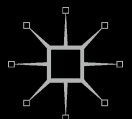


LIMITING
OUTER SPACE

Astroculture After Apollo

EDITED BY
Alexander C.T. Geppert



‘This provocative yet deeply researched collection of essays edited by Alexander Geppert reveals the profound connection between the climacteric of manned spaceflight after Apollo 11 and the onrush of globalization in the 1970s. Pausing after the moon landings in its cosmic quest, humanity, as it were, deepened its global connections; and this book opens up that hitherto unexplored linkage.’

—Charles S. Maier, Harvard University

‘For ages, mankind envisioned venturing to the moon. Surprisingly, once that vision was realized, popular fascination with spaceflight vanished quickly. The stars became disenchanted, and spaceship earth began to mirror itself with thousands of satellites instead. From perspectives as diverse as geopolitics, architecture and law, this intriguing book outlines continuities and transformations of astroculture during the post-Apollo era. It offers thought-provoking insights by adding a third dimension to the more than ambivalent 1970s and 1980s.’

—Dirk van Laak, Universität Leipzig

‘This is a highly original volume on the surprising lull in space exploration during the crisis-ridden 1970s. The particular value of its multinational chapters lies in their transdisciplinary investigation of how the end of the Apollo moon landings coincided with a growing disillusionment of space imaginaries during the onset of globalization.’

—Konrad H. Jarausch, University of North Carolina, Chapel Hill

‘*Limiting Outer Space* illustrates the rich possibilities of seeing spaceflight and astroculture as integral components of the pivotal decade of the 1970s. Representing an array of disciplines and geographies, the authors in this volume collectively complement and amend previous understandings of the cultural and geopolitical transitions of the age. Highly recommended for its broad scope and well crafted essays.’

—Emily S. Rosenberg, University of California, Irvine

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IMAGINING OUTER SPACE

European Astroculture in the Twentieth Century

(European Astroculture, vol. 1)

MILITARIZING OUTER SPACE

Astroculture, Dystopia and the Cold War

(European Astroculture, vol. 3) (forthcoming)



Alexander C.T. Geppert
Editor

Limiting Outer Space

Astroculture After Apollo

European Astroculture
Volume 2

palgrave
macmillan

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Palgrave Studies in the History of Science and Technology
European Astroculture, Volume 2
ISBN 978-1-137-36915-4 ISBN 978-1-137-36916-1 (eBook)
<https://doi.org/10.1057/978-1-137-36916-1>

Library of Congress Control Number: 2017951526

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Cover design by Tom Howey

Printed on acid-free paper

This Palgrave Macmillan imprint is published by Springer Nature
The registered company is Macmillan Publishers Ltd.
The registered company address is: The Campus, 4 Crinan Street, London, N1 9XW, United Kingdom

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ACKNOWLEDGMENTS

The idea of alien invasion is not entirely foreign to scholars of the past. In more than one instance in his voluminous *œuvre*, Eric Hobsbawm – arguably one of the greatest historians of the twentieth century – fantasized about the advent of extraterrestrial colleagues on planet Earth. ‘Suppose that one day, after a nuclear war, an intergalactic historian lands on a now dead planet,’ begins, for instance, his *Nations and Nationalism*, published in 1992.¹ Little did Hobsbawm know that such an obscure breed of historians from outer space had long touched down and even regularly convened at international conferences which would then, in turn, give rise to books like this one. Early versions of almost all of the 13 chapters gathered here were originally presented at such a symposium, entitled *Envisioning Limits: Outer Space and the End of Utopia* and convened together with Daniel Brandau and William Macauley in Berlin in April 2012. Those who enabled us to host an interplanetary gathering of this magnitude must be thanked first, and I would like to express sincere gratitude to both the Center for International Cooperation at Freie Universität Berlin (FU) and, in particular, the Deutsche Forschungsgemeinschaft (DFG). It is the latter institution, internationally known as the German Research Foundation, which has also been funding the Emmy Noether research group ‘The Future in the Stars: European Astroculture and Extraterrestrial Life in the Twentieth Century’ at Freie Universität Berlin, which I have had the pleasure to direct from 2010 through 2016.²

The Berlin symposium and this ensuing volume are tangible outcomes of that group’s work. *Limiting Outer Space: Astroculture After Apollo* pursues some of the problems raised and issues discussed in an earlier anthology, *Imagining Outer Space: European Astroculture in the Twentieth Century*, a companion volume published with Palgrave Macmillan in 2012 and now reissued in paperback.³ While *Imagining Outer Space* set out to establish and

contour a new field of historical inquiry – ‘astroculture’ –, the scope of the present book is more limited, yet also more narrowly focused. It is more limited because it zooms in on a single decade in the history of imagining, thinking and practicing outer space, the crisis-ridden 1970s. At the same time the volume foregrounds one particular problem, the limits of utopian thought and practice during this aptly called post-Apollo period. What both volumes have in common, however, is a cultural-interpretative approach, a commitment to combining a multiplicity of disciplinary perspectives, and the intention to push space history’s geographical focus beyond the borders of the two Cold War superpowers. *Militarizing Outer Space: Astroculture, Dystopia and the Cold War*, a forthcoming third volume in form and format identical with the existing two, will expose the ‘dark’ side of global astroculture by exploring the militant dimensions of outer space in science fiction and science fact. Concentrating on weapons, warfare and violence, *Militarizing Outer Space* will conclude the unintended ‘European Astroculture’ trilogy.⁴

Engineering such scholarly large-scale enterprises would not be possible without the help of many. Thanks are due to both the conference speakers whose presentations could, alas, not be included in this volume as well as more than a dozen commentators and discussants. Their insight and criticism shaped the original symposium and, in turn, this volume. These critical interlocutors include Philippe Ailleris, Debbora Battaglia, Peter Becker, Thomas Brandstetter, Ralf Bülow, Matthew Hersch, John Krige, Neil Maher, Patrick McCray, Lisa Messeri, Agnes Meyer-Brandis, Gonzalo Munévar, Virgiliu Pop, Claudia Schmölders, Matthias Schwartz, Helmuth Trischler, Christina Vatsella, Janet Vertesi and Thomas P. Weber. Insisting that the colors of space are black and silver, FU’s chief designer Gösta Röver developed our own visual language; her conference posters also formed the basis for the cover illustrations of all three volumes. FU photographer Hubert Graml helped prepare images for publication. Several anonymous reviewers offered invaluable criticism and pointed advice. Kayalvizhi Saravanakumar and her team oversaw the production process with equanimity and punctilious attention to detail. Audrey McClellan created the index with great professionalism and utmost care. I would also like to express my heartfelt gratitude to the contributors themselves, in particular for their patience and willingness to let me subject them to one round of revisions after another. The final word of thanks, however, must go to all members of the ‘Future in the Stars’ research group at Freie Universität Berlin. They include doctoral students Daniel Brandau and Jana Bruggmann, postdoctoral research associate Tilmann Siebeneichner as well as student assistants Björn Blaß, Ruth Haake, Friederike Mehl, Tom Reichard, Katja Rippert and Magdalena Stotter. Ruth proved particularly indispensable during the final stretches; without her, neither this book nor its editor would have survived the interminable publication process. Once the

group has dissolved in the not too distant future, I shall terribly miss working with an entire crew of intergalactic, and indeed stellar, historians. Fortunately, we still have a ways to go before our mission can be declared accomplished.

Shanghai
November 2017

Alexander C.T. Geppert

Notes

1. Eric J. Hobsbawm, *Nations and Nationalism: Programme, Myth, Reality*, 2nd edn, Cambridge: Cambridge University Press, 1992, 1.
2. A detailed conference program can be found at <http://limits.geschkult.fu-berlin.de>. For comprehensive reports see Friederike Mehl, 'Envisioning Limits: Outer Space and the End of Utopia. 19.–21. April 2012,' *H-Soz-u-Kult* (9 July 2012), online at <http://hsozkult.geschichte.hu-berlin.de/tagungsberichte/id=4303>; and idem, 'Berlin Symposium on Outer Space and the End of Utopia in the 1970s,' *NASA History News & Notes* 29.2–3 (2012), 1–5. For further information on the Emmy Noether research group 'The Future in the Stars: European Astroculture in the Twentieth Century,' consult <http://www.geschkult.fu-berlin.de/astrofuturism> (all accessed 1 October 2017).
3. Alexander C.T. Geppert, ed., *Imagining Outer Space: European Astroculture in the Twentieth Century*, Basingstoke: Palgrave Macmillan, 2012; 2nd edn, London: Palgrave Macmillan, 2018 (= *European Astroculture*, vol. 1); and idem, ed., *Astroculture and Technoscience*, London: Routledge, 2012 (= *History and Technology* 28.3).
4. Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner, eds, *Militarizing Outer Space: Astroculture, Dystopia and the Cold War*, London: Palgrave Macmillan, forthcoming (= *European Astroculture*, vol. 3).

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The 1969–72 moon landings marked a shift in planetary perspectives. Inspired by iconic NASA photographs Earthrise (1968), Blue Marble (1972) and the first picture of earth and moon captured in a single frame (1977), the cover image positions the post-Apollo spectator beyond the moon, looking back at the distant home planet from outer space. © Gösta Röver, Freie Universität Berlin.

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ABBREVIATIONS

ABM	Anti-ballistic Missile
AFOL	Adult Fan of Lego
AHR	<i>American Historical Review</i>
AIAA	American Institute of Aeronautics and Astronautics
ASAT	Anti-Satellite Weapon
ASE	Association of Space Explorers
ASTP	Apollo-Soyuz Test Project
BBC	British Broadcasting Corporation
BIS	British Interplanetary Society
BRD	Bundesrepublik Deutschland
BUL	Bulgaria
CETS	Conférence Européenne des Télécommunications par Satellites
CFE	Committee for the Future
CNES	Centre National d'Etudes Spatiales
CNN	Cable News Network
COPERS	Commission Préparatoire Européenne de Recherche Spatiale
COPUOS	Committee on the Peaceful Uses of Outer Space
COSPAR	Committee for Space Research
DDR	Deutsche Demokratische Republik
DEFA	Deutsche Film-Aktiengesellschaft
DFG	Deutsche Forschungsgemeinschaft
DFVLR	Deutsche Forschungs-und Versuchsanstalt für Luft- und Raumfahrt
DLR	Deutsches Zentrum für Luft- und Raumfahrt
DoD	Department of Defense
EEC	European Economic Community
ELDO	European Launcher Development Organization
ERNO	Entwicklungsring Nord
ESA	European Space Agency
ESOC	European Space Operations Centre
ESRO	European Space Research Organization
ET	Extraterrestrial

ETI	Extraterrestrial Intelligence
EU	European Union
EVA	Extravehicular Activity
FAZ	<i>Frankfurter Allgemeine Zeitung</i>
FR	France
FU	Freie Universität Berlin
GfW	Gesellschaft für Weltraumfahrt
HAEU	Historical Archives of the European Union
HAL	Heuristically Programmed Algorithmic Computer
IAF	International Astronautical Federation
IBMP	Institute of Biomedical Problems
ICBM	Intercontinental Ballistic Missile
IGY	International Geophysical Year
ISS	International Space Station
JPL	Jet Propulsion Laboratory
LGA	LEGO Group Archives
LSD	Lysergic Acid Diethylamide
MGM	Metro-Goldwyn-Mayer
MIRV	Multiple Independently Targetable Re-entry Vehicle
MOU	Memorandum Of Understanding
MOUSE	Minimum Orbital Unmanned Satellite, Earth
MTR	Military-Technical Revolution
n.d.	No date
n.p.	No publisher/pagination
NACA	National Advisory Committee on Aeronautics
NAS	National Academy of Sciences
NASA	National Aeronautics and Space Administration
NASM	National Air and Space Museum
NATO	North Atlantic Treaty Organization
NIEO	New International Economic Order
NRC	National Research Council
OST	Outer Space Treaty
Pan Am	Pan American World Airways
PAP	Post-Apollo Program
PL	Poland
RAE	Royal Aircraft Establishment
SDI	Strategic Defense Initiative
SDS	Students for a Democratic Society
SETI	Search for Extraterrestrial Intelligence
SKA	Stanley Kubrick Archive
SMI ² LE	Space Migration, Intelligence Increase, Life Extension
STS	Space Transportation System
SYNCON	Synergistic Convergence
TNA	The National Archives (UK)
UAR	United Arab Republic
UFO	Unidentified Flying Object
UK	United Kingdom
UN	United Nations

USA	United States of America
USAF	United States Air Force
USSR	Union of Soviet Socialist Republics
V-2	Vergeltungswaffe 2
VEB	Volkseigener Betrieb
VfR	Verein für Raumschiffahrt
WDR	Westdeutscher Rundfunk
ZDF	Zweites Deutsches Fernsehen

NOTES ON CONTRIBUTORS

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Introduction

The Post-Apollo Paradox: Envisioning Limits During the Planetized 1970s

Alexander C.T. Geppert

People aren't interested in the future any more. [...] One could say that the moon landing was the death knell of the future as a moral authority.

J.G. Ballard, 1970

We are now in an interesting transition period when we can compare the realities of space with earlier imaginings of artists.

Arthur C. Clarke, 1972¹

For much of the twentieth century, human possibilities in outer space seemed endless. Not the skies, but the stars were the limit. During the 1970s this relationship was reversed and outer space reconfigured. After the six moon landings between July 1969 and December 1972 (Figure 1.1), for many the 'unrepeatable spectacle of a lifetime,' disillusionment set in.² All successes in planetary exploration by robotic spacecraft were overshadowed by the memory and legacy of the American Apollo program. Machine-generated close-up photographs of Venus, Mars and Jupiter could not outrival a human being walking on earth's closest celestial neighbor. Against the backdrop of the raging Vietnam War and the global oil crisis of 1973/74, imaginary expansion was shrunk, bounded and

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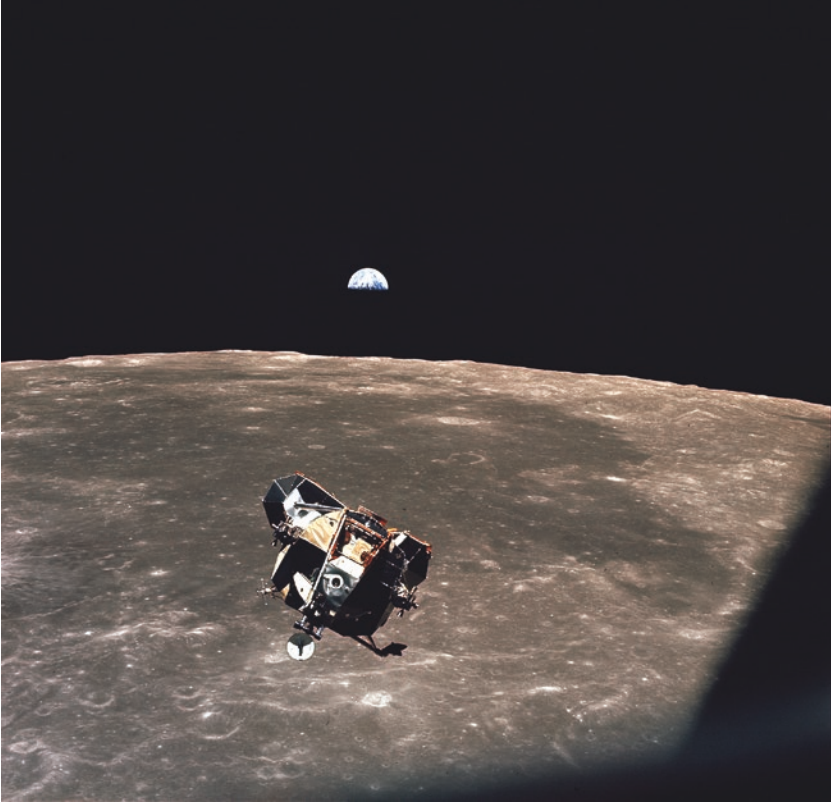


Figure 1.1 Apollo 11 lunar module ‘Eagle’ as it returned from the surface of the moon on 21 July 1969 to dock with the command module *Columbia*. While a smooth mare area is visible on the moon below, the half-illuminated earth hangs over the horizon in the background. Command module pilot Michael Collins (1930–), the NASA astronaut who took this picture when the lunar module ascent stage was about four meters away, has sometimes been described as ‘the only human alive or ever to have lived not contained within the frame of this photo.’

Source: Courtesy of NASA.

grounded. With human spaceflight confined to low-earth orbit ever since the last astronaut returned to earth, the skies once again became the limit. If the Apollo era, in particular the new picture of planet Earth as its key legacy, constituted the apogee of worldwide space enthusiasm and the apex of the global Space Age, how did the latter’s demise affect space thought and astroculture? Is the argument correct that it was during this aptly termed ‘post-Apollo period’ that the long-established link between sociotechnical imaginaries of outer space and phantasmagoric visions of a collective, imminent future in the stars loosened? And that, as a consequence, outer space itself lost much of the political relevance, cultural significance and popular appeal which it had been gaining worldwide since the mid-1920s, in particular after the end of the Second World War?

Limiting Outer Space has a triple focus. First, it zooms in on a particular time period, situated within a specific geographical setting, and foregrounds a

clear-cut historical question. Concentrating on the 1970s – according to the late New York University historian Tony Judt the ‘most dispiriting decade of the twentieth century’ – the book’s thirteen chapters examine this now widely debated transition process from expansion to reduction, often considered concomitant with disillusionment and disenchantment, from a multiplicity of disciplinary perspectives. Second, the majority of contributions aim to replace oft-repeated US- and USSR-centric narratives of a bipolar Cold War rivalry and an escalating Space Race between East and West with more nuanced, less formulaic and more comprehensive analyses, integrating and indeed featuring European, if not global views on and contributions to 1970s astroculture. Finally, chapters ask whether the new 1970s sense of ‘general space fatigue’ marked the end of that hitherto inextricably intertwined nexus between outer space and the quest for utopia, when widespread belief in infinite human expansion was superseded by the discovery of inner space.³

I The growth of limits in the decade of crisis

It has taken historians a while to realize the wide-ranging implications and indeed epochal significance of what Eric Hobsbawm termed the ‘crisis decades’ or, more drastically: ‘the landslide.’ With the first oil-price shock of 1973/74, the standard argument now goes, an unprecedented quarter-century-long boom era came to an end in the West. The *trente glorieuses* had been a long period of relative political stability that was characterized by rapid economic growth, material prosperity for larger sections of society than ever before, and a reassuring sense of having successfully overcome two devastating world wars.⁴ In March 1972, more than a year prior to the oil crisis, the Club of Rome had published its notorious 600-page *Limits to Growth* study on the ‘predicament of mankind.’ Translated into 35 languages and selling 9 million copies worldwide, the book’s computer-based predictions for the future seemed to be validated by the unfolding course of events.⁵ During the following years, a new sense of worldwide interconnectedness and global interdependence found its counterpart in the individualization of society and a withdrawal from the collective to the self. In an oft-cited article, American writer Tom Wolfe (1931–) coined the term ‘Me Decade’ to portray an ego-centered generation that had replaced ‘man’s age-old belief in serial immortality’ with a narcissistic ‘I have only one life to live.’ The golden postwar era thus gave way to a less romantic, less optimistic and much more troubled, if not entirely ‘lost,’ decade, as contemporary observers in both Europe and the United States were quick to point out. ‘In the long run,’ *Time* magazine forecasted correctly, ‘this decade and the next may well constitute an historical era of transition.’⁶

A majority of contemporary historians now echo these contemporaneous readings, impressionistic, unsystematic and incomplete as they may have been both then and now. Hardly surprising, economic and environmental historians were among the first to draw attention to the decade’s transformative character. The former declared the 1970s ‘of great interest for the economic and social historian,’ while the latter pointedly termed the all-encompassing reinterpretation

of the man-environment relationship during these years the ‘1970s diagnosis.’⁷ Within the past decade or so, literature on the so-called long 1970s, usually understood as lasting through the conservative turn of the early 1980s, has mushroomed both in European⁸ and American historiography.⁹ Contrary to usual experience, a rare consensus has eventually emerged among ‘general’ historians that the 1970s are to be regarded as a key period in the history of the twentieth century. Standing for structural rupture and constituting an epochal caesura, they should be conceptualized as a major turning point. Accordingly, a plethora of competing labels has been created to come to terms with a decade once overhastily described as a time when nothing happened: the 1970s as the ‘end of confidence,’ ‘the age of fracture,’ the period ‘after the boom,’ the ‘decade without a name’ that nonetheless constituted the ‘threshold of change,’ or the moment in time when all of a sudden the ‘shock of the global’ set in, simultaneously limiting and liberating. Others, somewhat predictably, have objected to any such forms of ‘decadology,’ as if historians were not well aware of their periodizations’ artificial character, necessitated by professional pragmatism to come to terms with change over time.¹⁰ There is opportunity in every crisis, goes another trite cliché, and labeling the 1970s as a global crisis consequentially leads to emphasizing their Janus-facedness, as a period of inertia *and* change, when the established post-Second World War consensus was revoked while giving way to the rise of post-industrial society in Europe and the world that dominates today’s planetized present.¹¹

As consequence and effect of such a structural rupture, not the least in contemporary self-understanding, the future changed its character during these years as well, often considered an unmistakable sign of epochs drawing to a close. ‘My children, or today’s teenagers, they are not interested in the future,’ English novelist J.G. Ballard (1930–2009) deplored in a 1970 interview with British *Penthouse* magazine. ‘What you see is the death of outer space, the failure of the moon landing to excite anyone’s imagination on a real level, and the discovery of inner space in terms of sex, drugs, meditation, mysticism,’ Ballard stated, thus giving expression to a frequently diagnosed assessment of the 1970s as a self-questioning time of troubles that looked neither forward nor outward but backward and inward.¹² Retrospection replaced prospectation. Continual progress, exponential growth and outward expansion – previously considered the basis of incessant improvement of the human condition by means of technoscience – went into reverse. Large-scale technology ceased to be the trustworthy engine of societal change and humankind’s betterment proved itself a problem, if not indeed its very obstacle.

Images and imaginaries of outer space and spaceflight, vastly popular and usually utopia-saturated in previous decades, changed correspondingly. Three cover images of the West German weekly *Der Spiegel* – published in 1966, 1970 and 1979, respectively – illustrate the shifting space-future nexus over the course of the decade. Quoting at length Arthur C. Clarke (1917–2008), British techno-prophet bar none, the *Spiegel*’s 6 December 1966 issue indulged in 1960s technocratic planning fervor. The future could be forecast because it was man-made and therefore controllable (Figure 1.2). Published



Figure 1.2-4 From planning fervor to threat via irrelevance: changing expectations for the future over the course of the 1970s as illustrated by the West German weekly *Der Spiegel*. The headlines translate as ‘Futurology: Man’s Future is Being Planned’ (1966, left), ‘The Seventies: Planless into the Future?’ (1970, center) and ‘Skylab Falls to Earth: Danger for Mainz?’ (1979, right). Mainz, the capital of Rhineland-Palatinate, was the largest German city lying within the forecasted hazardous zone. *Source:* Courtesy of *Der Spiegel* 20.53 (6 December 1966); 24.1 (5 January 1970); 33.27 (2 July 1979).

only a couple of years later, the *Spiegel's* 5 January 1970 issue denounced the formerly utopian ideal of total feasibility not only as outmoded ideology but as the very 'trauma of the modern world' (Figure 1.3). Scenarios of future expansion into outer space were now marginalized; the only mention of spaceflight in this 12-page feature was an image of a moon colony illustrating the article. In a third *Spiegel* cover story published in 1979, another nine years later, space was no longer a futuristic promise nor an irrelevant epiphenomenon but had transformed into an otherworldly threat. Dangerous debris raining down from Skylab (1973–79), the decommissioned and long uninhabited first American space station, might cause considerable damage upon re-entry, the article warned its readers (Figure 1.4).¹³

The same modernist faith in technoscientific rationalism that had propelled the Apollo program into the 1960s skies and beyond was feared to be falling from the heavens at the end of the 1970s. Ballard, commenting in another *Penthouse* interview conducted a decade later, agreed. 'The world of "outer space," which had hitherto been assumed to be limitless, was being revealed as essentially limited, a vast concourse of essentially similar stars and planets whose exploration was likely to be not only extremely difficult, but also perhaps intrinsically disappointing,' the writer pointed out. For him, the Space Age had irrevocably ended in 1974, when the last Skylab mission returned to earth, having long given way to an era of limits in which the future developed in one direction only – toward home. 'The twentieth century began with a futuristic utopia and ended with nostalgia. Optimistic belief in the future was discarded like an outmoded spaceship,' literary scholar Svetlana Boym has summarized this drastic volte-face in hindsight. The turn from a prospective and extroverted to a retrospective and introverted reasoning simultaneously marked the inglorious end of the much celebrated Age of Space.¹⁴

That outer space, whether imagined, journeyed or feared, should have played a key role in the genesis of the 1970s as a transitional period might surprise middle-of-the-road historians of the twentieth century more than experts in space history.¹⁵ 'Post-Apollo period' – the term suggested here to characterize the decade *succeeding* the classical Space Age, namely the time period from December 1972 until the early 1980s – is an example of how mainstream historiography – in this case 1970s scholarship in particular – and space history can supplement, illuminate and enrich each other.¹⁶ The benefit is mutual: on the one hand, 'post-Apollo' provides students of outer space, spaceflight and astroculture with a broader intellectual and conceptual context, which in turn allows them to situate their analyses within a recognized interpretative framework to which general historians can equally relate. On the other hand, christening the 'decade without a name' the 'post-Apollo period' suggests that the end of the postwar consensus, the widely shared sense of societal crisis, the growth of limits and the oft-noted introspective spirit of the 1970s did not only coincide but also shared a common denominator. It is not by chance that humankind's outward movement correlated with a new sense of planetized globality; the irony is that both only emerged *after* the classical Space Age had drawn to a close.

II The Post-Apollo paradox

According to contemporaneous experts, the historical assessment would be unambiguous. When asked what the American Apollo missions *meant* for mankind and how their societal impact was to be characterized then and in the future, American, British, French and German historians, anthropologists, philosophers, scientists and public intellectuals all but agreed. According to notables such as Arnold M. Schlesinger Jr., Arnold J. Toynbee, C.P. Snow, Margaret Mead, Claude Lévi-Strauss, Hoimar von Ditfurth and many other *hommes de lettres*, landing a man on the moon was an unprecedented achievement of unforeseen dimensions which later generations would hail as an epoch-making step in human history. ‘The twentieth century will be remembered,’ historian Schlesinger forecasted in 1972 in a later oft-repeated statement, ‘as the century in which man first burst his terrestrial bonds and began the exploration of space.’¹⁷ Yet, as to what characteristics and societal consequences the just-entered Moon Age would entail, the experts were divided. Some reckoned the moon to be a stepping stone toward the discovery of new worlds and their imminent colonization, while others warned of a rise of ‘cosmic claustrophobia’ should humankind fully comprehend its aloneness throughout the universe. ‘Was the voyage of Apollo 11 the noblest expression of a technological age, or the best evidence of its utter insanity?’, wrote Norman Mailer (1923–2007), bringing the dilemma to a head.¹⁸ A third, originally less prominent, reading suggested that the truly alien planet and the only newly discovered frontier was, indeed, planet Earth itself. Bridging unparalleled physical distances and reaching a new vantage point in space made it possible to turn the gaze around, to look back and inward rather than forward and outward. Accordingly, the most precious souvenirs brought along from the journey were neither the pictures of Neil Armstrong’s footprints on the moon’s gray, dusty surface nor the 382 kilograms of lunar rock the six missions brought back, but rather two unplanned, low-priority by-products of the \$20 billion Apollo program, ‘Earthrise’ (1968) and ‘Blue Marble’ (1972). Two photographs of the home planet, epitomizing this newly reversed perspective from without, proved the program’s inadvertent legacy.

Present-day geographers, historians, art historians and philosophers have readily taken up and now widely echo this third reading, arguably elevating it to one of the few widely accepted standard arguments in space history. Geographer Denis E. Cosgrove has attested to Earthrise and Blue Marble having ‘altered the shape of the contemporary geographical imagination,’ whereas historians Robert Poole and Benjamin Lazier have, respectively, declared Earthrise as providing the ‘defining moment of the twentieth century’ which gave rise to an entire ‘Earthrise era.’ Similarly, art historian Horst Bredekamp has used philosopher Peter Sloterdijk’s notion of a ‘Copernican revolution of the gaze’ to argue that Blue Marble became the image of earth par excellence as it allowed for a complete reversal of viewing directions only possible from an extraterrestrial standpoint. Distance made for a reorientation and complete reversal of perspective, which in turn led literally to a

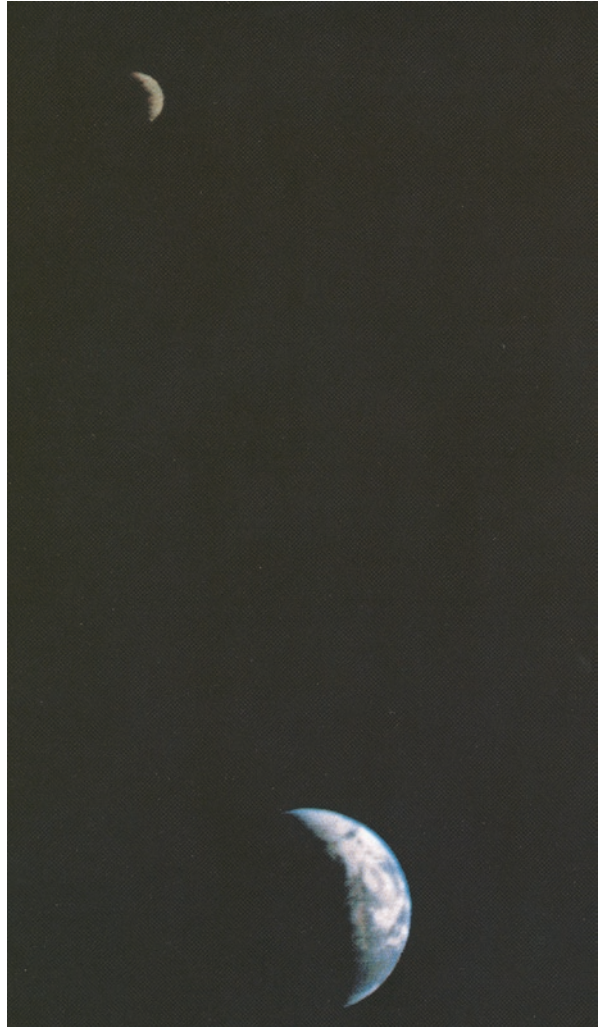
new *Weltanschauung* on earth.¹⁹ Following these and other assessments, the Apollo program did indeed prove epoch-making – albeit hardly for the reasons put forward by the majority of observers, analysts and critics at the time. Apollo was not tantamount to a caesura in human history because it meant twelve men walking on earth’s closest celestial body, but because the spacefarers, acting as representatives of all of humankind, returned with portraits of everyone’s communal home, the world’s first selfie.

The minority of experts who had predicted that jaunting into outer space would, paradoxically, lead to a rediscovery of *inner* space were correct. As some had argued as early as 1965, ‘man’s thrust into outer space’ proved ultimately a return to himself. Correspondingly, when in 1977, five years after the end of the Apollo program, US probe Voyager 1 sent back a color photograph that showed earth and moon floating together in the vast darkness of outer space, public resonance was limited. Lacking the implicit ‘human touch’ of the earlier souvenirs, the novelty of this machine-generated image was not sufficient to excite the public anew, and neither did it make front-page headlines (Figure 1.5).²⁰

How then to connect this new, earth-centered image of outer space featuring *planet* Earth with the transitional 1970s, and why suggest labeling these years the ‘post-Apollo period’? Signalling its problematique in its very name, post-Apollo denotes a period, a program and a problem. First, the term obviously refers to the time period *after* the completion of the Apollo missions in 1972.²¹ Second, it also stands for NASA’s spaceflight program by the same name, first discussed in Congress in August 1965, laid out in a September 1969 report and culminating in President Richard Nixon’s announcement on 5 January 1972 in which he committed to build the Space Shuttle. Vehemently debated nationally and internationally, the task was to find an answer to the question of where the American nation would ‘go in space in the Post-Apollo period.’ As historian John M. Logsdon has argued, the set of decisions made during those three short years defined human spaceflight activities in the United States for the next four decades, until the termination of the Shuttle program in 2011.²² But in addition to marking a historical time period and denominating a national space policy of long-term impact, post-Apollo also points, third, to a particular historical problem: the Post-Apollo paradox. As the contributions to this book testify, neither spaceflight nor astroculture ceased to exist during the 1970s, even if their already complex relationship further loosened once the future moved elsewhere and enthusiasm began to dwindle all the more.²³ Yet, it was precisely at this moment in time that, by many accounts, the world-encompassing process of international entanglement now usually referred to as globalization finally unfolded with full force. That the term ‘global’ took on its contemporary theoretical connotations in the early 1970s and turned into the conceptual category so familiar today is not a coincidence but a by-product of the post-Apollo period.²⁴

Surprisingly absent from the flourishing historiography is the causal connection between the heyday of space exploration, space thought and astroculture of the 1950s and 1960s, and the sense of crisis and incipient globality of

Figure 1.5 Recorded by NASA's Voyager 1 spacecraft on 18 September 1977, this photograph was the first complete image of earth and moon together in a single frame. The spacecraft had been launched two weeks earlier, on 5 September 1977, and was at this point 11.7 million kilometers away. Voyager 1 passed the boundaries of the solar system in 2012 and continues to travel in interstellar space, making it to date the farthest human-made object away from planet Earth. *Source:* Courtesy of NASA.



the 1970s. 'Achievement of the Apollo goal resulted in a new feeling of "oneness" among men everywhere,' the aforementioned 1969 US report stated, stipulating that any subsequent program would have to continue promoting a similar 'sense of world community.'²⁵ In addition to such imaginative repercussions, while difficult to distinguish from their propagandistic value, there was also a more tangible technological component behind the globalizing impact of the Space Age whose significance is easily overlooked: the incipient telecommunication satellite revolution. According to contemporaneous estimates no fewer than 7,600 satellites were launched between October 1957 and 1975 alone. Even though the vast majority is no longer operational, together with undersea cables they constituted the key infrastructure for

processes of world-encompassing interconnectedness and increasing global entanglement.²⁶ Thus, the polymorphic and multinational thrust into outer space after the Second World War was a major factor in making our planet as planetized as it is. Indeed, it is arguably the most unintended *and* most far-reaching consequence of the reach for the stars, both realized and imagined.

And this is the very ‘Post-Apollo paradox’: the full impact of the Space Age only came to the fore when it had by most accounts effectively passed, with 1970s astroculture proving more earth-centered than previous imaginaries. Because the post-Apollo period was characterized by epochal change for which spaceflight proved a central motif, space historian Martin Collins has suggested terming it the ‘in-between decade.’²⁷ Another historian has argued that the 1970s marked as much the end of the *trente glorieuses* as they constituted the beginning of a new epoch of globalization and individualization. If this is accurate, the paradigmatic shift in humankind’s self-understanding – caused by a temporary departure from home as well as earth’s communicative coalescence based on space-placed infrastructures – was a decisive factor in this transition.²⁸

III Spaceflight after Apollo

On closer inspection, spaceflight during the post-Apollo period was far from being ‘marked by matter-of-factness rather than by lofty visions,’ but the 1970s proved indeed a time of disenchantment, disillusion and disengagement. Not only in the United States but also in Europe and the Soviet Union, outer space lost much of its capacity to arouse and engage divergent publics.²⁹ In January 1972, Nixon announced the new Post-Apollo Program which would ‘revolutionize transportation into near space by routinizing it’ and ‘take the astronomical costs out of astronautics.’ Featuring a ‘space vehicle that can shuttle repeatedly from earth to orbit and back’ in addition to a space station, a lunar base and a manned voyage to Mars, the program would take a decade to produce tangible results.³⁰ Between the Apollo-Soyuz Test Project (ASTP) in July 1975 – the first docking of a US and a Soviet spacecraft in earth orbit that symbolized for many the end of the Space Race – and the maiden Space Shuttle launch in April 1981 there was a gap of almost six years without a manned US mission.

Judged by public memory, this ‘post-Apollo, pre-Space Shuttle interregnum’ lasting from 1975 through 1981 looks indeed unremarkable.³¹ Preceding decades had each been characterized by a single dominating event, each with diverse and wide-ranging repercussions: the late 1920s by the first space ‘fads’ in the Soviet Union, Europe and the United States; the 1940s by the development of the A4/V-2 and the ‘invention’ of the flying saucer in 1947; the 1950s by the launch of Sputnik, the first artificial satellite; the 1960s by Yury Gagarin’s orbit of planet Earth in 1961 and, of course, the Apollo moon landings. The 1980s, on the other hand, were under the sign of the Space Shuttle, subject to a first catastrophe only five years after its first launch, while the 1990s saw the initial steps toward the assembly of the most cost-intense

civilian project ever undertaken, the International Space Station (ISS). But the 1970s? While the classical Space Age came to a symbolic close with astronaut Eugene Cernan (1934–2017) stepping off the moon on 14 December 1972, spaceflight and space exploration continued in a variety of ways.

As a necessary historical grounding of the chapters that follow, four parallel strands of this post-Apollo, pre-Shuttle period need to be sketched: first, the renewed emphasis, both in East and West, on positioning space stations in earth orbit; second, the surprising interdependence between planetary exploration on the one hand, and the new interest in the search for extraterrestrial intelligence (SETI) on the other; third, the sweeping, yet short-lived space colonization fad during the second half of the 1970s; and, fourth, the so-called rebirth of Space Age Europe throughout this decade of transition and reconfiguration.

First, although Apollo did indeed ‘end up as a dead end project’ at the peak of its acclaim, as historian Logsdon has remarked, its hardware had a material afterlife as it continued to be used for Skylab and the Apollo-Soyuz Test Project.³² Partially assembled from recycled leftovers and less specialized than later space stations, Skylab was launched in May 1973. It remained circling earth in a low orbit of 480 kilometers for much of the 1970s, even if its so-called Orbital Workshop was only inhabited for a total of 171 days during the first two years of operation. A similar return to a much older itinerary, namely the positioning of a space station in earth orbit rather than directly going to the moon or beyond, occurred simultaneously in the Soviet Union. Beginning in 1971 and lasting through 1986, that is over a period of 15 years, its Salyut program consisted of a series of six crewed space stations positioned in earth orbit, four of them civilian, two military.³³

Second, the 1970s were a surprisingly successful period for the robotic exploration of the solar system. Launched in May 1971, Mariner 9’s orbital survey of Mars revealed entirely unexpected canyons, volcanoes and signs of massive floods in the planet’s distant past. In March 1972 and April 1973, respectively, the Pioneer 10 and 11 probes were sent to Jupiter and Saturn, carrying the famous aluminum plaque picturing two naked human bodies against the backdrop of a map of pulsars. And in the fall of 1975, the Soviet Venera 10 probe survived all the way to Venus and returned a photograph during the 65 minutes of its operation on the surface. Together, these robotic missions gave rise to the ‘Golden Age of planetary exploration,’ as American science celebrity and media personality Carl Sagan (1934–96) had it, himself co-creator of the Pioneer plaque and one of the most influential 1970s space *personae*.³⁴

However, the two most momentous of all these robotic undertakings were arguably the 1975 Viking missions to Mars and the two Voyager launches in 1977. While Voyager 1 was sent to Jupiter and Saturn and then continued on a trajectory beyond the solar system (see Figure 1.5 above), the photographs the two Viking probes sent back from barren Mars in 1976 found more immediate, if ambivalent, societal resonance. They contributed to the widespread recognition of humankind’s cosmic isolation as much as they granted the sometimes ridiculed search for extraterrestrial intelligence new legitimacy.

Precisely because no immediate signs of life were detected anywhere on Mars, the Viking missions proved central for the emerging scholarly field of exobiology, soon to reinvent itself as astrobiology. Encouraged by opinion polls that nonetheless reported widespread belief in life on other planets, both futurist and bestselling *Future Shock* author Alvin Toffler (1928–2016) and noted anthropologist Sol Tax (1907–95) lent the contested discipline societal legitimacy by their sheer support.³⁵

Third, fueled by the Club of Rome's gloomy predictions, triggered by a growing concern for imminent environmental disaster and inspired by the Skylab missions, grandiose space colonization scenarios witnessed a brief burst of popularity in the second half of the 1970s, in the United States more so than in Europe (see Figure 1.6). 'After you have landed 12 men at six locations on the moon to walk and jeep around scooping up rock samples, kept a space station manned for a total 171 days, and landed two robot spacecraft on a planet more than 200 million miles away from Earth, what do you do for an encore?', one mid-1970s commentator could not help but wonder. To solve problems of overpopulation and counter the abiding energy crisis, for some the answer lay in bypassing the boundaries of a 'sharply limited planet' by transferring entire populations into space.³⁶ The leading advocate of such large-scale expansion scenarios soon became Princeton physicist Gerard K. O'Neill (1927–92). Having originally developed his concepts during the late 1960s, O'Neill first published a triad of articles in *Nature*, *Physics Today* and *Science* in 1974 before making headline news in mainstream media in 1976 and 1977. 'Is a planetary surface really the best place for an expanding technological civilization?', O'Neill asked rhetorically in a *New York Times* article before going on to prophesy that 'thousands of people now alive may choose within the next two decades to live and work on a new frontier in space.'³⁷ Especially in his 1976 book *The High Frontier* O'Neill presented detailed concepts for a permanent human presence in outer space, envisioning large manned colonies at L5 – one of five points in space where the gravitational fields of the earth and the moon balance each other and where a space station could remain stable. Completed by the early 2000s, these human colonies would be constructed with unlimited raw materials from the moon and later the asteroid belt, spun to simulate gravity and employ light reflected from the sun for illumination, power and infinite energy. Proclaiming that 'water and food are no limits on the range of the human species in space,' O'Neill ultimately aimed to reinstate an idea of infinite boundlessness during the era of limits, what he addressed as the 'humanization of space.'³⁸

Widespread as it was, the popularity of such colonization scenarios proved also short-lived, and by the end of the 1970s futuristic megastructures of this magnitude were largely transferred into virtual computer worlds. Despite popularization attempts by space advocates and architects such as Duncan Lunan (1945–) in Great Britain and Fritz Haller (1924–2012) in Switzerland, space colonies never seem to have found the same cultural resonance in Europe.³⁹ Nonetheless, the European Space Agency (ESA) responded dutifully when a high-school student asked for its particular stance on such



Figure 1.6 Interior of an imaginary post-Apollo space colony. The original caption read ‘Main Street, Hometown, Cosmos finds colonists on the move, passing the stacked, modular habitations and shops of L-5. Fruit trees relieve the stark simplicity of a manufactured environment. The alumni of earth can order buildings, climate, and sunlight to suit. Yet L-5 is no playground in the void. Hardworking pioneers make it the latest outpost on a limitless frontier.’

Source: Isaac Asimov, ‘The Next Frontier?’, *National Geographic* 150 (July–December 1976), 76–89, here 80. Painting by Pierre Mion.

expansion scenarios, seizing the opportunity to sell its own Spacelab project as a more feasible alternative:

It is beyond doubt that space colonies are a real possibility for the future. Our Agency, however, has not been doing extensive work on such colonies but we are [...] developing [...] a space laboratory, the Spacelab, which will be a manned laboratory to be flown on the Space Shuttle. This Spacelab could very well evolve into a space station by linking different Spacelabs together in space.⁴⁰

Fourth and finally, in the case of Western Europe, there was yet another ironic twist to the Post-Apollo paradox. One of NASA's main motives for seeking European involvement in its Post-Apollo Program was to counter a lack of public enthusiasm. Having more international partners would not only help to share some of the risks and expense, they reasoned, but also demonstrate that space exploration was the humanitarian task par excellence, only to be fulfilled on a truly global scale. European participation would be 'the most ambitious nonmilitary effort ever undertaken collectively by the West European nations,' the *New York Times* rejoiced somewhat prematurely.⁴¹ For Western Europe, the invitation proved a double-edged sword as it allowed Europe to play a more active role on the international scene than ever before, but it also brought home the urgent need to completely reorganize the hitherto ill-starred European spaceflight program. After complex political struggle and organizational reform, ESA was officially established in 1975, replacing its predecessors, the European Launcher Development Organization (ELDO) and the European Space Research Organization (ESRO). While Europe's position, visibility and significance were indeed stronger than ever before – eventually emblemized by the successful launch of the first European-built Ariane 1 rocket on Christmas Eve 1979 from the spaceport in Kourou, after a decade of failures – the timing of its eventual lift-off in space was less than ideal. What space history veteran Walter McDougall has termed the 'rebirth of Space-Age Europe' took place when popular enthusiasm for space exploration and astroculture had long been in decline. Yet, from an institutional perspective the post-Apollo crisis largely meant a pre-Ariane *Aufbruchstimmung* or promise of departure, with Europe's much more limited participation in NASA's Post-Apollo Program itself providing a 'formative experience.'⁴²

IV Limiting outer space

If the 1970s were contemporaneously perceived as an age of boundaries impinging on man's project in outer space, at odds with formerly close connections between expansion fantasies and humankind's futurity, what effect did the general sense of crisis have on pre-existing imaginaries of outer space and extraterrestrial life? How were the new limits reflected, integrated and challenged by then-current visions of cosmic utopias and the disenchanting

realities of spaceflight after Apollo? And were human boundaries effectively challenged, if not entirely transformed, in outer space? As a contribution to historical research on astroculture – a concept previously introduced and defined as the interplay of different social groups and heterogeneous cultural forms aiming to ascribe meaning to the infinite void that surrounds planet Earth – *Limiting Outer Space* focuses on what Arthur Clarke termed ‘an interesting transition period’ that allows one to ‘compare the realities of space with earlier imaginings of artists.’⁴³ It is noteworthy that in private correspondence Clarke was far more blunt and less upbeat than this, and repeatedly lamented the ‘present malaise’ when referring to the situation post-Apollo. ‘The human activity to which I have mainly devoted my life is in decline,’ agreed his old friend Arthur ‘Val’ Cleaver (1917–77) from the British Interplanetary Society wholeheartedly.⁴⁴ Concentrating on this decade of crisis, disenchantment and reconfiguration, *Limiting Outer Space* explores a pivotal transition in imagining the cosmos and projecting utopian dreams into outer space. Inspired by and contributing to the ongoing historiographical reassessment of the 1970s, it argues that the post-Apollo period constituted a crucial, if hitherto underrated and understudied, era in the history of space, spaceflight and space thought that awaits closer scrutiny and smoother integration into mainstream historiography, just like space history itself.

While it would be unwise for a book that carries ‘Apollo’ in its subtitle to leave the most celebrated human spaceflight program aside, the geographical focus lies decidedly elsewhere, particularly in Western Europe, with all its complex transnational and intercontinental interdependencies.⁴⁵ It is, however, worth remembering that before the late 1970s, no human being from any nation other than the Soviet Union or the United States had left planet Earth. The first Eastern European in outer space was the Czech cosmonaut Vladimír Remek (1948–) onboard Russian Soyuz 28 spacecraft in March 1978, while French spationaut Jean-Loup Chrétien (1938–) followed four years later, in June 1982, onboard Soyuz T-6. Chrétien’s seven-day mission to the Salyut 7 space station made him not only the first Western European but also the first Western non-American beyond the earth’s atmosphere ever. Participating as payload specialist in STS-9, the ninth NASA Space Shuttle mission in November and December 1983, West German Ulf Merbold (1941–) was the first ESA astronaut proper in space. To date, no European has flown on a European-built spacecraft.⁴⁶

This book’s thirteen chapters – including this introduction and an epilogue – are grouped in three sections: ‘Navigating the 1970s,’ ‘Reconfiguring Imaginaries’ and ‘Grounding Utopias.’ The first part – ‘Navigating the 1970s’ – addresses the 1970s as the great division of the postwar years and aims to periodize the post-Apollo period accordingly. It includes a sweeping reconfiguration of some of the major conceptual issues associated with recent historiographical work on the 1970s as the ‘in-between’ period of twentieth-century change (Martin Collins); an essay on Great Britain’s space program after the cancelation of its short-lived Black Arrow rocket program

in July 1971, asking whether a particularly British variant of European astroculture can be identified (Doug Millard); and a chapter on the historical significance, societal impact and long shadow that the Apollo program cast over expectations for the future in the United States but also worldwide (Roger D. Launius).

The second section – ‘Reconfiguring Imaginaries’ – comprises four chapters dealing with manifestations and exemplars of 1970s European and global astroculture. It opens with a chapter tracing the history of Stanley Kubrick’s 1968 feature film *2001: A Space Odyssey* from Arthur Clarke’s 1951 science-fiction short story ‘The Sentinel’ through the novel *Journey Beyond the Stars* (1964) to the making of *2001* as a cult film, widely considered the most important space movie ever produced (Robert Poole); an analysis of the 1970s self-reflexive turn in English-language literature, as exemplified in the works of novelists Doris Lessing, A.S. Byatt and John Banville, all from non-spacefaring nations (Florian Kläger); a chapter on Legoland Space, the Danish toy company’s hugely successful line created in 1978 as an example of the sacralization of modern consumer culture and intergenerational communication of values through material culture (Thore Bjørnvig); as well as a careful analysis of the international negotiations leading to the adoption of the United Nations’ Outer Space Treaty in January 1967 and the Moon Agreement in December 1979, focusing on the competing normative and political rationales that informed the former’s perceived success and the latter’s failure (Luca Follis).⁴⁷

Chronologically situated toward the end of the ‘long’ 1970s, that is the early 1980s, the third and final section – ‘Grounding Utopias’ – focuses on spacefarers, space stations and space colonies in science fiction and in science fact. This part features a chapter that examines three distinct collaborative moments – the Soviet Union’s Interkosmos program created in 1970, the Apollo-Soyuz Test Project of 1975 and the establishment of the Association of Space Explorers in 1985 – as supranational attempts to promote international détente through spaceflight technology, propagating planetary consciousness as an alternative (Andrew Jenks); a comparative analysis of imaginary space architectures, be they located in ground-based laboratories, in outer space itself or as part of film sets, all probing the human-technology relationship during the post-Apollo period (Regina Peldszus); a chapter on the transnational media coverage of Spacelab, the European showcase project of the 1970s and early 1980s intended to signal Western Europe’s active participation in, if not independent entry into, manned spaceflight (Tilmann Siebeneichner); and a contribution on the ways in which 1970s space-colony enthusiasts mingled with nuclear-weapon designers and military planners, effectively creating the foundations for Ronald Reagan’s 1983 Strategic Defense Initiative (SDI), also known as Star Wars (Peter J. Westwick).⁴⁸ Finally, David A. Kirby’s comprehensive epilogue reminds us how the grand expectations and celebrations of Space-Age accomplishments gave way to a

growing awareness of the problems humankind faced on earth in the post-Apollo period. Dystopian, bleak and at times despairing science-fiction films set in space such as *Earth II* (1971), *Silent Running* (1972), *Solaris* (1972), *Soylent Green* (1973), *La Planète sauvage* (1973), *Dark Star* (1974), *The Man Who Fell to Earth* (1976), *Operation Ganymed* (1977) and *Alien* (1979) left no doubt that space exploration was no longer considered the key technology to solving terrestrial problems from without.⁴⁹

Linking and interrelating the history of astroculture, space thought and spaceflight with recent scholarship on the social and political history of the 1970s, *Limiting Outer Space* aims to correct, complement and reorient the existing historiography on the post-Apollo period. Focusing on selected European countries – in particular Great Britain, France, West Germany and Denmark – its thirteen chapters examine the limiting of outer space and the grounding of utopia after the American moon landings. Rather than invoking oft-repeated narratives of a bipolar Cold War rivalry and an escalating Space Race between East and West, the book charts new historiographical ground by exploring a hitherto underappreciated decade in space history. With the rapid waning of what European observers termed *Apollo-Rausch* or Apollo frenzy, the classical Space Age gave way to an era of space fatigue and planetized limits: the post-Apollo period.⁵⁰

Notes

1. J.G. Ballard and Lynn Barber, 'Sci-Fi Seer,' *Penthouse* [UK] 5.5 (May 1970), 26–30, here 27; Arthur C. Clarke, 'Foreword,' in Patrick Moore and David A. Hardy, eds, *The New Challenge of the Stars*, London: Mitchell Beazley, 1972, n.p. Thanks are due to Stephen Gross, Ruth Haake, Michael Neufeld, Robert Poole, Tom Reichard, Emily Rosenberg, Tilmann Siebeneichner and, as always, Anna Kathryn Kendrick.
2. Laurence Goldstein, 'Introduction,' in idem, ed., *The Moon Landing and its Aftermath*, Ann Arbor: University of Michigan, 1979 (= *Michigan Quarterly Review* 18.2), 153–4, here 153.
3. Tony Judt, *Postwar: A History of Europe Since 1945*, New York: Penguin, 2005, here 477; *Westdeutsche Allgemeine Zeitung* 161 (15 July 1978): 'allgemeine Weltraummüdigkeit.' Pertinent to the Apollo years yet self-limiting to the United States is Matthew D. Tribbe's recent *No Requiem for the Space Age: The Apollo Moon Landings and American Culture*, Oxford: Oxford University Press, 2014.
4. Eric Hobsbawm, *The Age of Extremes: A History of the World, 1914–1991*, New York: Pantheon, 1994, chapter 14: 'The Crisis Decades,' 403–32; Jean Fourastié, *Les trente glorieuses: Ou, la révolution invisible de 1946 à 1975*, Paris: Fayard, 1979.
5. Donella H. Meadows, Dennis L. Meadows, Jørgen Randers, William W. Behrens III and Club of Rome, *The Limits to Growth: A Report for the Club of Rome's Project on the Predicament of Mankind*, New York: Universe Books, 1972. The literature is vast but see, for example, Mauricio Schoijet, 'Limits to Growth and the Rise of Catastrophism,' *Environmental History* 4.4 (October 1999), 515–30, and, above all, Helga Nowotny, 'Vergangene Zukunft:

- Ein Blick zurück auf die “Grenzen des Wachstums,” in Michael Globig, ed., *Impulse geben – Wissen stiften: 40 Jahre VolkswagenStiftung*, Göttingen: Vandenhoeck & Ruprecht, 2002, 655–94, here 663.
6. Tom Wolfe, ‘The “Me” Decade and the Third Great Awakening,’ *New York* (23 August 1976), 26–40, here 40; ‘From the ’60s to the ’70s: Dissent and Discovery,’ *Time* 94.25 (19 December 1969), 20–6, here 20, 22.
 7. Richard Coopey and Nicholas Woodward, ‘The British Economy in the 1970s: An Overview,’ in eidem, eds, *Britain in the 1970s: The Troubled Economy*, London: UCL Press, 1996, 1–33, here 2; Patrick Kupper, ‘Die “1970er Diagnose”: Grundsätzliche Überlegungen zu einem Wendepunkt der Umweltgeschichte,’ *Archiv für Sozialgeschichte* 43 (2003), 325–48, here 328. For review essays on 1970s historiography, see Rodney Lowe, ‘Life Begins in the Seventies? Writing and Rewriting the History of Postwar Britain,’ *Journal of Contemporary History* 42.1 (January 2007), 161–9; Martin H. Geyer, ‘Auf der Suche nach der Gegenwart: Neue Arbeiten zur Geschichte der 1970er und 1980er Jahre,’ *Archiv für Sozialgeschichte* 50 (2010), 643–69; Lawrence Black, ‘An Enlightening Decade? New Histories of 1970s’ Britain,’ *International Labor and Working-Class History* 82 (Fall 2012), 174–86; and Barbara Keys, Jack Davies and Elliott Bannan, ‘The Post-Traumatic Decade: New Histories of the 1970s,’ *Australasian Journal of American Studies* 33.1 (July 2014), 1–17. Although US-centered and by no means as ‘global’ as its title promises, the best of the existing 1970s syntheses is arguably Thomas Borstelmann’s *The 1970s: A New Global History from Civil Rights to Economic Inequality*, Princeton: Princeton University Press, 2012, with Andy Beckett’s fabulous account of the UK, *When the Lights Went Out: Britain in the Seventies*, London: Faber & Faber, 2009, a close second.
 8. For Europe, see in chronological order and without any claim to completeness: Gerhard A. Ritter, Margit Szöllösi-Janze and Helmuth Trischler, eds, *Antworten auf die amerikanische Herausforderung: Forschung in der Bundesrepublik und der DDR in den ‘langen’ siebziger Jahren*, Frankfurt am Main: Campus, 1999; Charles S. Maier, ‘Two Sorts of Crisis? The “Long” 1970s in the West and the East,’ in Hans Günter Hockerts, ed., *Koordinaten deutscher Geschichte in der Epoche des Ost-West-Konflikts*, Munich: Oldenbourg, 2004, 49–62; Hartmut Kaelble, ‘Vers une histoire sociale et culturelle de l’Europe pendant les années de “l’après-prospérité,”’ *Vingtième Siècle* 84.4 (2004), 169–79; idem, *The 1970s in Europe: A Period of Disillusionment or Promise?*, London: German Historical Institute, 2010; Anselm Doering-Manteuffel and Lutz Raphael, *Nach dem Boom: Perspektiven auf die Zeitgeschichte seit 1970*, Göttingen: Vandenhoeck & Ruprecht, 2008 (3rd edn 2012); Ingrid Gilcher-Holtey, Rainer Eckert, Etienne François, Christoph Kleßmann and Krzysztof Ruchniewicz, ‘Die 1970er-Jahre in Geschichte und Gegenwart,’ *Zeithistorische Forschungen* 3.3 (2006), 422–38; Konrad H. Jarausch, ed., *Die 1970er-Jahre: Inventur einer Umbruchzeit*, Göttingen: Vandenhoeck & Ruprecht, 2006 (= *Zeithistorische Forschungen* 3.3); idem, ed., *Das Ende der Zuversicht? Die siebziger Jahre als Geschichte*, Göttingen: Vandenhoeck & Ruprecht, 2008; Antonio Varsori, ed., *Alle origini delle presente: l’Europa occidentale nella crisi degli anni settanta*, Milan: Franco Angeli, 2007; Alwyn W. Turner, *Crisis? What Crisis? Britain in the 1970s*, London: Aurum, 2008; Philippe Chassaigne, *Les années 1970: Fin d’un monde et origine de notre modernité*, Paris: Armand Colin, 2008; Beckett, *When the Lights*

- Went Out*, Jeremy Black, *Europe Since the Seventies*, London: Reaktion Books, 2009; Laurel Forster and Sue Harper, eds, *British Culture and Society in the 1970s: The Lost Decade*, Newcastle-upon-Tyne: Cambridge Scholars, 2010; Marie-Janine Calic, Dietmar Neutzatz and Julia Obertreis, eds, *The Crisis of Socialist Modernity: The Soviet Union and Yugoslavia in the 1970s*, Göttingen: Vandenhoeck & Ruprecht, 2011; Andreas Wirsching, Göran Therborn, Geoff Eley, Hartmut Kaelble and Philipp Chassaing, 'The 1970s and 1980s as a Turning Point in European History?', *Journal of Modern European History* 9.1 (2011), 8–26; Lawrence Black, Hugh Pemberton and Pat Thane, eds, *Reassessing 1970s Britain*, Manchester: Manchester University Press, 2013; and Martin H. Geyer, "Gaps" and the (Re-) Invention of the Future: Social and Demographic Policy in Germany during the 1970s and 1980s,' *Social Science History* 39.1 (April 2015), 39–61.
9. For the United States, see only: Peter N. Carroll, *It Seemed Like Nothing Happened: The Tragedy and Promise of America in the 1970s*, New York: Holt, Rinehart and Winston, 1982; Elsebeth Hurup, ed., *The Lost Decade: America in the Seventies*, Aarhus: Aarhus University Press, 1996; Bruce J. Schulman, *The Seventies: The Great Shift in American Culture, Society and Politics*, New York: Free Press, 2001; Beth Bailey and David Farber, eds, *America in the Seventies*, Lawrence: University Press of Kansas, 2004; Bruce J. Schulman and Julian E. Zelizer, eds, *Rightward Bound: Making America Conservative in the 1970s*, Cambridge, MA: Harvard University Press, 2008; Jefferson Cowie, *Stayin' Alive: The 1970s and the Last Days of the Working Class*, New York: New Press, 2010; 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; Daniel T. Rodgers, *Age of Fracture*, Cambridge, MA: Harvard University Press, 2011; Borstelmann, *1970s*; and Hallvard Notaker, Giles Scott-Smith and David J. Snyder, eds, *Reasserting America in the 1970s: U.S. Public Diplomacy and the Rebuilding of America's Image Abroad*, Manchester: Manchester University Press, 2016.
 10. Carroll, *It Seemed Like Nothing Happened*; Jarausch, *Ende der Zuversicht?*; Rodgers, *Age of Fracture*; Doering-Manteuffel and Raphael, *Nach dem Boom*; Lutz Niethammer quoted after Calic, *Crisis of Socialist Modernity*, 8, 118; Ferguson et al., *Shock of the Global*; Borstelmann, *1970s*, 6. On 'decadology', see Joe Moran, 'Decoding the Decade,' *The Guardian* (13 November 2009); and Alexander C.T. Geppert and Till Kössler, 'Zeit-Geschichte als Aufgabe,' *Geschichte und Gesellschaft*. Sonderheft 25 (2015), 7–36, here 15–16.
 11. Philippe Chassaing, 'Why the 1970s Really Matter,' *Journal of Modern European History* 9.1 (2011), 21–3, here 23; idem, *Années 1970*. A comprehensive discussion of 'planetization' as a global consciousness concept, introduced and coined by French philosopher, geologist and Jesuit priest Pierre Teilhard de Chardin (1881–1955) in 1946, is beyond the scope of this chapter. Suffice to say, planetization denotes the historical process of transforming earth into one imagined entity (and community) and can be considered an alternative to 'globalization.' Teilhard de Chardin himself defined 'planetization' as the 'idea of the planetary totalisation of human consciousness.' See idem, 'Vie et planètes: Que se passe-t-il en ce moment sur la Terre?,' *Études: Revue de culture contemporaine* 248 (1946), 145–69; Eng. 'Life and the Planets: What is Happening at this Moment on Earth?,' in idem, *The Future of Man*, London: William Collins, 1964, 97–123, here 115.

12. Ballard, 'Sci-Fi Seer'; now more easily accessible in idem, *Extreme Metaphors: Selected Interviews, 1967–2008*, London: Fourth Estate, 2012, 22–35, here 25. For this inward turn, see also Judt, *Postwar*, 483, and, in particular, Florian Kläger's contribution, Chapter 6 in this volume.
13. 'Zukunft: Todlos glücklich,' *Der Spiegel* 20.53 (26 December 1966), 80–90, here 82–3; 'Zukunftsplanung: Ritt auf dem Tiger,' *ibid.* 24.1 (5 January 1970), 34–47, here 38; 'Skylab: Am Tag X eine Trümmerschleppe,' *ibid.* 33.27 (2 July 1979), 142–53. Skylab is not to be confused with Spacelab, the reusable laboratory flown on the US Space Shuttle during the 1980s and 1990s. On Skylab, see Regina Peldszus's contribution, Chapter 10 in this volume; on Spacelab, Tilmann Siebeneichner's article, Chapter 11.
14. J.G. Ballard and Christopher Evans, 'The Space Age is Over,' *Penthouse* [UK] 14.1 (January 1979), 39–42, 102, 106, here 40–1; also in *Extreme Metaphors*, 121–31, here 123; Svetlana Boym, *The Future of Nostalgia*, New York: Basic Books, 2001, xiv.
15. Among those few 'general' historians willing to consider, at least in passing, that the 'final frontier so recently opened up for exploration by the spacemen' might have had any effect at all on the 1970s and humankind's self-perception, are Thomas Borstelmann and Niall Ferguson. See Borstelmann, *1970s*, here 70–1, 138–9, 239–40; and Ferguson, 'Crisis, What Crisis? The 1970s and the Shock of the Global,' in idem et al., *Shock of the Global*, 1–21, here 2–3.
16. Thus, the periodization suggested here is more comprehensive than Matthew Tribbe's. Separating 1950s/1960s Space Age America from the 1968–72 moon landing years, Tribbe aims to introduce a specific 'Apollo era' for these four years only, even though the program itself began technically much earlier; see Tribbe, *No Requiem for the Space Age*, 14, 211. On conceptualizing the so-called Space Age as a historical period that lasted from 1942 through 1972 and was characterized by a specific temporal dimension, see Alexander C.T. Geppert, 'Die Zeit des Weltraumzeitalters, 1942–1972,' *Geschichte und Gesellschaft*. Sonderheft 25 (2015), 218–50.
17. John Noble Wilford, 'Last Apollo Wednesday: Scholars Assess Program,' *New York Times* (3 December 1972), 1, 68; idem, 'Meaning of Apollo: The Future Will Decide,' *ibid.* (21 December 1972), 21; Hoimar von Ditfurth, 'Kosmische Quarantäne,' and idem, 'Ein Schuß ins Leere,' both reprinted in *Zusammenhänge: Gedanken zu einem naturwissenschaftlichem Weltbild*, Reinbek: Rowohlt, 1977, 25–8, 76–9; 'Apollo: "Mann, ist der Berg groß,"' *Der Spiegel* 26.53 (25 December 1972), 76–8, quote Schlesinger on p. 78. See also Kurt Rudzinski, 'Die Monderoberung verweist auf die Erde zurück: Zum Abschluß des Apollo-Programms,' *Frankfurter Allgemeine Zeitung* (20 December 1972), 2. On world-wide reactions to the Apollo moon landings, see Roger Launius's contribution, Chapter 3 in this volume.
18. 'The Moon Age,' *Newsweek* (7 July 1969), 26–52; Wilford, 'Meaning of Apollo'; Norman Mailer, *Of a Fire on the Moon*, Boston: Little, Brown, 1970, 310.
19. Denis E. Cosgrove, 'Contested Global Visions: *One-World, Whole-Earth*, and the Apollo Space Photographs,' *Annals of the Association of American Geographers* 84.2 (June 1994), 270–94, here 271, 274; Robert Poole, *Earthrise: How Man First Saw the Earth*, New Haven: Yale University Press, 2008, 199; Benjamin Lazier, 'Earthrise; or, The Globalization of the World Picture,' *American*

- Historical Review* 116.3 (June 2011), 602–30; Horst Bredekamp, ‘Blue Marble: Der Blaue Planet,’ in Christoph Marksches et al., eds, *Atlas der Weltbilder*, Berlin: Akademie, 2011, 367–75, here 367, 372. Already vast, the literature on Earthrise and Blue Marble is ever-growing; see only Wolfgang Sachs, ‘Satellitenblick: Die Ikone vom blauen Planeten und ihre Folgen für die Wissenschaft,’ in Ingo Braun and Bernward Joerges, eds, *Technik ohne Grenzen*, Frankfurt am Main: Suhrkamp, 1994, 305–46; William Bryant, ‘The Re-Vision of Planet Earth: Space Flight and Environmentalism in Postmodern America,’ *American Studies* 36.2 (Fall 1995), 43–63; Sheila Jasanoff, ‘Heaven and Earth: The Politics of Environmental Images,’ in idem and Marybeth Long Martello, eds, *Earthly Politics: Local and Global in Environmental Governance*, Cambridge, MA: MIT Press, 2004, 31–52; Stefan Helmreich, ‘From Spaceship Earth to Google Ocean: Planetary Icons, Indexes, and Infrastructures,’ *Social Research* 78.4 (Winter 2011), 1211–42; Robin Kelsey, ‘Reverse Shot: Earthrise and Blue Marble in the American Imagination,’ *New Geographies* 4 (2011), 10–16; and most recently, even with a slightly different emphasis, Peter Sloterdijk, ‘Starke Beobachtung: Für eine Philosophie der Raumstation,’ in idem, *Was geschah im 20. Jahrhundert?*, Berlin: Suhrkamp, 2016, 177–84.
20. This is yet another argument that was put forward by contemporaneous observers rather than coined by latter-day historians. See, for instance, J.G. Ballard, ‘Which Way to Inner Space?’, *New Worlds Science Fiction* 118 (May 1962), 2–3, 116–18 (reprinted in idem, *A User’s Guide to the Millennium: Essays and Reviews*, London: HarperCollins, 1996, 195–8); and Bruce Mazlish, ‘Historical Analogy: The Railroad and the Space Program and Their Impact on Society,’ in idem, ed., *The Railroad and the Space Program: An Exploration in Historical Analogy*, Cambridge, MA: MIT Press, 1965, 1–52, here 41, 52. See also the contributions by Florian Kläger and Andrew Jenks, Chapters 6 and 9, respectively, in this volume.
 21. Some, Ballard included, would argue that the three manned Skylab missions conducted between May 1973 and February 1974 should be categorized under the Apollo years. But both Skylab (1973–79) and the 1975 Apollo-Soyuz Test Project were different spaceflight programs. They were launched on a Saturn IB spacecraft, not the famous Saturn V rocket, and the Skylab workshop used a Saturn V with only two active stages
 22. See United States Congress, Committee on Aeronautical and Space Sciences, *National Space Goals for the Post-Apollo Period: Hearings on Alternative Goals for the National Space Program Following the Manned Lunar Landing. Eighty-ninth Congress, First Session, August 23, 24, and 25, 1965*, Washington, DC: Government Printing Office, 1965; United States President’s Science Advisory Committee, *The Space-Program in the Post-Apollo Period*, Washington, DC: Government Printing Office, 1967, here 45; United States Space Task Group, *The Post-Apollo Space Program: Directions for the Future*, Washington, DC: Government Printing Office, 1969; Richard Nixon, ‘Statement Announcing Decision to Proceed with Development of the Space Shuttle,’ 5 January 1972, *The American Presidency Project*, available at <http://www.presidency.ucsb.edu/ws/?pid=3574> (accessed 1 October 2017). John M. Logsdon, *After Apollo? Richard Nixon and the American Space Program*, Basingstoke: Palgrave Macmillan, 2015, here 3, 103–15, 269, 275.
 23. See, for example, the contributions by Thore Bjørnvig and David Kirby, Chapters 7 and 13, respectively, in this volume.

24. Jürgen Osterhammel and Niels P. Petersson, *Geschichte der Globalisierung: Dimensionen, Prozesse, Epochen*, Munich: C.H. Beck, 2003, 27; Martin Collins, 'One World... One Telephone: Iridium, One Look at the Making of a Global Age,' *History and Technology* 21.3 (September 2005), 301–24, here 304. See also Martin Collins's contribution to the present volume, Chapter 2.
25. United States Space Task Group, *Post-Apollo Space Program*, 6, 16.
26. '7600 Satelliten seit Sputnik I im Weltraum,' *Frankfurter Allgemeine Zeitung* (29 January 1975), 25. Despite their invisible omnipresence in everyday life, the history of artificial satellites is still dramatically under-researched. But see, in addition to Martin Collins's work, Pamela E. Mack, *Viewing the Earth: The Social Construction of the Landsat Satellite System*, Cambridge, MA: MIT Press, 1990; Edward R. Slack, 'A Brief History of Satellite Communications,' *Pacific Telecommunications Review* 22.3 (2001), 7–20; Hugh R. Slotten, 'Satellite Communications, Globalization, and the Cold War,' *Technology and Culture* 43.2 (April 2002), 315–50; Lisa Parks, *Cultures in Orbit: Satellites and the Televisual*, Durham: Duke University Press, 2005; and Laurence Nardon, 'Cold War Space Policy and Observation Satellites,' *Astropolitics* 5.1 (August 2007), 29–62.
27. See Martin Collins's contribution, Chapter 2 in this volume.
28. Konrad H. Jarausch, 'Verkannter Strukturwandel: Die siebziger Jahre als Vorgeschichte der Probleme der Gegenwart,' in idem, *Das Ende der Zuversicht?*, 9–26, here 22–3.
29. Sabine Höhler, *Spaceship Earth in the Environmental Age, 1960–1990*, London: Pickering & Chatto, 2015, 113; Asif A. Siddiqi, 'From Cosmic Enthusiasm to Nostalgia for the Future: A Tale of Soviet Space Culture,' in Eva Maurer et al., eds, *Soviet Space Culture: Cosmic Enthusiasm in Socialist Societies*, Basingstoke: Palgrave Macmillan, 2011, 283–306, here 284. The official record of the Apollo-Soyuz Test Project is Edward Clinton Ezell and Linda Neuman Ezell, *The Partnerships: A History of the Apollo-Soyuz Test Project*, Washington, DC: NASA, 1978.
30. Nixon, 'Statement Announcing Decision'; George E. Mueller, 'In the Next Decade: A Lunar Base, Space Laboratories and a Shuttle Service,' *New York Times* (21 July 1969), 14; Logsdon, *After Apollo?*, 266–9.
31. Warren Smith, 'To Infinity and Beyond?,' *Sociological Review* 57.1 (May 2009), 204–12, here 205, 209.
32. John M. Logsdon, 'Evaluating Apollo,' *Space Policy* 5.3 (August 1989), 188–92, here 190.
33. Technically, there were even more than six: Salyut 2 aborted before it could be manned, and another station failed without taking the name of Salyut. On Skylab, see Courtney G. Brooks, Roland W. Newkirk and Ivan D. Ertel, *Skylab Chronology: The Story of the Planning, Development, and Implementation of America's First Manned Space Station*, Washington, DC: NASA, 1977; as well as William David Compton and Charles D. Benson, *Living and Working in Space: A History of Skylab*, Washington, DC: NASA, 1983. On Salyut, see Grujica S. Ivanovich, *Salyut – The First Space Station: Triumph and Tragedy*, New York: Springer, 2008; and, in particular, Cathleen Lewis, 'Space Spies in the Open: Military Space Stations and Heroic Cosmonauts in the Post-Apollo Period, 1971–77,' in Alexander C.T. Geppert, Daniel Brandau and Tilmann Siebeneichner, eds, *Militarizing Outer Space: Astroculture, Dystopia and the Cold War*, London: Palgrave Macmillan, forthcoming (= *European Astroculture*, vol. 3).

34. Carl Sagan quoted after Walter A. McDougall, 'A Melancholic Space Age Anniversary,' in Steven J. Dick, ed., *Remembering the Space Age: Proceedings of the Fiftieth Anniversary Conference*, Washington, DC: NASA, 2008, 389–95, here 394. See also Robert S. Kraemer, *Beyond the Moon: A Golden Age of Planetary Exploration, 1971–1978*, Washington, DC: Smithsonian Institution Press, 2000. Biographies of Carl Sagan include William Poundstone, *Carl Sagan: A Life in the Cosmos*, New York: Henry Holt, 1999; and Ray Spangenburg and Diane Moser, *Carl Sagan: A Biography*, Amherst: Prometheus, 2004. On the Sagan plaque, see William R. Macauley, 'Inscribing Scientific Knowledge: Interstellar Communication, NASA's Pioneer Plaque, and Contact with Cultures of the Imagination, 1971–1972,' in Alexander C.T. Geppert, ed., *Imagining Outer Space: European Astroculture in the Twentieth Century*, Basingstoke: Palgrave Macmillan, 2012, 285–303 (= *European Astroculture*, vol. 1).
35. 'World Poll Finds Wide Belief in Life on Other Planets,' *New York Times* (13 June 1971), 20; Magoroh Maruyama and Arthur Harkins, eds, *Cultures Beyond the Earth: The Role of Anthropology in Outer Space*, New York: Vintage Books, 1975. On the history of SETI, see George Basalla, *Civilized Life in the Universe: Scientists on Intelligent Extraterrestrials*, Oxford: Oxford University Press, 2006, here 120; and Steven J. Dick, 'Anthropology and the Search for Extraterrestrial Intelligence: An Historical View,' *Anthropology Today* 22.2 (April 2006), 3–7, here 6.
36. Terry White, 'What Do You Do for an Encore?,' in Goldstein, *Moon Landing and its Aftermath*, 275–7, here 277; Gerard K. O'Neill, *The High Frontier: Human Colonies in Space*, New York: William Morrow, 1976, 34.
37. Gerard K. O'Neill, 'A Lagrangian Community?,' *Nature* 250 (23 August 1974), 636; idem, 'The Colonization of Space,' *Physics Today* 27.9 (September 1974), 32–40; idem, 'Space Colonies and Energy Supply to the Earth,' *Science* 190 (5 December 1975), 943–7; and idem, 'Colonies in Orbit,' *New York Times Magazine* (18 January 1976), 11, 25–9, here 11, 25. The same 'letter from space' was also published in the introduction of his *High Frontier*, 13–17. Declaring that 'space exploration is inevitable and those who prepare now will ride a wave of the future,' a contemporaneous bibliography listed more than 60 articles and essays on Gerard O'Neill and his space colonization scenarios; see Michael E. Marotta, *Space Colonization: An Annotated Bibliography*, Mason: Loompanics, 1979, here 4. See also Michael A.G. Michaud, *Reaching for the High Frontier: The American Pro-Space Movement, 1972–84*, New York: Praeger, 1986, 60–3; Peder Anker, 'The Ecological Colonization of Space,' *Environmental History* 10.2 (April 2005), 239–68; and Douglas Murphy, *Last Futures: Nature, Technology and the End of Architecture*, London: Verso, 2016, 77–9, here 77, 135, in addition to the contributions by Tilmann Siebeneichner and Peter Westwick, Chapters 11 and 12, respectively, in this volume.
38. O'Neill, *High Frontier*, 36, 46.
39. Duncan Lunan, *Man and the Stars: Contact and Communication with Other Intelligence*, London: Souvenir Press, 1974, 104–17; Fritz Haller, *Umweltgestaltung einer prototypischen Raumkolonie*, Karlsruhe: Universität Karlsruhe, 1980.
40. Walter M. Thiebaut to Pam Dattilo, 12 April 1979, Historical Archives of the European Union/European Space Agency (hereafter HAEU/ESA), 9970.

41. 'Europe Assured on Role in Space,' *New York Times* (23 September 1970), 9.
42. For the 'rebirth,' see Walter A. McDougall, 'Space-Age Europe: Gaullism, Euro-Gaullism, and the American Dilemma,' *Technology and Culture* 26.2 (April 1985), 179–203, here 195; Guy Collins, *Europe in Space*, Basingstoke: Macmillan, 1990, here 22, 30–2; Helmuth Trischler, *The 'Triple Helix' of Space: German Space Activities in a European Perspective*, Noordwijk: ESA, 2002, 17–18; and idem, 'Contesting Europe in Space,' in Martin Kohlrausch and idem, *Building Europe on Expertise: Innovators, Organizers, Networkers*, Basingstoke: Palgrave Macmillan, 2014, 242–75, here 269. See also Burl Valentine, 'Obstacles to Space Cooperation: Europe and the Post-Apollo Experience,' *Research Policy* 1.2 (April 1972), 104–21, and John Krige, Angelina Long Callahan and Ashok Maharaj, *NASA in the World: Fifty Years of International Collaboration in Space*, Basingstoke: Palgrave Macmillan, 2013, 65–124. For the United Kingdom's space policy in particular, see Doug Millard's contribution, Chapter 4 in this volume.
43. Clarke, 'Foreword.' As this concept has been introduced, defined and discussed in detail in the first volume, there is no need for repetition here; see Alexander C.T. Geppert, 'European Astrofuturism, Cosmic Provincialism: Historicizing the Space Age,' in idem, *Imagining Outer Space*, 3–24, here 6–9; and idem, 'Rethinking the Space Age: Astroculture and Technoscience,' *History and Technology* 28.3 (September 2012), 219–23. See also De Witt Douglas Kilgore, 'Exploring Astroculture,' *Science Fiction Studies* 41.2 (July 2014), 447–50; and the epilogue to the forthcoming third volume, Geppert et al., *Militarizing Outer Space*.
44. Arthur C. Clarke to Julian Scheer, 10 April 1971; Val Cleaver to Arthur C. Clarke, 9 January 1971, both in Smithsonian National Air and Space Museum Archives, Arthur C. Clarke Collection (hereafter NASMA/ACCC), 007/06 and 007/07, respectively.
45. On the United States, see the contributions by Roger Launius and Peter Westwick, Chapters 3 and 12, respectively, in this volume.
46. For further observations on the simultaneity of comprehensive space enthusiasm and the decades-long abstinence from independent human spaceflight in Space-Age Europe, see Geppert, 'European Astrofuturism, Cosmic Provincialism,' 9–13.
47. Space Treaty is short for 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies'; Moon Agreement stands for 'Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.' As of 1 January 2016, 104 states have signed the former, but only 16 the latter; see http://www.unoosa.org/documents/pdf/spacelaw/treatystatus/AC105_C2_2016_CRP03E.pdf (accessed 1 October 2017).
48. See also the contributions to the forthcoming third volume in this European Astroculture trilogy: Geppert et al., *Militarizing Outer Space*.
49. See also H. Bruce, Franklin 'Don't Look Where We're Going: Visions of the Future in Science-Fiction Films, 1970–82,' *Science Fiction Studies* 10.1 (March 1983), 70–80.
50. Dieter Vogt, 'Die gute alte Zeit der Mondrakete: Amerikas Weltraumbahnhof nach dem Apollo-Rausch,' *Frankfurter Allgemeine Zeitung* (31 January 1976), BuZ 1.