and spaceflight. In his 2018 book, *Spaceflight: A Concise History*, Michael Neufeld features 'astroculture' as the organising principle of one of his six chapters.[34] Geppert reports this concept's appearance in fifty other scholarly publications in English, French and German. In a retrospective epilogue, he evaluates that the trilogy's goal of 'making "astroculture" a new field of modern (European) historiography' has been achieved. Readers will nonetheless note a subtle change in emphasis. The word European, once unmarked, has become parenthetical. Geppert gives several reasons for this shift in formulation. One is the trilogy's disproportionate attention to Western rather than Eastern Europe. A wholly European history would require additional inquiry. Geppert also highlights the relevance of astroculture for non-European histories, encouraging research into manifestations in 'the Global South', namely China, Japan and India. He writes, 'the analytical, empirical and intellectual gains to be made from globalizing the history of outer space, spaceflight and space exploration are gigantic'.[35]

To these recommendations for studying astroculture more deeply in Europe as well as in the Global South might be added a third provocation: the need for histories of space and empire that foreground transnational relationships across Europe's continental boundaries. In 1961, the anti-colonial thinker Frantz Fanon posited that Europe was 'literally the creation of the Third World'.[36] Imperial conquests and centuries-long exploitation of racialised others gave Europe its power. That Western European states could embark on space programmes in the wake of the Second World War reflected this accumulated wealth. More concretely, their space endeavours relied on the postwar reassertion of

[32] John Lewis Gaddis, *The Long Peace: Inquiries into the History of the Cold War* (Oxford: Oxford University Press, 1987), 195–214; Neufeld, 'Cold War – But No War – in Space', 45–6.

[33] Geppert, 'European Astrofuturism', 21.

[34] Michael J. Neufeld, *Spaceflight: A Concise History* (Cambridge, MA: MIT Press, 2018), 137–68.

[35] Alexander C.T. Geppert, 'What Is, and to What End Do We Study, European Astroculture?' in Geppert, Brandau and Siebeneichner, eds., *Militarizing Outer Space*, 373, 376. Recent histories of space science and astroculture in the Global South have included important treatments of India and southern Africa, e.g.: Asif Siddiqi, 'Science, Geography, and Nation: The Global Creation of Thumba', *History and Technology* 31, 4 (2015), 420–51; Asif Siddiqi, 'Another Global History of Science: Making Space for India and China', *BJHS: Themes* 1 (2016), 115–43; Thembisa Waetjen, 'Sputnik from Below: Space Age Science and Public Culture in Cold War Southern Africa', *Interventions* 18, 5 (2016), 687–708; Keith Snedegar, 'The Congressional Black Caucus and the Closure of NASA's Satellite Tracking Station at Hartebeesthoek, South Africa', in Brian C. Odom and Stephen P. Waring, eds., *NASA and the Long Civil Rights Movement* (Gainesville: University Press of Florida, 2019), 167–79; Asif Siddiqi, 'Whose India? SITE and the Origins of Satellite Television in India', *History and Technology* 36, 3–4 (2020), 452–74. See also Asif Siddiqi, 'Competing Technologies, National(ist) Narratives, and Universal Claims: Toward a Global History of Space Exploration', *Technology and Culture* 51, 2 (2010), 425–43.

[36] Frantz Fanon, *The Wretched of the Earth*, trans. Constance Farrington (New York: Grove Press, 1963), 102.

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

colonialism, an underemphasised but integral aspect of Western European unification in this period more broadly.[37] Early British space science entailed the founding of a rocket range in the Australian Outback. Named 'Woomera' after an Aboriginal throwing spear, this facility tested missiles on Aboriginal lands, from which previous inhabitants were removed.[38] Italy built its spaceport on Kenyan territory, with dubious consequences for local economic and ecological health.[39] France, meanwhile, launched rockets from the Sahara Desert while fighting a brutal war of decolonisation in Algeria. In 1964, France relocated space activities to French Guiana, the site of a former penal colony. The Guiana Space Centre later became the European Space Agency's premier spaceport. By the 1990s, it was launching over half of all commercial satellites in orbit.[40]

The European astroculture trilogy provides a promising foundation for future scholars to integrate the histories of space and empire. 'An entire geography of outer space developed', we learn, 'that presented itself as a continuation, if not a logical extension of earlier geographies of imperial expansion and colonial domination'. The three volumes also consider European views of alien life forms. These appear as 'the twentieth century's most radical version of alterity'. If they were indeed 'an "other" unlike any before', then they were nonetheless surely modelled on and offered ciphers for very real others in the collective European experience.[41] Hints of this line of analysis arise tantalisingly throughout. Chapters on aliens in fiction and claims of UFO sightings point to social anxieties about belonging and equality in postwar Europe.[42] The space age benefitted some groups more than others, with disparities manifesting both within Western Europe and between the Global South and North. The concerns of elites in the so-called Third World that their countries were not sufficiently profiting from space receive consideration in a contribution on the negotiation of international space law during the 1960s and 1970s.[43] In those years, global inequality also provided a motivating factor behind the most ambitious schemes for space colonisation, which helped to lay the groundwork for Reagan's SDI dreams. If overpopulation threatened unfettered economic growth on earth, escape to the stars promised an end to limits.[44]

[37] Paul Betts, *Ruin and Renewal: Civilising Europe after the Second World War* (London: Profile Books, 2020), 225–6. Literature on Europe after empire includes Todd Shepard, *The Invention of Decolonization: The Algerian War and the Remaking of France* (Ithaca: Cornell University Press, 2006); Jordanna Bailkin, *The Afterlife of Empire* (Berkeley: University of California Press, 2012); Elizabeth Buettner, *Europe after Empire: Decolonization, Society, and Culture* (Cambridge: Cambridge University Press, 2016). On European integration and space, see 'West European Integration and the Militarization of Outer Space, 1945–70', in Geppert, Brandau and Siebeneichner, eds., *Militarizing Outer Space*, 93–118.

[38] Sue Davenport, Peter Johnson and Yuwali, *Cleared Out: Contact in the Western Desert* (Canberra: Aboriginal Studies Press, 2005).

[39] Asif Siddiqi, 'Dispersed Sites: San Marco and the Launch from Kenya', in John Krige, ed., *How Knowledge Moves: Writing the Transnational History of Science and Technology* (Chicago: University of Chicago Press 2019), 175–200.

[40] Peter Redfield, *Space in the Tropics: From Convicts to Rockets in French Guiana* (Berkeley: University of California Press, 2000), xiv.

[41] Geppert, 'European Astrofuturism', 4, 17–18. See further Peter Redfield, 'The Half-Life of Empire in Outer Space', *Social Studies of Science* 32, 5–6 (2002), 791–825. On aliens and ideas of otherness, see also Steven J. Dick, *The Biological Universe: The Twentieth-Century Extraterrestrial Life Debate and the Limits of Science* (Cambridge: Cambridge University Press, 1996); Stefan Helmreich, *Alien Ocean: Anthropological Voyages in Microbial Seas* (Berkeley: University of California Press, 2009); Thomas Brandstetter, 'Imagining Inorganic Life: Crystalline Aliens in Science and Fiction', in Geppert, ed., *Imagining Outer Space*, 73–96; Gonzalo Munévar, 'Self-Reproducing Automata and the Impossibility of SETI', in ibid., 293–312; Debbora Battaglia, 'Life as We Don't Yet Know It: An Anthropologist's First Contact with the Science of "Weird Life"', in ibid., 231–44.

[42] Pierre Lagrange, 'A Ghost in the Machine: How Sociology Tried to Explain (Away) American Flying Saucers and European Ghost Rockets, 1946–47', in ibid., 245–58; James I. Miller, 'Seeing the Future of Civilization in the Skies of Quarouble: UFO Encounters and the Problem of Empire in Postwar France', in ibid., 269–92.

[43] Luca Follis, 'The Province and Heritage of Humankind: Space Law's Imaginary of Outer Space, 1967–79', in Geppert, ed., *Limiting Outer Space*, 183–208.

[44] Peter J. Westwick, 'From the Club of Rome to Star Wars: The Era of Limits, Space Colonization, and the Origins of SDI', in ibid., 283–304.

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

That the astroculture trilogy does not fully develop its postcolonial leads is due, at least in part, to a fraught attitude toward the United States. While the books are eager to affirm Western Europe as a distinct field, they simultaneously exhibit deep indebtedness to the historiography of US space programmes. This approach creates a lopsided effect, in which most regions outside Western Europe are treated as extraneous, yet references to the United States abound. On one hand, this is understandable, given the extraordinary power the United States exercised in Western Europe during the Cold War. Western Europeans retained freedom of motion in science and other realms, but the role of the United States was 'hegemonic'.[45] As recent reevaluations of the Cold War demonstrate, however, cultural and technological differences between East and West were less significant than claimed at the time. One major treatment examines the Cold War as a global phenomenon originating in the 1890s with 'the radicalization of the European labor movement [and] the expansion of the United States and Russia as transcontinental empires'.[46] To position Soviet astroculture as a foil for Western European versions while treating the United States as a model, then, runs the danger of obscuring the Global North as a unifying category for interpreting twentieth-century spaceflight.[47] Viewing the origins of astroculture as a common project within European expansionism (broadly defined) could productively illuminate prominent tropes such as 'the frontier' in thinking about space.[48]

Envisioning European astroculture as a phenomenon that extends beyond the continent of Europe might also deepen the value of insights imported from scholarship on the United States and space. Consider, for instance, the 2003 book *Astrofuturism* by the US literary scholar De Witt Douglas Kilgore. Authors preparing papers for *Imagining Outer Space* were asked to consider Kilgore's idea of 'astrofuturism' in a European context.[49] Kilgore interprets works of science fiction that use space to postulate ideas about the perfectibility of US society. He readily acknowledges the overwhelming maleness and, especially, whiteness of twentieth-century science fiction. For him, race 'should not be considered marginal to the astrofuturist project; rather, racial difference is a wellspring of its agenda'. He views astrofuturism as a window onto 'America's response to the claims of marginalized peoples'.[50] The uptake of Kilgore's book in the European astroculture trilogy, however, mostly leaves race behind. Authors are more likely to position Western Europe as 'peripheral' over and against the superpowers. A chapter in the second book, *Limiting Outer Space*, provides a captivating account of the writing of the landmark film *2001: A Space Odyssey* (1968). The filmmakers read deeply in cutting-edge anthropology to create the iconic opening sequence, 'The Dawn of Man'. In this parable of human genesis, African ape-men develop bone weapons, ostensibly prefiguring the ability of the

[45] John Krige, *American Hegemony and Postwar Reconstruction of Science in Europe* (Cambridge, MA: MIT Press, 2006), 6. The cultural dimensions of US hegemony in Europe are considered in Victoria De Grazia, *Irresistible Empire: America's Advance through Twentieth-Century Europe* (Cambridge, MA: Harvard University Press, 2005).

[46] Odd Arne Westad, *The Cold War: A World History* (New York: Basic Books, 2017), 4. See further Kate Brown, *Plutopia: Nuclear Families, Atomic Cities, and the Great Soviet and American Plutonium Disasters* (Oxford: Oxford University Press, 2013); Bathsheba Demuth, *Floating Coast: An Environmental History of the Bering Strait* (New York: W.W. Norton, 2019).

[47] Several chapters in the astroculture trilogy consider Russian and Soviet space thought, notably Claudia Schmolders, 'Heaven on Earth: Tunguska, 30 June 1908', in Geppert, ed., *Imagining Outer Space*, 51–72; Andrew Jenks, 'Transnational Utopias, Space Exploration and the Association of Space Explorers, 1972–85', in Geppert, ed., *Limiting Outer Space*, 209–236; Cathleen Lewis, 'Space Spies in the Open: Military Space Stations and Heroic Cosmonauts in the Post-Apollo Period, 1971–77', in Geppert, Brandau and Siebeneichner, eds., *Militarizing Outer Space*, 313–42. This topic has previously generated interest in Russian and Soviet studies, e.g.: James T. Andrews and Asif A. Siddiqi, eds., *Into the Cosmos: Space Exploration and Soviet Culture* (Pittsburgh: University of Pittsburgh Press, 2011); Eva Maurer, Julia Richers, Monica Rüthers and Carmen Scheide, eds., *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies* (New York: Palgrave Macmillan, 2011).

[48] On the language of space as a frontier, see McCurdy, *Space in the American Imagination*, 154–80; Rainer Eisfeld, 'Projecting Landscapes of the Human Mind onto Another World: Changing Faces of an Imaginary Mars', in Geppert, ed., *Imagining Outer Space*, 97–116.

[49] Geppert, 'European Astrofuturism', 19.

[50] De Witt Douglas Kilgore, *Astrofuturism: Science, Race, and Visions of Utopia in Space* (Philadelphia: University of Pennsylvania Press, 2003), 10, 222.

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

space age to 'rescue Western civilization from the cycles of war and self-destruction'.[51] Such a reading looks east and west. But one might also turn south, inquiring what 1960s palaeoanthropology told whites about their evolutionary status.

An article by Sara Pritchard in *Environmental History* illustrates the rewards of keeping multiple continents in the same frame. Pritchard's essay, 'The Trouble with Darkness', offers a close reading of *City Lights of Africa, Europe, and the Middle East*, a nighttime image of earth from space compiled with data from NASA's Suomi satellite in 2012.[52] The photograph might also be called *Black Marble*, given its similarity to the famous *Blue Marble* image taken forty years earlier. *City Lights* depicts many of the same areas visible in its predecessor. Unlike *Blue Marble*, however, *City Lights* shows Europe in addition to Africa and the Middle East. A more northerly angle relative to Earth's equator allows viewers to see parts of the Global South and North together. NASA released *City Lights* as a contribution to understanding the distribution of rural versus urban areas, a goal in line with the organisation's current environmental orientation. Yet as Pritchard reveals, digital editing and design choices ensured that the nighttime lights in wealthy Europe look far brighter than the comparatively sparse artificial illumination of Africa. This juxtaposition risks recapitulating racist depictions of Africa as 'the Dark Continent'. On the other hand, some conservationists have positively connoted Africa's lack of light pollution, ideal for stargazing. Pritchard shows how this too centres the poverty of the Global South. It moreover implies that regions inhabited primarily by individuals of colour should remain underdeveloped. At a time when spaceflight is providing a rich theoretical ground for debates about blackness and modernity against the backdrop of deep racist violence, *City Lights* testifies to the importance of considering multicontinental and postcolonial viewpoints in studies of Europe and spaceflight.[53]

Planetary Power

A central insight of the European astroculture trilogy is that human interest in outer space has often been more about earth than about the extraterrestrial itself. Astroculture harnesses the beyond to tell us something about ourselves, while military and commercial ventures in space advance terrestrial aims. The term Geppert deploys to describe this phenomenon, 'planetization', is not standard in the broader literature.[54] It nonetheless complements much recent scholarship concerned with globalisation and the environment since the Second World War. Spacefaring's relevance for earthly events underscores the utility of bringing histories of space to bear on 'mainstream' historiography, in turn raising practical questions about how scholars should narrate the place of space in macro-processes like modernisation or decolonisation. A new history of the Cuban Missile Crisis, *Nuclear Folly* by Serhii Plokhy, offers a sobering reassessment of the instability of planetary power during the nuclear age. Plokhy shows how close fears of atomic war came to actualisation. They formed a crucial

[51] Robert Poole, 'The Myth of Progress: *2001 – A Space Odyssey*', in Geppert, ed., *Limiting Outer Space*, 119. *2001* co-creator Arthur C. Clarke is also considered in Thore Bjørnvig, 'Transcendence of Gravity: Arthur C. Clarke and the Apocalypse of Weightlessness', in Geppert, ed., *Imagining Outer Space*, 141–64.

[52] Sara B. Pritchard, 'The Trouble with Darkness: NASA's Suomi Satellite Images of Earth at Night', *Environmental History* 22, 2 (2017), 312–30.

[53] The development of 'Afrofuturism' as a literary tradition and site of cutting-edge scholarly analysis deserves significant engagement within future studies of European astroculture. For an introduction, see Reynaldo Anderson and Charles E. Jones, eds., *Afrofuturism 2.0: The Rise of Astro-Blackness* (Lanham, MD: Lexington Books, 2016), viii–xviii.

[54] This term is promisingly if idiosyncratically used in the astroculture trilogy, e.g.: Geppert, 'The Post-Apollo Paradox', 19; Geppert, '*Spacewar!*', 31. Historians, anthropologists and others have expressed substantial interest in theorising conceptions of earth, although the nomenclature and theoretical ground remain in flux. See Joyce E. Chaplin, *Round About the Earth: Circumnavigation from Magellan to Orbit* (New York: Simon and Schuster, 2012); Zoe Todd, 'An Indigenous Feminist's Take on the Ontological Turn: "Ontology" Is Just Another Word for Colonialism', *Journal of Historical Sociology* 29, 1 (2016), 4–22; Bruno Latour, *Facing Gaia: Eight Lectures on the New Climatic Regime* (Cambridge: Polity, 2017); Dipesh Chakrabarty, *The Climate of History in a Planetary Age* (Chicago: University of Chicago Press, 2021).

backdrop for Cold War astroculture, especially surrounding the Apollo programme that placed astronauts on the moon. Teasel Muir-Harmony traces this story in *Operation Moonglow*. She shows how US officials resolved to promote global astroculture as a means of stabilising the Cold War and of advancing Western interests across the Third World. Locating European imperialism and challenges to it within the interplay of planetary power and astroculture may, in turn, yield insights relevant for confronting inequality and ecological crisis.

Nuclear history provides a natural site of comparison for historical study of outer space. Scholars who underscore the cultural dynamics of spaceflight have their counterparts among nuclear historians. The premise of the Cold War arms race, after all, was that stockpiling atomic weapons would preclude large-scale use. It was the thinkability of nuclear war that supposedly offered the best deterrent.[55] Nuclear-armed countries campaigned to promote favourable attitudes among their own publics and abroad, especially touting the alleged wonders of civilian nuclear technology.[56] Yet by the early 1960s, concerns about the radiological effects of atomic fallout – from testing bombs and from possible use in a future war – helped engender a treaty between Britain, the Soviet Union and the United States, prohibiting atomic tests above ground, underwater and in outer space.[57] By contrast, no substantial anti-space movement ever emerged. The initial panicked reaction to Sputnik across much of the West suggests a different outcome might have transpired. Sputnik terrified because it showed that powerful rockets could potentially carry warheads to any point on earth. In fact, the Soviet Union had not yet built a large and reliable force of missiles with truly intercontinental precision, a reality betrayed by the decision to station nuclear arms on the island of Cuba in 1962. The resulting hair-trigger confrontation detailed in Plokhy's *Nuclear Folly* led to the withdrawal of Soviet arms. It also helped to stoke global anti-nuclear sentiment.

Nuclear Folly reframes the Cuban Missile Crisis as a series of strategic mistakes by the Cold War superpowers as they sought to navigate the new world wrought by nuclear arms and ballistic missiles. Plokhy synthesises previous accounts of Soviet, US and Cuban actions and motivations. To this vast extant literature he contributes new sources, especially Soviet military memoirs and recently released KGB files. The book's major intervention, however, is to ask not what the countries involved did for their constituents but rather to ask how they failed. 'Kennedy and Khrushchev marched from one mistake to another', Plokhy writes. 'What saved the world during the Cuban crisis was that both leaders considered a nuclear war unwinnable'.[58] Such an interpretation holds at least two implications for understanding the history of planetary power. First, it demonstrates the extreme contingency of this period when the global order was shifting from a system dominated by empires to one defined by nation-states and the superpowers' extra-territorial projection of force. While the United States and the Soviet Union were still building their arsenals of intercontinental missiles, they relied on shorter-range missiles stationed in or near Western Europe and in a former colony, Cuba. The retraction of Western European imperial power occurred slowly enough to keep the region central to this transition yet also at a fast enough rate that the instability left in colonialism's wake facilitated a Soviet incursion into the Western hemisphere. Second, emphasising nuclear fear – that is, the superpowers' ultimate unwillingness to wage nuclear war (at least against each other) – helps explain the ascendence of astroculture as soft power.

[55] Spencer R. Weart, *Nuclear Fear: A History of Images* (Cambridge, MA: Harvard University Press, 1988); Matthew Grant and Benjamin Ziemann, eds., *Understanding the Imaginary War: Culture, Thought, and Nuclear Conflict, 1945–90* (Manchester: Manchester University Press, 2016).

[56] Jacob Darwin Hamblin, *The Wretched Atom: America's Global Gamble with Peaceful Nuclear Technology* (New York: Oxford University Press, 2021).

[57] Toshihiro Higuchi, *Political Fallout: Nuclear Weapons Testing and the Making of a Global Environmental Crisis* (Stanford: Stanford University Press, 2020). On the material consequences of the nuclear age, see also Joseph Masco, *The Nuclear Borderlands: The Manhattan Project in Post-Cold War New Mexico* (Princeton: Princeton University Press, 2006); Gabrielle Hecht, *Being Nuclear: Africans and the Global Uranium Trade* (Cambridge, MA: MIT Press, 2012); Kate Brown, *Manual for Survival: A Chernobyl Guide to the Future* (New York: W.W. Norton, 2019).

[58] Serhii Plokhy, *Nuclear Folly: A History of the Cuban Missile Crisis* (New York: W.W. Norton, 2021), xvi, 362.

Conceptual distinctions between Cold War nuclear politics and spaceflight are due in no small part to the US moon programme. Muir-Harmony's *Operation Moonglow* bridges this divide by reframing the Apollo flights as an enormous public relations exercise. This effort depended on the portrayal of spaceflight – in the wake of the Cuban Missile Crisis – as non-military. US officials insisted to global publics that voyaging to the moon constituted an achievement for all humankind. At every step, they weighed their project's public impact. 'Spaceflight spectaculars, and their promotion abroad', Muir-Harmony explains, 'were by design aimed at winning over international public opinion, countering anti-American sentiment, and, most importantly, shaping the emerging global order'. *Operation Moonglow* is a studiously realpolitik account. To bring the involvement of the US Information Agency – which spent millions of dollars on films and exhibits promoting moon-related content, and which hired polling firms on every continent – to the fore in our understanding of Project Apollo is to place the moon programme squarely within the history of efforts to maintain US power worldwide. Muir-Harmony does not deny that billions of people felt a sense of collective participation when astronauts first landed on the moon, nor that deep international interest helped generate environmental sensibilities. But in her telling, these realities were side effects of superpower aims: 'the idea of "planetary consciousness" was cultivated and marketed to advance US national interests'.[59]

Non-Soviet Europe illuminates the background of *Operation Moonglow* like latent light from a diminished star. Muir-Harmony explains that by the 1960s, 'the psychological battlefield of the cold war had moved from the fronts of western Europe to the newly independent nations in the developing world'. The stabilisation of the Cold War in Europe coincided with the largest postwar wave of independence movements in formerly colonised lands. Having navigated the draw-down of Western European imperial might, the US and Soviet superpowers competed to court the Third World. Muir-Harmony's descriptions of efforts by the US Information Agency to promote enthusiasm for space in Africa, Asia and Latin America are fascinating (and contribute brilliantly to calls for scholarly attention to astroculture in the Global South). She details how decolonisation affected space propaganda but also spaceflight hardware. Following the 1963 independence of Zanzibar from Great Britain, for instance, an anti-Western revolution forced NASA to relocate a tracking station from the island to another African state, the Malagasy Republic (today Madagascar). Although US officials claimed to peoples around the globe that Apollo would benefit all, in reality the United States required help from countries worldwide to track its extraterrestrial machinery. The Soviet Union dispatched its own spacefarers and exhibit materials on goodwill tours to the Third World. But Soviet space technologies remained comparatively secret, and global audiences more readily believed they had a stake in Apollo. The US approach to 'information dissemination – especially the policy of 'openness' – bore fruit'.[60]

Taken together, the accounts provided by Plokhy, Muir-Harmony and the authors of the astroculture trilogy offer a reassessment of the space age befitting our era of information-driven political economy and society. These books might be situated alongside treatments of computing history and the challenges of the digital revolution.[61] Feminist scholarship has been especially effective at identifying the structures and costs of information generation in big science, as with the

[59] Teasel Muir-Harmony, *Operation Moonglow: A Political History of Project Apollo* (New York: Basic Books, 2020), xii–xiii, 275. On planetary consciousness, see also Benjamin W. Goossen, 'A Benchmark for the Environment: Big Science and "Artificial" Geophysics in the Global 1950s', *Journal of Global History* 15, 1 (2020), 149–68.

[60] Muir-Harmony, *Operation Moonglow*, 122, 276.

[61] Relevant works include Janet Abbate, *Recoding Gender: Women's Changing Participation in Computing* (Cambridge, MA: MIT Press, 2012); Mar Hicks, *Programmed Inequality: How Britain Discarded Women Technologists and Lost its Edge in Computing* (Cambridge, MA: MIT Press, 2017); Safiya Umoja Noble, *Algorithms of Oppression: How Search Engines Reinforce Racism* (New York: New York University Press, 2018); Margaret O'Mara, *The Code: Silicon Valley and the Remaking of America* (New York: Penguin, 2019); Thomas S. Mullaney, Benjamin Peters, Mar Hicks and Kavita Philip, eds., *Your Computer Is On Fire* (Cambridge, MA: MIT Press, 2021).

consequential yet devalued labour performed by female 'hidden figures' from multiple racial backgrounds.[62] *Nuclear Folly* is notably pessimistic about communication and governance in the male-dominated era of space. For Plokhy, the Cuban Missile Crisis lurched from one misstep to another, due to poor knowledge about strategic thinking across the Iron Curtain. Dramatic ironies fuel the narrative as readers encounter data that took agonising hours to reach historical actors. 'The nuclear age preceded the arrival of the information age by at least a few decades', Plokhy writes. 'In October 1962, that gap might very well have led to the return of the Stone Age'. We are left to wonder whether the information age – riddled with *kompromat*, election lies and the rage generators of social media – would handle nuclear brinksmanship more effectively. Plokhy warns, 'Today we are back to a period resembling the one that preceded the Cuban missile crisis, when there is no generally recognized "balance of terror"'.[63] An expanded club of countries now possesses nuclear weapons, and international norms against their use are weakening. The nuclear fear that prevented global escalation in 1962 might prove elusive in our own disinformation age.

Operation Moonglow confirms that large-scale scientific communication can succeed, but with caveats. In addition to meeting its technical objective of reaching the moon, Project Apollo achieved its political goal of winning support for the United States abroad. Muir-Harmony explains this by expanding the cast of characters who populate the annals of space historiography. She introduces us to globetrotting US Information Agency officials (such as the remarkable Elton Stepherson Jr., an African American who helped win hearts and minds in Africa) and post-flight astronauts-turned-diplomats (the self-assured Frank Borman was a runaway hit in Western Europe). The protagonists of *Operation Moonglow* exhibit the NASA hallmarks of national honour, teamwork and mid-century gumption. Whether in space or on the ground, they got the job done. Absent a unifying ideology and nearly unlimited funding, however, the shelf life of space diplomacy was short. Muir-Harmony notes that imagery from the public relations campaigning surrounding the moon programme remained one of its most lasting legacies. Photographs taken from space, such as *Blue Marble*, epitomised Apollo's capacity to help humans imagine commonalities in a divided world. Internationally shared astroculture was Apollo's 'afterglow', a deepened sense of global interconnection. Muir-Harmony is nonetheless frank about the limitations of this self-reflexive gaze. 'After Project Apollo ended', she writes, 'the geopolitical landscape did not reflect the image of the borderless Earth . . . depicted in *Blue Marble*; the world was still very much parceled into nation-states, and the US and the USSR radiated their separate spheres of influence'.[64]

The trouble with 'planetary consciousness', as these works demonstrate, is that it is not planetary power. If the US space propaganda was designed, in part, to distract global attention from US militarism abroad, it could not bring back to life the soldiers and civilians who died from bullets, bombs and napalm. Nuclear fear may have prevented conflict between the great powers in the Cuban Missile Crisis and afterwards, but the following decades were hardly a 'long peace', as some have claimed.[65] The age of planetary consciousness – the era of *Blue Marble* – has in fact been remarkably unsuccessful in the two realms so often attributed to it: assuaging geopolitical tensions and inspiring environmentalist action. As many as twenty million individuals died in major armed conflicts during the Cold War. Most victims were people of colour in the Global South. The years since 1945 have also witnessed

[62] Margot Lee Shetterly, *Hidden Figures: The American Dream and the Untold Story of the Black Women Mathematicians Who Helped Win the Space Race* (New York: William Morrow, 2016). See also Margaret A. Weitekamp, *Right Stuff, Wrong Sex: America's First Women in Space Program* (Baltimore: Johns Hopkins University Press, 2004); Nathalia Holt, *Rise of the Rocket Girls: The Women Who Propelled Us, From Missiles to the Moon to Mars* (New York: Little, Brown and Co., 2016).

[63] Plokhy, *Nuclear Folly*, 162, 186.

[64] Muir-Harmony, *Operation Moonglow*, 280.

[65] Odd Arne Westad, *The Global Cold War: Third World Interventions and the Making of Our Times* (Cambridge: Cambridge University Press, 2005); Paul Thomas Chamberlin, *The Cold War's Killing Fields: Rethinking the Long Peace* (New York: Harper, 2018).

https://doi.org/10.1017/S0960777321000813 Published online by Cambridge University Press

a 'great acceleration' in the human-caused collapse of natural ecosystems.[66] Global inequality and environmental destruction have only grown more intertwined in the twenty-first century. A recent report by the United Nations' special rapporteur on extreme poverty and human rights evaluates: 'Climate change threatens the future of human rights and risks undoing the last 50 years of progress in development, global health and poverty reduction'. Even in a best-case outcome, 'hundreds of millions will face food insecurity, forced migration, disease and death'. One dire yet entirely plausible scenario would entail a regressive construction of 'climate apartheid', in which wealthy populaces pay to evade weather disasters, malnourishment and conflict while the rest of humanity is abandoned to suffering.[67] The stakes for addressing inequality and ecological strain through collective action have never been higher.

Conclusion

Understanding Europe's final frontier requires attention to the frontiers that came before. Bringing the legacies of colonial violence into the history of space holds urgency in light of close linkages between spaceflight, militarism and global capitalism, as well as the ties between outer space and environmental thought. European space science today remains multi-continental as well as transnational and interplanetary. A tracking station built by the European Space Agency in Kenya might acquire signals from a satellite commissioned in Spain, assembled by Germany and launched with a Russian rocket from the spaceport in French Guiana. The continued wealth of Europe in this era of growing inequality and ecological crisis, moreover, should call attention to the ways European power has been sustained after empire. Space programmes have played a substantial role in preserving Europe's worldwide influence, rendering them among the many necessary areas to target within ongoing efforts to alleviate the intertwined problems of global inequality and climate crisis. That campaign, surely, is a form of astroculture worth embracing.

Acknowledgements. Support for this article came from the American Historical Association, the European University Institute, NASA, and Harvard University. The author thanks Rachel Waltner Goossen, Alison Frank Johnson, Madeline J. Williams and the editors at *Contemporary European History* for their suggestions.

[66] J.R. McNeill and Peter Engelke, *The Great Acceleration: An Environmental History of the Anthropocene since 1945* (Cambridge, MA: Harvard University Press, 2014). The environment has yet to become a major category of analysis in histories of Europe and space. Future work in this area might engage Roger Launius, 'Writing the History of Space's Extreme Environment', *Environmental History* 15, 3 (2010), 526–32; Stefan Helmreich, 'From Spaceship Earth to Google Ocean: Planetary Icons, Indexes, and Infrastructures', *Social Research* 78, 4 (2011), 1211–42; Lisa Ruth Rand, 'Falling Cosmos: Nuclear Reentry and the Environmental History of Earth Orbit', *Environmental History* 24, 1 (2019), 78–103; Megan Black, 'Prospecting the World: Landsat and the Search for Minerals in Space Age Globalization', *Journal of American History* 106, 1 (2019), 97–120.

[67] Special Rapporteur on Extreme Poverty and Human Rights, 'Climate Change and Poverty', 17 July 2019, UN Human Rights Council, <https://digitallibrary.un.org/record/3810720?ln=en#record-files-collapse-header>.

Cite this article: Goossen BW (2023). Europe's Final Frontier: Astroculture and Planetary Power since 1945. *Contemporary European History* **32**, 475–488. https://doi.org/10.1017/S0960777321000813