

CONTENTS

Acknowledgments ix

Introduction: Climate Change and Changing Climates	1
1 A Science of Sand: The Sahara as Archive and Warning	13
2 Flooding the Desert: Roudaire's Sahara Sea Project	38
3 New Garden Edens: The Rise of Colonial Climate Engineering	53
4 A New Climate for a New Continent: Herman Sörgel's Atlantropa	72
5 Europe's Last Hope: Active Geopolitics and Cultural Decline	92
6 Slavic Steppes and German Gardens: Desertification in the Third Reich	115
7 Eastern Deserts: Climate and Genocide in the <i>Generalplan Ost</i>	135
8 Epilogue: Global Desertification and Global Warming	153

Notes 171

Archives 231

Index 233

Introduction

CLIMATE CHANGE AND CHANGING CLIMATES

IN EARLY JULY 1850 the German Sahara explorer Heinrich Barth undertook the arduous task of scaling the southern high plateau of the Libyan Desert. The expedition party had just finished pitching their tents in a particularly dry and barren camping spot when the North African guides pointed out a number of rock engravings to their European travel companions. Barth was exhilarated. On the spot, he drew the images portraying cows, gazelles, and hunting scenes and asked his guides to show him more of the artifacts. Barth also described the engravings in his travel journal, remarking on their possible provenance and their ethnographic and historical significance.¹

The disconnect between the bodily experience of an arid, denuded desert and the evidence of past human habitation inspired Barth to spend a few lines on the images as “evidence of entirely different living conditions than we are currently observing in these lands.” He wrote this without any indication of surprise at the drastic environmental and climatic changes he alluded to. The idea was not new, after all. Offering easily available sources on environmental conditions from antiquity to the present day, North Africa and the Mediterranean region had long been among the preferred sites for Europeans pondering potential climatic shifts. Had Barth still been alive by the last third of the nineteenth century, he might nevertheless have been surprised to witness the fate of his own brief reflections on the subject: his sketches of the Libyan engravings and his cursory notes about “different living conditions” in North Africa’s past would become essential material for climatologists engaged in an extended debate on large-scale desiccation. And Barth would surely have been even more surprised had he been able to observe the growing interest not only in continent-wide or even global climate changes but also in large projects to actively modify climates or—closer to the words of the engineers involved in these projects—to make the desert bloom again.²

I recount this history, tracing the upsurge of climatic anxieties among French and German colonial practitioners, before examining how some planners

responded to these worries by proposing large engineering projects to counteract the perceived environmental decline. Europeans already had a long tradition of thinking about the effects of climates on both humans and their surroundings. From the late nineteenth century onward, however, they dramatically upscaled their climatic vision in two ways. First, practitioners now contemplated climatic changes affecting not just particular places and regions, but whole continents or even the entire planet; and second, engineers and planners used these ideas to design and justify large-scale, if ultimately unrealized, projects that would use the full force of industrial technology to halt or even reverse not only climatic but also societal and cultural decline. But what inspired Europeans to start thinking about extensive climatic shifts that could turn lush, forested environments into vast deserts? How, when, and where did engineers find inspiration in these theories to devise colonial engineering projects that attempted to transform those deserts back into forests? And how did the theories about both climate change and changing climates become embroiled in the political geography and the philosophies of cultural pessimism of the first half of the twentieth century?

In answering these questions, the book spans a wide arc, from the budding interest in large-scale climatic changes around the middle of the nineteenth century to Nazi plans to transform the climates and environments of war-occupied areas in the East. Connecting these chronologically and geographically distant places was the desert that Heinrich Barth had traversed in the 1850s. Whether conceptualized as a colonial repository for data, as a blank canvas for ambitious hydro-engineers, or as a symbol of environmental decline and desolation, the Sahara remained central to European, and particularly French and German, climatological concerns and designs throughout the period. First explorers and then climatologists theorized about its past and considered the possibility of widespread environmental and climatic changes that had shaped the history of landscapes and human habitation. The desert and its mutable ecology also inspired colonial officials and engineers to envision projects for an all-encompassing environmental and climatic transformation of the region or even the entire continent of Africa. Simultaneously, then, the Sahara was both a daunting representation of the awesome power of nature over humans and a surface on which to project designs that would reveal the newfound power of humans over nature in the era of industrial technology.³

Changing Climates

In the second half of the nineteenth century, popular science publications and magazines treated their readers to a continuous stream of reports by European travelers. These accounts told heroic stories about the adventurous feats of

white men, but usually also provided some information on the inhabitants and environmental conditions of faraway places. Reports about Sahara travels habitually closed with references to a once lush landscape that had turned into a barren wasteland through desertification processes that were possibly still at work. The theory and apprehensions that formerly fertile or habitable land could have transformed into desert was not only a standard ingredient of European exploration stories but closely linked to the scholarly study of climates. As an independent academic discipline, climatology was still a field in the making but had already reached a sizeable audience and achieved a sturdy academic infrastructure. With a motley crew of practitioners from various related fields, climatology also featured a diverse set of approaches and methodologies, borrowing from geology, physics, and chemistry. More often than not, however, nineteenth-century climatic researchers relied on historic and geographic data to make inferences about climatic phenomena. While the methods they used were clearly different from the model-driven and computer-based climate science of today, one of the most important objects of investigation—climatic variation in the past, present, and future—was the same.

Western ideas about the variability of climates in the nineteenth century grew out of the confluence of new theories about the earth's geological past, imperialist expansion around the globe, desert exploration in North Africa, and the rise of geography and geology as established academic disciplines. Together, these developments prepared the ground for a lively scholarly discussion about the existence and possible causes of large, sometimes even global, climatic shifts in the past and present. The theories were as diverse as the evidence used to support them: from progressive warming to cooling, and from stable climates to short-term climatic oscillations. Eduard Brückner, one of the leading climatologists of the late nineteenth century, likened an overview of the competing theories to “walking through a veritable labyrinth without the benefit of Ariadne's thread.” In the early twentieth century, the labyrinth was still just as difficult to navigate: the field remained without the stable framework of a generally accepted causal explanation that could have convinced a majority of the practitioners to adopt one among the many competing hypotheses. This did not mean, however, that large-scale climate change languished in the back pages of barely read journals. The debate elicited ideas and terminology that had already left the confines of academia and started to inspire public concerns over the possibility of environmental decline or even future climatic catastrophes that could destabilize colonial and even metropolitan economies and polities. Magazines published hyperbolic warnings of impending climatic doom, science fiction writers used climate change as both a setting and a plot device, philosophers ruminated on the connections between

environmental and civilizational decline, and planners sketched afforestation schemes to counteract a looming environmental catastrophe.⁴

The emergence of ambitious engineering plans to counteract desiccation and desertification, whether regarded as man-made or “naturally” occurring, was one of the most striking manifestations of these growing climate anxieties. From the middle of the nineteenth century, some explorers, engineers, and colonial officials in arid parts of the world developed projects that would use the might of industrial technology to transform desert environments into fertile landscapes with climates fit for European settlement and agriculture. In the following chapters, I examine the designs proposed by three individuals and the implications of their projects: the French colonial engineer François Roudaire, who developed a plan in the 1870s to create large water surfaces in the Sahara to change climates; the pan-Europeanist architect Herman Sörgel, who proposed to completely reconfigure the Mediterranean to expand European climates, settlements, and culture to North Africa in the 1920s; and the German landscape architect Heinrich Wiepking-Jürgensmann, who pushed for his ideas of counteracting desertification through large-scale planning to be included in the official plans to Germanize the Nazi-occupied eastern territories during the Second World War.

Reflecting and refracting the debates on extensive climate change, the climate-engineering designs exhibited a deep environmental and cultural pessimism paired with a similarly powerful technological optimism, mixing narratives of crisis with those of redemption. Deserts—both as a powerful threat to be contained and as an inviting playground for the modern engineer’s ambition—became coveted environments for climate modification projects. As different as the projects and their contexts were, their creators used and developed a common vocabulary forged in the climate change debate of the late nineteenth century, focusing on the Sahara as the quintessential desert in the European imagination. They also shared a deep techno-colonial impetus, promoting the use of modern industrial machines and tools to create productive landscapes for the benefit and habitation of non-indigenous populations, be they French, British, pan-European, or Germanic. To varying degrees, the schemes to convert desert environments became projects of social engineering. For the planners and their supporters, anxiety over encroaching deserts was always laden with cultural significance: environmental and climatic decline came to signify societal decline and vice versa. This added even more urgency to the fight against the purportedly encroaching deserts, but it also meant that engineering an amelioration of nature could potentially lead to an enhancement of culture or civilization in return—or at least to what the planners considered an enhancement.⁵

Colonial Science, Global Science, Desert Science

Both the climate engineering projects and the climate theories behind them were deeply embedded in colonial structures: explorers were on the payrolls of colonial offices, scientists used colonial infrastructure to conduct their research, and the engineers and planners of large-scale projects either worked directly for colonial governments or sought their favor and support. As Europeans occupied other lands during the age of High Imperialism in the last third of the nineteenth century, colonial officials paid greater attention to climatic conditions and, especially, to potential climatic changes in non-European environments. The possibility of climatic instability added to the sense of “unreadability” of little-known and environmentally alien overseas landscapes. Colonial planners also claimed climatic instability as a means to legitimize their colonial occupation and control, which involved deploying not only colonial agents but also colonial and colonizing science and technology.⁶

In many ways, this dynamic continued earlier colonial discourses and efforts to make colonial climates more agreeable and healthier for white settlers and administrators. At the same time, however, the nineteenth-century climate projects and theories were also part of the emergence of global science, a developing trend especially in geographical and geological disciplines, which built upon the collection and exchange of data from around the colonial world of the nineteenth and early twentieth centuries. In fact, the colonial and the global went hand in hand. Over the second half of the twentieth century, the data gathered by colonial governments and agents over decades gave modern climate scientists material to develop intricate numerical models of worldwide weather and climate forecasting. Today, climate science has become the most global science—or at least the most visible branch of global science—dealing with arguably the most far-reaching issue of all: anthropogenic global warming. But long before the last third of the twentieth century, climatology and climate anxieties had already scaled up to the global, with some European practitioners pondering and fearing the existence of environmental processes that affected the entire earth.⁷

Hypotheses about extensive climatic variability were part of public discourse long before the late nineteenth century—from Comte de Buffon’s musings on climate amelioration in North America to Alexander von Humboldt’s ideas about large-scale desiccation in South America. And yet scientists in the early nineteenth century still largely conceptualized climate as an essentially stable environmental feature that human action could only alter to a modest extent. This, however, was not to last. The gradual acceptance of the ice age theory around the middle of the nineteenth century opened the way to a reconceptualization of climate as a powerful and dynamic force shaped by and

actively shaping environments from the poles to the equator. If, as proponents of the theory argued, the world had experienced substantial or even full glaciations in the past, what spoke against large climatic shifts in the more recent past, the present, and the future of the earth? Some climatologists, among them those working on extra-European, colonial environments, started to argue that the local or regional climatic changes they had described could be understood as part of much larger processes that spanned the entire globe. The exchange of climate data that took off in international conferences and journals in the second half of the nineteenth century aided the development of these large-scale theories of climate.⁸

Based on the musings about large-scale climatic phenomena, climatologists began to develop something resembling a global view of the environment, or what Mary Louise Pratt has called a “planetary consciousness.” Theories about climate change—both anthropogenic and natural—played a central role in this development, as scientific practitioners increasingly portrayed environments as connected, inherently instable, and potentially malleable. Not just the Darwinian theory of evolution but also ideas and hypotheses of climatic variability and change made the nineteenth-century world and its environments appear increasingly variable or even unstable. In a recent study, Deborah Coen has traced the development toward a dynamic and multiscalar climate science in Central Europe over the last decades of the long nineteenth century, in which the varied environments of the Habsburg Empire provided the sites for research, data collection, and methodological innovation.⁹

The provinces of Austria-Hungary were certainly not the only colonial sites of climatological development. Some European practitioners interested in issues of climatic variability looked beyond their own continent and chose deserts as their primary field of research. With cave paintings, dry riverbeds, abandoned cities, and exposed geological features, arid landscapes provided an abundant source of evidence for long-term climatic changes. As powerful representations of danger, adventure, and desolation, deserts also played an important role in disseminating and popularizing ideas about environmental change and catastrophe. In the late nineteenth century, many of the deserts that climatologists studied, from Central Asia to Africa and South America, were either colonial or barely postcolonial environments and frequently represented territories that central governments situated in less arid places had claimed but not fully controlled.¹⁰

The colonial encounter with deserts was never a one-way street: as Europeans colonized desert environments, deserts also began to colonize European thought. This is visible not only in European ideas about and fears of deserts expanding but also in the work of early climate engineers, who often looked to create new Gardens of Eden in the arid zones of the world. They did not

attempt to directly engineer the atmosphere, as some of today's geoengineers envision. Some early climate engineers nevertheless aimed to transform environments and climates beyond the local scale, designing lesser-known and unrealized, but certainly noteworthy, projects in colonial regions to halt the feared expansion of desert climates. These technological attempts to change environments and climates are a prime example of the early entanglement of climate science and colonial politics, representing the techno-political dimension of climate change ideas. While European practitioners often conceptualized deserts as empty spaces, climatological theories were never separate from the colonial contexts of their production. Rather, climate scientists took part in political debates and contributed to the search for solutions to perceived climatic and environmental issues in colonized spaces. Whether as proponents or critics of climate engineering, they frequently considered the possibility of continent-wide or even global climatic effects of human interventions. And climate scientists—along with climate engineers—theorized the effects of both natural and man-made climate changes on the social, economic, and cultural trajectories of both colonized and colonizing societies.¹¹

Correcting Nature and Society

Climate engineering was not a new idea in the nineteenth century, and to many contemporary observers the concept did not seem out of the ordinary. After all, ideas about climatic instability were widespread among colonial planners and scientists. And if climates were indeed inherently unstable, the mental leap to attempting to change them intentionally was not that great—particularly with the tools of industrial technology and colonized deserts as testing grounds at the disposal of colonial engineers. Planners who proposed ambitious climate engineering projects in the nineteenth century were thus responding to mounting anxieties over environmental and climatic decline and expressing a growing belief in the possibilities of modern technology to reorder environments as well as societies. The scope of technological possibilities and the related scale of engineering projects reached new heights and new spheres of activity in the late nineteenth century. The German geographer Emil Deckert expressed the self-assurance of the age when he commented on a French climate-engineering project in the Sahara: “The unbound action of humankind [will] correct a number of critical mistakes of nature.” And, as he added rhetorically, “to whom should this thought not appear beautiful and—if indeed feasible—tempting?”¹²

Deckert's words from 1884 seem to prefigure what is generally believed to be a recent phenomenon: the close link between climate change and macro-technology, which is exemplified by current geoengineering projects to halt

and reverse anthropogenic global warming. As Deckert's comment reveals—and as I show in the following chapters—climate and macro-technology have actually had a long-lasting relationship, reaching back deep into the nineteenth century. In fact, climate engineering had already seemed tempting in the eighteenth century, when the Comte de Buffon declared that mankind would be able to “alter the influence of its own climate, thus setting the temperature that suits it best.” In the nineteenth century this dream seemed to move into the realm of feasibility: steam-powered machines and both metropolitan and colonial labor reserves provided new potential energy for large projects, while the planetary perspective of environmental interconnectedness provided a new scale for Western engineering ambitions.¹³

Deckert's comment is also noteworthy for its description of environmental transformation. Rather than positing a contentious relationship between engineering and nature, Deckert, along with many of his contemporaries, emphasized the use of technology to “correct,” or readjust, nature.¹⁴ Once again, engineering as a means to restore natural perfection and harmony was not a new idea: earlier colonial climate improvement projects had often followed a similar logic, attempting to restore local climates to an allegedly prior and more perfect state. It is remarkable, however, that planners and commentators in the late nineteenth and early twentieth centuries tended to frame even revolutionary projects aiming to create new climates, change geographies, and connect continents as conventional and, for lack of a better term, “natural.” Engineers planning far-reaching interventions into environments and climates tended to express their own role as that of a repairman tackling natural flaws resulting from geological, cosmic, or anthropogenic processes. In the plans of the early “geoengineers,” nature and technology did not stand in opposition; nor did they even belong to different conceptual frameworks. Climate engineers from the late nineteenth century to the first half of the twentieth often saw the large-scale use of technology merely as a tool to perform a kind of maintenance of nature, mirroring the effects of physical forces such as tides, streams, winds, erosion, and climatic changes.¹⁵

While proposing some of the most extreme uses of industrial technology in their time, early climate engineers also tended to not distinguish between the “natural” and the “social” spheres, a separation that has had a firm grip on some of the most durable conceptions of modernity and the technical imagination in the twentieth century. The separation was never complete and has been questioned by both sociologists and historians. Nineteenth-century ideas about climate change and climate engineering represent another powerful empirical argument against the overdrawn contrast between a stable “natural” and a dynamic “social” sphere. In fact, in the following chapters I suggest that nature was at times brought more and more into the social sphere *through*

technology: after all, climate engineering proposed to offer mechanisms to steer and control climates similar to economic, political, and cultural parameters. François Roudaire, the engineer behind the Sahara Sea project, represents a striking example of the desire to revitalize and control nature as part of the French colonial project in North Africa.¹⁶

Conversely, climate engineers also voiced their hope that changing climates would engender social and cultural transformations. This was particularly visible in the first half of the twentieth century, when neo-Malthusian anxieties about the intrinsic limits to food production and widespread notions of civilizational decline combined with the fears of climatic change and desertification. Herman Sörgel's pan-European *Atlantropa* project, which aimed to transform European civilization alongside the climate of North Africa, was maybe the most grandiose embodiment of this dynamic, while the megalomaniac project of Nazi planners to comprehensively transform the environmental and racial characteristics of landscapes in the East was its infamous apogee.

The engineering projects that I examine, from the Sahara Sea in North Africa to the German *Generalplan Ost*, were more ambitious than any of their predecessors and among the most ambitious of their respective times. Their ambitions and their scale ultimately proved too large: the projects ended up unrealized, languishing in drawers in colonial departments or discussed to death in government offices and scientific journals. Rather than looking at the actual consequences of engineering projects as material, technological systems, I focus on the intellectual roots, the intended effects, and the impact of envisioned climate modification measures. While taking this approach forces me to stay in the realm of ideas and does not allow me to look at local consequences or responses, it provides insight into the most extreme forms of the technological imagination that were inspired by colonial and environmental anxieties from the late nineteenth century to the middle of the twentieth. If, as William Cronon has stated, “the nature inside our heads is as important to understand as the nature that surrounds us,” then colonial imaginaries of environmental and social transformation are also as important as the everyday colonial encounters with non-European environments and their inhabitants. The proposed projects usually presupposed empty lands free of any indigenous habitation or activity and thus reinforced the colonial narratives of a *tabula rasa*, ready for European production and settlement. More generally, as David Edgerton has more recently pointed out, most innovations “fail” and are never used, but that does not mean that they are any less significant. The memory of their aspirations and their failures continues to influence new technologies and historical developments. As culturally embedded utopias or dystopias, unrealized designs—especially those seeking to transform vast swaths

of the earth—thus play an important role in demarcating the extreme edges of the technological imagination. And that certainly includes large-scale climate engineering.¹⁷

Chapters

In the first chapter I explore how the discovery of ice ages, and thus the growing realization among European climatologists of the instability of paleoclimates, prepared the ground for a discussion of large-scale climatic shifts. In the second half of the nineteenth century, colonial travelers further fueled this discussion with information about environments and climates that they collected on their journeys in North Africa. Environmental knowledge about the history of the Sahara could serve both as data for scientific theories and as important information for colonial governments that wished to implement imperial projects. This was especially the case in the developing debate about climate fluctuations and climate changes that—as some European practitioners began to argue—had shifted the borders of the desert in the past and were still at work. The geographers and geologists involved in the debate presented a wide variety of theories and standpoints, but they moved largely between two poles: while one group held local, man-made causes responsible for climatic changes, others, and in particular German-speaking geologists and geographers, proposed that “natural” processes had been influencing climatic conditions all around the globe. By the early twentieth century the debate remained unresolved. This did not mean, however, that the topics of climate change and desertification vanished entirely. They reappeared periodically in scientific journals throughout the first half of the twentieth century. And the discussions about expanding deserts had left traces elsewhere: through the popularization of geographic and climatological knowledge, the issue of large or even global climatic changes and catastrophes had impressed itself upon the public imagination, while resourceful engineers had already started looking for ways to actively change climates through technological interventions.

In the second and third chapters I return to the nineteenth-century Sahara, exploring the emergence of colonial climate engineering projects. The second chapter examines a project by the French engineer François Roudaire, who developed a plan to flood a large portion of the Algerian and Tunisian desert in order to facilitate French access to the hinterland and, more importantly, to acquire new land for European settlement. The scheme was based on the premise that a large body of water in the North African inland would act as an evaporation surface, producing more precipitation and thus progressively altering the climate in the region. Even before the academic debate about

climate variability had hit its stride at the end of the century, Roudaire took the idea one step further: he explored ways to engineer the climate and to return environmental conditions to their assumed prior conditions.

The third chapter looks more closely at the wider context of colonial climate engineering, exploring the reasons behind the sustained public debate about Roudaire's project. While commentators raised some doubts about particular features of large-scale climate projects, Roudaire's claim that he could bring about a considerable man-made change in climate often went largely uncontested. Like other similar projects of the time, the Sahara Sea project benefitted from a widespread Western belief in modern technology's ability to overcome all potential environmental and technological obstacles. It also tapped into both growing concerns about environmental decline among colonial planners and general anxieties about the precariousness of the French colonial project in North Africa. This mix of technological optimism and civilizational pessimism would become a common feature of climate engineering projects in the first half of the twentieth century.

The fourth chapter examines the development of this cornucopian-declensionist dynamic through one of the boldest successor projects to Roudaire's Sahara Sea, designed by the German architect Herman Sörgel in the 1920s. Atlantropa represented a gigantic plan to dam the Mediterranean and geoen engineer a new combined Afro-European continent. Although Sörgel was working on a vastly different scale than Roudaire, his ideas were strikingly similar—and he in fact openly referred to his French predecessor's project as an inspiration for his own work. Sörgel's final goal for Atlantropa was to fertilize and colonize the Sahara by channeling enormous amounts of water through its midst and changing the climate to suit the needs of European settlers, while forcibly displacing the African population to the south. Sörgel was convinced that Atlantropa would bring about a new, peaceful era of progress and cooperation for Europeans and would form the basis for a coming postnational European society with room to expand on an engineered, colonized, and ethnically cleansed African continent.

In the fifth chapter I explore the transformative ambition of Sörgel's project, which took the idea of changing climates and geologies to an unprecedented level. Sörgel, who read widely not only in climatology and doomsday philosophy but also in geographical theories of the time, developed a model for overcoming cultural and environmental decline by changing the material conditions of their foundations or what could be called "active geopolitics." While this twist on geopolitical theories harmonized with some of the ideas of the new fascist government in Germany, Sörgel ultimately fell out of favor with the Nazi leadership. Sörgel focused all of his energies on colonizable land in the South, whereas Nazi planners looked to the East, where they discovered

Europe's own "Sahara" in the eastern steppes, which they deemed to be expanding just like its African counterpart.

The notion that Europe and Asia, in addition to Africa, were becoming successively drier had long been a theme in the debates among climatologists, especially in Russia. In the 1930s, so-called *Versteppung*, or "steppification," became a focus of Nazi planners. In the sixth chapter I trace the intellectual origins of work by Heinrich Wiepking, who became the main proponent of the *Versteppung* argument in the Nazi bureaucracy. In articles and books, Wiepking elaborated on the notion that once-fertile lands in the East had been turned into an arid steppe through Slavic settlement and possibly through larger climatic processes. These ideas would become central in preparation documents for the *Generalplan Ost*, which is my focus in chapter 7. The *Generalplan* sought to completely reorganize the East, combining ethnic cleansing with a comprehensive environmental and climatic transformation. Neither Wiepking nor his colleagues were particularly well versed in geology or climatology. They did, however, manage to incorporate and further popularize climate change anxieties that stemmed from the nineteenth-century debate. The Nazi administration used powerful images of *Versteppung* and desiccation to justify their military conquest and occupation of the East. *Versteppung*—stripped of all academic pretense—became first and foremost a political term charged with strong racist and fascist overtones during the Third Reich.

The epilogue connects the end of the *Versteppung* debate after the Second World War with our current concerns about global warming and desertification. I follow the development of climatology over the twentieth century, showcasing the discipline's split into global, atmospheric approaches in climate science and local, telluric approaches in soil science and desertification research. I end the book with an outlook on the rise of modern geoengineering schemes. Although these projects reflect current and presumed future technological capabilities, they also echo, perhaps unwittingly, terms, concepts, and fears of climatic catastrophe that have been around since the nineteenth century.

INDEX

Page numbers in *italics* refer to figures and tables.

- Abbott, Charles, on sunspots, 183n47
Aburi, Hans, “The End of a Big Idea,” 110
Academy of Sciences, Paris, 44, 56, 62
active geopolitics, Sörgel on, 11
Adenauer, Konrad, Loeffelholz and, 110
Africa, Green Wall, 164
African Association, 22
African land use, Western scientific community and, 159
Agassiz, Louis, on ice age theory, 15–16
age of earth, change in conceptions of, 174n4
Agricultural University, Berlin, 116
Aichinger, Erwin, comparing plant and human societies, 140
Algeria: colonial potential of, 41–43; meteorological stations in, 190n10; oil discovery in, 162; winds in region of chotts, 191n10
Algerian Forest Service, 43
Algerian Meteorological Service, 57
Allied Patriotic Societies, Braman in, 81
Almásy, Count László: supporting Sörgel’s plans, 86–88; technological exploration of Sahara, 184n51
Anglo-French Forestry Commission, 156
Anthropocene, 153
anthropogenic global warming, iconography of, 13
Anthropo-Geographie (Ratzel), 97
anthroposophy, Steiner, 132
anti-desertification belts, concept of, 165
apostle of eucalyptus, Trottier as, 56
Arrhenius, Svante: on atmospheric greenhouse effect, 35; impact of atmospheric carbon dioxide, 17–18, 32; regulating temperature, 111
ARTEMIS (Association des recherches techniques pour l’étude de la mer intérieure saharienne), 163–64
“Artificial Gulf Formation Scheme,” 165
Ascherson, Paul: debate of lions inhabiting Sahara, 24; travel in Sahara, 24
Association for Promoting the Discovery of the Interior Parts of Africa, African Association, 21–22
Atlantis, discovery in “the salt swamps of Tunis,” 70–71
Atlantropa (Sörgel), 96
Atlantropa Institute, 108, 110, 204n42
Atlantropa Mitteilungen (newsletter), 108
Atlantropa Party, ideas of, 104
Atlantropa project: active geopolitics, 96–98; civilization and climate, 111–14; climate change potential, 92; council preparing world for, 109; fate of climate change debate, 113–14; fear of European decline in, 79–80; first called Panropa, 72; map of, 73; propaganda, 107, 113; Sörgel and, 9, 11, 71–74, 79, 80–84, 149, 163. *See also* Sörgel, Herman
Atlantropa Society, 108

- Atlantropa Symphony, 93
Atlantropa World Exhibition, 93
Atlas of German Living Space in Middle Europe, 124
Aubin, Hermann, on questions of "German East," 124
Auslandsdeutsche, foreign Germans, 148
autarkic economy, forests and wood in, 221n26
Autobahn, Seifert on, 117, 129, 131
- Ball, John: on plans to flood wadis, 70;
Qattara Depression plans, 81
Baltic States, 135
Bardo Treaty, 62
Barth, Heinrich: artistic representation of, 21; Duveyrier and, 47; Libyan Desert expedition, 1, 2; rock drawings in Fezzan, 22, 23; Sahara travel by, 20–22; successors of, in Sahara, 24–25; travelogue (1857), 22
Bary, Erwin von, travel in Sahara, 24
Bavarian Building Commission, 74
Becquerel, Antoine and Edmond, meteorological work of, 50
Behrens, Peter: design for tower, 94; urban and building design, 93
Berlin Conference (1884), 29
Bernhard, Patrick, settlement schemes, 218n13
Bert, Paul, supporting Roudaire, 47
Bertherand, Émile, Société climatologique d'Alger, 57
bloodlands, 135; term, 215n1
Borchardt, Paul, Atlantis and, 70
Braman, Dwight: Allied Patriotic Societies, 81; on Cuba plan to McKinley, 81; on irrigating desert, 70
Brooks, Charles, on desiccation and climatic decline, 82
Brower, Benjamin Claude, on "Saharan sublime," 43
Brückner, Eduard: on climate variations, 122, on competing climate theories, 3; on worldwide climate oscillations, 31
Brüning, Heinrich, Catholic Center Party, 100
Buckland, William, Agassiz and, 16
Bunche, Ralph, 109
Bund Deutscher Osten, League of the German East, 124
Carette, Ernest, on tribes of North Africa, 180n34
carrying capacity, 124, 197n17
Cathcart, Richard: biography of Sörgel, 165; visions of macro-engineering bodies of water, 166
Catholic Center Party, Brüning of, 100
CATS (Chotts Algeria-Tunisia Scheme), 166
Charney, Jule: biogeophysical feedback loops, 156; land-surface-atmosphere interactions, 160; unidirectional desertification, 158
China, Great Green Wall, 164
Churchill, Winston, 109
climate: changing, 2–4, 26–32, 36–37; civilization and, 111–14; cooling and warming of, 17–19; effects on humans and surroundings, 2; importance of studies, 26–27; process of understanding, 25–26; race-based theories, 35–36; as subfield of geology and geography, 26; Western ideas on variability of, 3
climate change, 10; debate on, 13–14, 33–35; demon of the desert, 14; disappearance of debate, 184n54; discussions about desertification and, 51–52; early development of debate, 28; engineered, of Sahara Sea project, 49–52; Fischer on, 183n50; missionaries as source, 178n23; role of Europeans, 171n3; term, 169; theories of, mechanisms, 182n46; *Versteppung* for, 207n6; warnings of, 3–4
climate classification system, Köppen, 144
climate engineering, 7; colonial, 11; Mäding and, 144; projects, 10

- climate science: dynamic, 154; as subfield of geography, 118
- climatological variability, studies on, 34
- Coen, Deborah, on climate science, 6
- colonial science, 5–7
- Commission for the Scientific Exploration of Algeria, 54
- Convention of Madrid (1880), 68
- Cotton, Arthur, on transforming Sahara, 66–67
- Coudenhove-Kalergi, Richard: Pan-Europa movement, 76–77; Sörgel and, 105
- Croll, James: gravitational pull, 34; on ice ages, 176n10
- Cronon, William, on nature inside our heads, 9
- cultural soil, *Kulturboden*, 122–24
- cycle of world religions, 98
- Dahan, Amy, climate science, 170
- Damodaran, Vinita, on first environmental decade, 36
- Darré, Richard Walther, “blood and oil” ideology of, 125
- Darwin, Charles, evolution, 6, 97
- Das Schwarze Korps* (magazine), 116, 136–37
- Daubr e, Gabriel, on climate deterioration around Mediterranean, 55–56
- Daumas, Eug ne, study of Sahara, 54
- Davis, Diana, 56
- de Buffon, Comte, on climate influence, 5, 8
- Deckert, Emil: on climate-engineering project, 7–8; on limits of Roudaire’s climatic changes, 61
- Decline of the West* (Spengler), 101–3
- demon of the desert, 14
- desert(s): climate modification projects, 4; movement of, 13; science, 5–7
- desertification: causes for, 158, 160, 164, 224–25n10; climate change and, 51–52; climate variability and human activities, 157–58; concept of, 150; definition of, 156, 158; deforestation link, 159; desiccation and, 154, 169; globalization of, 170, 223n1; history of research, 168; Otterman model of, 156; Sahel Drought and, 164; “Spaceship Earth,” 161; Stebbing on debate, 82–83; term, 169, 207n6; version 2.0, 155–61; *Versteppung*, 74, 112–13, 114, 149–52
- Deserts on the March* (Sears), 133
- Desert Threatens, The* (Metternich), 112
- Desor,  duard, views on flooded Sahara, 57–58
- Die drei groben “A”* (Sörgel), 104–5
- Die Versandung Europas* (Sokolowski), 88
- doctrine of absolute uniformity, Lyell, 16
- Döllgast, Hans, design of Sörgel’s project, 94
- Dresden University, Schumacher of, 74
- Dubos, Jean-Baptiste, climate shifts, 15
- Dust Bowl, United States, 82, 132–33, 137, 198n22
- Duveyrier, Henri: on creating inland sea, 47; heroic science, 21; on religion of industrial world, 60; Sahara travels, 24; supporting Roudaire, 65
- Earth system problem-framework, development of, 172n9
- Eckardt, Wilhelm: on effects of forests, 31; study on climate problem, 28
- Edgerton, David, on innovations, 9
- Edinburgh University, Stebbing, 82
- Einstein, Albert, 109
- Einstein Tower, Mendelsohn, 94
- Ekholm, Nils, on large-scale climate change, 32
- energy: atomic shattering, 205n46; concept of, 202n26
- Enfantin, Prosper, on agricultural colonization in Sahara, 60–61
- English Patient, The*, L szl  Alm sy of, 86
- enlightened colonialism, Saint-Simonian vision of, 65
- ENSO (El Ni o Southern Oscillation), 154
- environmental anxiety, definition of, 171n4
- EOS* (magazine), 72

- Europe: active geopolitics, 96–98; blank slate, 93–96; decline of West, 101–3; hydropower usage, 78; improvement of the climate, 111–12; into oblivion, 108–11; south versus east, 103–8; technology over everything, 98–101. *See also* Atlantropa project
- evolution, Darwinian theory of, 6, 97
- exploration, heroic science and, 21
- Fairgrieve, James, on Sahara climate, 96–97
- Favé, Idelphonse, on feasibility of Roudaire's plans, 62
- first environmental decade, 1860s as, 36
- First International Meteorological Congress, 27
- First World War, 33–34, 95, 100, 130, 132; as civil war between Europeans, 76; Europeans as farmers in, 42; geopolitics and, 96; Germany and, 119, 121–22; nationalist atmosphere of Europeans, 91; Partsch and, 33, 36; search for alternatives to fossil fuels, 78; supply crises, 105
- Fischer, Theobald: on anthropogenic deforestation, 55; on Barth's writings and climate change, 24; climate change debate, 30–31; climate of North Africa, 183n50; desert formation, 181n37; on "German" approach, 30; on hypothesis of natural desiccation, 34; on planting trees, 30–31
- Flatters, Paul, expedition to Sahara, 65
- Fleming, Jim, on atmospheric computer models, 168
- Flohn, Hermann, on climate change and modification, 112
- Flooding the Sahara* (Mackenzie), 67
- Forestry Ministry, 147, 148
- Fourier, Jean-Baptiste Joseph, on gradually cooling earth, 16
- Fraas, Carl Nikolaus, use of plant geography and agricultural production, 29
- Fraas, Oscar: on cultural decline of Egypt, 29; on derelict state of North Africa, 29
- Francé, Raoul Heinrich, re-planting of forests, 81–82
- Franco-Prussian War, 42
- Frankfurter Allgemeine Zeitung* (journal), 110
- Frederick the Great, 136; characterization of, 115–16; image of, 206n2
- French Ministry for Public Instruction, 48
- Freycinet, Charles de, on examining Roudaire's project, 62–63
- Fuchs, Edmond, on macro-climate as "general cosmic phenomenon," 55
- Fund for German National and Cultural Soil Research (SdVK), 121–22
- Gall, Alexander, utopia of the crisis, 101
- GCMs. *See* global atmospheric circulation models (GCMs)
- "General Plan East": of Third Reich, 135–36. *See also* *Generalplan Ost*
- Generalplan Ost*, 9, 12; in action, 146–49; climates of East and, 140–46; Nazi planners, 153; Nazi plans of, 141, 141–42; RKF plans for the East, 141–46; settlement schemes, 218n13; of Third Reich, 135–36
- geoengineering: definition of, 167; Fleming on, 168; Sahara Sea as, 40
- Geographical Journal*, 32
- German Autobahn, Seifert on, 117, 129, 131
- German conservation movement, 217n11
- German East, significance of, 222n37
- German Mennonites, soil care, 213n33
- German Research Foundation (DFG), 146
- Germany: blood and soil, 124–25, 127–29; climate changes and North Africa, 29–30; *Generalplan* in action, 146–49; German and Polish Settlement Areas, 126; German and Polish Settlement Patterns, 127; German nature and cultural soil, 120–24; Hitler's accession to power, 103, 124, 136; Hitler's reclamation attempts, 121; mythical "German East," 118–20; obsession with "drive eastwards," 118; *Versteppung* in, 129–34

- Gibbon, Edward, on fall of Roman Empire and climate changes, 15
- glacial nightmare, 18
- glacial theory, Agassiz on, 16
- glaciers: depictions of, 18; movement of, 13
- global atmospheric circulation models (GCMs): climate science, 154; generation of, 168; human actions and climatic variability, 160; scale problems, 169
- global science, 5–7
- global warming: anthropogenic, 180n30; political dimension of, 173n11; term, 169
- Gradmann, Robert: on forest and steppe periods, 130; term *Kultursteppe* “cultural steppe,” 130–31
- “granary of Rome”: attempts to rebuild, 37, 42; North Africa as, 28, 56, 82, 198n21; Roudaire on rebuilding, 37, 42
- Grévy, Jules, Commission supérieure, 63
- Great Depression, 100, 101, 105
- Great Plains, United States, 130
- Gregory, John, expanding Leiter’s conclusion, 34
- Griffith, George, *Great Weather Syndicate*, 71
- Gropius, Walter, urban and building design, 93
- Grove, Richard H., on first environmental decade, 36
- Gulf of Bomba, Barth on Libyan, 22
- Habsburg Empire, 6
- Haeckel, Ernst, evolution, 97
- Haushofer, Karl: on German soil, 211n22; as *Pantoffelritter*, 96; realization of Atlantropa, 95–96
- Hector Servadac* (Verne), 185n4
- Heimat*: concept of, 208n9; nature conservation associations, 118
- Hellpach, Willy: climate engineering, 144; on race in climate analysis, 140; theory of climatic influence on racial psychology, 35
- Hennig, Richard: on Atlantis debate, 95; criticism of Atlantropa, 95
- Hense, Georges, on desalination plants, 165
- Herder, Johann Gottfried von, on national “natures,” 120
- Herodotus, 27; on Lake Tritonis, 45–47, 179–80n28; travelogues, 27
- heroic science: age of, 13, 25; exploration and, 21; term, 176n15
- Heymann, Matthias, shift in climate research, 154
- Hiehle, Kurt: on climatization of arid landscapes, 114; common salt water criticism, 163
- High Imperialism: Africa, 51; age of, 5
- Himmler, Heinrich: German plans for reorganizing East, 125; Reich Commissariate for the Strengthening of Germandom, 106, 125, 148; Reichssicherheitshauptamt (RSHA), 141; Wiepking as “special deputy,” 116
- Histories* (Herodotus), 27
- Hitler, Adolf: accession to power, 103, 124, 136; land reclamation attempts, 121; Molotov-Ribbentrop Pact, 140
- Hitler’s *Mein Kampf*, 105
- Höger, Fritz, design of Sörgel’s project, 94
- Holocene, 177n18
- Hornemann, Friedrich, fateful journey of, 22
- Hothouse Earth* (Wilcox), 162
- Hulme, Mike, on predictive natural sciences, 168
- Humboldt, Alexander von: on dearth as issue in Prussia, 132; landscape as “steppe,” 129–30, 213n34; on large-scale desiccation in South America, 5; on national “natures,” 120
- Hume, David, climate shifts, 15
- Hunt, Hugh, University of Cambridge, 167–68
- Huntington, Ellsworth: on desiccation and climatic decline, 82; research on climate, 35–36, 135; on worldwide desiccation, 122
- hydro-engineers, 200n6

- hydroimperialism, 53
hydropower, 196n10–11
- Ibn Khaldun, 27
- Ibsen, Henrik, *Peer Gynt*, 38, 185n1
- Ice Age, 17, 19
- ice ages, 10; Agassiz on theory of, 15–16;
MacFarland on return of, 18
- imperial climatology, 26
- industrial technology, climate engineering,
8–9
- Intergovernmental Panel on Climate
Change (IPCC), 153, 167
- International Meteorological Organization,
27
- Invasion of the Sea, The* (Verne), 39, 48, 71
- IPCC. *See* Intergovernmental Panel on
Climate Change (IPCC)
- Iron Curtain, 151
- Islamic theology, Barth and, 20
- Jaekel, Otto, on vicious circle of desiccation,
132
- Jessen, Otto, on lost cities of antiquity, 75
- Jevons, William Stanley, dire prediction of,
78
- Johnson, R. G., on dam at Gibraltar, 72, 79,
195n1
- Junge, Werner: shaped German cultural
landscape, 128, 128–29; unformed cultural
steppe, 128, 128
- Kalahari project, Schwarz, 69, 69–70
- Kalm, Pehr, climate shifts, 15
- Kampfwald*, Wiepking as “fighting forest,” 144
- Kaufmann, Karl Josef, on rule of the Poles,
120
- Keith, David, on carbon capture, 167
- Kelvin, Lord, 175n8; cooling celestial
bodies, 175n9; on dissipation of heat, 17
- Kervran, Louis, on dream of Sahara Sea, 163
- Kessler, Paul, on changing climate, 132
- Kjellén, Rudolf, 105
- Kley, Heinrich, Atlantropa propaganda, 107
- Knittel, John: Nazi leadership, 204n42;
Sörgel’s supporter, 108
- Köppen, Wladimir: climate classification
system, 144; “steppe” as independent
climatic zone, 130
- Korherr, Richard, 106
- Kraft*, Ratzel and, 98
- Kraft, Raum, Brot* (“Energy, Space, Bread”)
(Sörgel), 108
- Kropotkin, Pjotr, on desiccation of Eurasia,
34
- Kulturboden*, cultural soil, 122–24
- Kulturlandschaft*, cultural landscape, 142
- Kultursteppe*, cultural steppe, 130
- Lake Fetzara project, 64–65, 65
- Lake Tritonis, Herodotus’, 45–47
- Landas, Gustave, continuing Roudaire’s
project, 66
- Landscape Decree, 145, 150; Wiepking’s,
145–46
- Landschaftsfibel* (Wiepking), 140
- Landvolk im Werden* (Meyer), 141
- Lanier, Lucien, on colonial potential of
Algeria, 41
- Lavigne, Georges, on debate on chotts, 47, 58
- law of desert formation, Walther on, 37
- League of the German East, *Bund Deutscher
Osten*, 124
- Lebensraum*, 146; living space, 97; term, 97
- Le Corbusier, urban and building design, 93
- Leiter, Hermann: on climate change, 25,
169; desiccation of North Africa, 34; on
non-anthropogenic climate change, 150
- Lenz, Oskar, large-scale desert reclamation,
57, 58
- Leopoldina, Walther of, 122
- Lesseps, Ferdinand de: as defender of
Sahara Sea scheme, 39, 58, 60; Panama
Canal and, 63, 64, 66; supporting
Roudaire, 64
- Libyan Desert, Barth in expedition, 1, 2
- Lichtenauer, Arthur, from coal to hydro-
power, 79

- lions, debate on inhabiting Sahara, 24
- Little Ice Age, 18
- Liulevicius, Vejas, on eastern landscapes, 119
- Livingstone, David, heroic science, 21
- Lockyer, William, sunspot cycle, 183n47
- Loeffelholz, Baron von, Atlantropa Institute, 110
- Lorenz, Werner, Ethnic German Liaison Office, 125
- Lyell, Charles, on doctrine of absolute uniformity, 16
- Måding, Erhard: landscape changes on macroenvironment, 144; working new settlement areas, 217n11
- MacFarland, Robert, on return of ice age, 18
- Mackenzie, Donald: Sahara Sea, 81; West Africa project, 66–68
- McNeill, John, material environmental history, 201n12
- Madden-Julian Oscillation, 154
- Man and Technology* (Spengler), 101
- Mann, Thomas, 109
- Mannert, Konrad, on Herodotus's Lake Tritonis, 46
- Mannheim, Karl, on desert in twentieth century, 103
- Mao Zedong, 109
- Martins, Charles, on creating inland sea, 47
- material environmental history, definition, 201n12
- Mediterranean, as power plant of Europe, 76
- Mediterranean Sea, flooding event of, 201n18
- Mein Kampf* (Hitler), 105
- Mela, Pomponius, on Lake Tritonis, 45
- Mendelsohn, Erich, Einstein Tower, 94
- meteorology, climatology and, 171n3
- Meteorology Project, Institute for Advanced Study, 162
- Metternich, Anton, *The Desert Threatens*, 112
- Meyer, Konrad: *Generalplan* and, 141, 148; German and Polish Settlement Areas, 126; RKF's Main Department for Planning and Soil, 125, 127; Wiepking and, of RKF, 116; Wiepking as "special deputy" for, 136
- Middle Europe, Partsch on, 118–19
- Middleton, Nicholas, on desertification, 158
- Milanković, Milutin: climate cycles, 183n51; on earth's orbital variations, 35; on orbital variations and solar radiation, 161
- Miller, Oskar von, electricity transmission, 78
- Ministry of Public Works, 62
- Molotov-Ribbentrop Pact, Hitler breaking, 140
- Mumford, Lewis, hydropower and energy of future world, 196n11
- Myth of the 20th Century* (Rosenberg), 103
- Nachtigal, Gustav, Sahara travels, 24
- National Academy of Science, 167
- National Socialist ideology, 200n7, 214n39; RKF policies, 116
- national soil, *Volksboden*, 122–24
- nature, as climatic machine, 58–62
- Nazi Germany, 106; blood and soil, 124–25, 127–29; defeat of, 153; *Generalplan* in action, 146–49; ideas about *Versteppung* in, 116–17; planners, 106. 128–29; Sörgel's criticism of plans, 107–8
- Nazi ideology, 104, 117, 206n2, 207n6
- Nazi leadership: Sörgel and, 11; *Versteppung* or "steppification," 12
- Nehru, Jawaharlal, 109
- neoconservatism, racism and pseudo-socialism, 125
- Newmann, John von, first computer-based weather forecast, 162
- New Nobility of Blood and Soil* (Darré), 125
- North Africa, 14, 16; climate change and desiccation through deforestation, 36–37; climate change and variability, 56–57; climatic conditions in, 27–28; derelict state of environment and culture, 29; desert exploration, 3; environmental degradation on Arab invasion, 180n34; as granary of Rome, 28, 56, 82, 198n21; Libyan Desert, 1

- North Polar Circle, 31
nuclear energy, 110, 205n46
nuclear winter, 18
- Oceanographic Museum, Monaco, 86
O CRS. *See* Organisation commune des régions sahariennes (O CRS)
Olbrich, Anton, on wind protection plantings, 151
Operation Desert, Unternehmen Wüste, 106
optimism is cowardice, Spengler, 102
Organisation commune des régions sahariennes (O CRS), 163
Organization of American States (OAS), 76
Ortega y Gasset, José, 109
Osborne, Michael, on colonial enterprise, 172n6
Ostforscher: political force in Third Reich, 124; steppes of the East, 131; term “steppe,” 130
Ostpolitik, expansionism program, 124
Ostuniversitäten, Universities of the East, 124
Otterman, Joseph, model of desertification, 156
Outline of History (Wells), 76
Outline of Technocracy, An (Parrish), 100
Overweg, Adolf, Barth and, 22, 25
- Panama Canal, 63; Lesseps, 63, 64, 66
Pan American Union, 76, 77
Panropa, 72. *See also* Atlantropa project
Paris World Exposition (1878), 48
Park, Mungo, Sahara region, 22
Parrish, Wayne W., *An Outline of Technocracy*, 100
Partsch, Joseph: on Huntington’s work, 36; on Middle Europe, 118–19; Penck and, of SdVK, 121–22; on “uncertainties of method,” 33
patriotic emigration, 42
Pauncefote, Julian, on Mackenzie’s scheme, 67
- Peer Gynt* (Ibsen), 38–40, 185n1
Penck, Albrecht: conceptions of “German East,” 122; on German relationship with nature, 123–24; on German soil, 211n22; map of German Volks- und Kulturboden, 123; Partsch and, of SdVK, 122
Petermann, August, on utility of deserts, 53
Pius XII (Pope), 109
planetary consciousness, Pratt on, 6
Plan of Action to Combat Desertification, 157
Pliny, 27
Pliocene, 55
Poland, 135; occupation of, 140
Pomel, Auguste, on Sahara’s arid conditions, 58–59
Pomerania, dying forest in, 152
Ponte, Lowell, on new ice age, 161
Pratt, Mary Louise, on planetary consciousness, 6
Procopius, 27
Propaganda Ministry, 108
Prussian Academy of Sciences, 124
Pseudo-Scylax, on Lake Tritonis, 45, 187n16
Ptolemy, 27; on Lake Tritonis, 45
- Qattara Depression, Ball’s plan, 81
- Race and Resettlement Office, Third Reich, 125
racism, anticapitalism and, 125
Radkau, Joachim: ecological thinking of, 133; on push toward bigness, 150
rain shade, 61
Ratzel, Friedrich: ideas about *Lebensraum*, 97, 122; *Kultursteppe* of the East, 130, 138
Raubtier Mensch (human beast of prey), Spengler, 101
Reclams Universum (magazine), 95
Reforestation League, 43; Algeria, 56
Reich, 146
Reich Commissioner for the Strengthening of Germandom (RKF): Himmler, 125; Main Department for Planning and Soil, 125

- Reichskommissariat für die Festigung des deutschen Volkstums (RKF): Forest Ministry and, 147, 148; *Generalplan* in action, 146–49; Himmler's, 116; planners including climate change, 117; plans of, 141–46; Reich Commissariat for the Strengthening of Germandom, 116; Wiepking as member of, 116, 139–40, 212n27
- Reichssicherheitshauptamt (RSHA), Himmler and, 141
- religion of the industrial world, 60
- Rennell, James, on Herodotus, 45
- Revue scientifique* (magazine), 18
- Richardson, James, Barth and, 22, 25
- Riker, Carroll, on oceanic dams, 199n36
- RKF. *See* Reich Commissioner for the Strengthening of Germandom (RKF); Reichskommissariat für die Festigung des deutschen Volkstums (RKF)
- Rohlf, Gerhard: debate of lions inhabiting Sahara, 24; for exterminating Arabs in North Africa, 25; pushing back of Arabs, 178n22; Sahara expeditions, 53
- Rosenberg, Alfred, *Myth of the 20th Century*, 103
- Roudaire, François: Algerian and Tunisian desert project, 10–11; background of, 44; death of, 66; desertification and climate change, 51–52, 59; Lesseps and, 39, 44–45; photograph of, 44; plan for chotts, 45–48; rebuilding “granary of Rome,” 37, 42; on Sahara and climate, 4; Sahara plans, 150; Sahara Sea project, 9, 11, 37, 39–40, 45, 53, 95, 135, 163
- Rouire, Alphonse, 54
- Royal Geographical Society, African Association and, 22
- Ruskin, John, 176n14; debate on glacial retreat rate, 19; glacial landscapes, 19; *Glacier des Bois*, 20
- Russia, 135, 151
- Saberwal, Vasant, desiccationist discourse of, 159
- Sahara, 2, 10, 13; Barth's successors traveling in, 24–25; Barth travels of, 20–22; climatology field, 19–20; as country of thirst, 41; ethnography of region, 22; landscapes of, 14; North Africans as “go-betweens” for travel, 24–25; physical evidence for climate change, 25
- Saharan sublime, phenomenon as, 43
- Sahara Sea: beyond the, 166–70; long life of, 66–71; provisional demise of, 62–66; travels, 3; very long life of, 161–66
- Sahara Sea project: changing deserts, 54–58; colonized sand, 41–43; engineered climate change, 49–52; as geoengineering, 40; Lake Tritonis of, 45–47; map of chotts, 46; map of Roudaire's project, 45; Roudaire's, 39–40, 43–49
- Sahel Drought, 164
- Saint-Simon: disciples of, 60; vision of “enlightened colonialism,” 65
- Scherhag, Richard, on changing climate, 132
- Schumacher, Fritz, Dresden University, 74
- Schuman, Robert, 109
- Schwarz, Ernest: Kalahari project, 69; plans for Thirstland Redemption, 69–70
- Schweinfurth, Georg, Sahara travels, 24
- Schwenkel, Hans, Forestry Office, 145
- Science* (magazine), 61
- Science Service, Slosson of, 194n40
- Scientific American* (magazine), 18
- Scott, James, as abridged maps, 64
- SdVK. *See* Stiftung für deutsche Volks- und Kulturbodenforschung (SdVK)
- Sears, Paul, on deserts, 132–33
- sea surface temperature (SST), 158, 160
- Second World War, 4, 109, 194n; climatic shifts, 153; desertification debate after, 154–56; European continent after, 110; Germanization of the soil, 136; military investigations from, 162; Nazi leadership and, 106, 140; Sörgel after, 111;

- Second World War (*continued*)
 Versteppung debate, 12; Wiepking on climate deterioration, 139
- Seifert, Alwin: article on *Versteppung*, 132–34, 135; Autobahn, 131; on climate debate, 132–34; desertification theory, 116; “Future of the East German Landscape” essay, 134; German Autobahn, 117, 129; on human water engineering schemes, 112–13; landscape advocate, 131–32; as landscape expert, 117; Wiepking and, 134, 137–39
- SETAMI, 165
- Shaw, George Bernard, 109
- Shaw, Thomas, on chotts of Lake Tritonis, 45
- Sieglwart, Bruno: Atlantropa supporter, 83; on dam at Gibraltar, 99; planned between Congo and Chad Sea, 85; Sörgel and, 83, 84–87, 89
- Slosson, Edwin: on Atlantis in “the salt swamps of Tunis,” 70–71; of Science Service, 194n40
- Smuts, Jan Christiaan, 109
- Snyder, Timothy, on Nazi project of genocide and expansion, 116
- social engineering, 4
- Société climatologique d’Alger, 57
- society, correcting nature and, 7–10
- Society of Geography, Paris, 47
- Sokolowski, Paul: *Die Versandung Europas* (“The Sanding-Up of Europe”), 88; on environmental catastrophe, 128
- Sörgel, Herman: on active geopolitics, 11; Atlantropa project, 9, 11, 71, 72–74, 79–80, 92, 135–36, 150; beyond granary of Rome, 84–91; carrying capacity and space, 197n17; cooling Europe, 199n36; Coudenhove-Kalergi and, 76–77; *Die drei groben “A”* (“The Three Great A’s”), 104–5; English-language and Atlantropa, 195n2; in footsteps of Roudaire, 80–84; Pan American Union, 76, 77; photograph of, 75; postnational hydropower, 74–80; on reconfiguring Mediterranean, 4; representation of Gibraltar dam on Gulf Stream, 90; Seifert and, 132; Sieglwart and, 83, 84–87, 89, 99, 104; south versus east, 103–8; Spengler and, 102–3; transport of “Atlantropa Archive,” 194
- Sörgel, Johann, 74
- Sörlin, Sverker, glaciology and meteorology, 223n3
- Soviet Russia, 155
- Soviet Union, 148, 151
- Spaceship Earth, 161
- Speer, Albert, on query of tree, 145
- Spengler, Oswald: *Decline of the West*, 101; Sörgel and, 136
- SPICE. *See* Stratospheric Particle Injection for Climate Engineering Project (SPICE)
- Stalin, Joseph, 109
- Statistical Atlas of the German People in Middle Europe, 124
- Staudinger, Paul, on Sahara Sea project, 68
- Stebbing, Edward, desertification debate, 82–83, 156
- Steiner, Rudolf, anthroposophy, 131
- steppe, Google Books Ngram of, 131
- steppification: desertification theory, 116; *Versteppung* or, 12
- Stiftung für deutsche Volks- und Kulturbodenforschung (SdVK), relationship of Germans and nature, 121–22
- Strabo, 27
- Strait of Gibraltar, 99
- Stratospheric Particle Injection for Climate Engineering Project (SPICE), 168
- Suez Canal: completion of, 40; construction of, 58, 59; criticism of, 64; Lesseps as developer, 39, 58; success of, 61
- Suez Canal Works, 63
- sunspots, importance of, 183n47
- SWECO, Swedish research group, 165
- Swiss Alps, 13

- Technical Research Association for the Study of the Saharan Inland Sea, 163
- techno-globalism, 202n22
- technology: Atlantropa, 98–101; nature and, 99; rhetoric of, 202n19
- Teutonic Knights, heroism and fortitude of, 119–20
- Theens, Karl: Atlantropa Institute, 204n42; Sörgel's supporter, 108
- thermonuclear energy, 163
- Third Reich, 12, 92, 104, 105, 112; agricultural land in, 216n3; Atlas of German Living Space in Middle Europe, 124; collapse of, 151, 204n42; concerned about "blood" and "soil," 116–17; *Generalplan Ost* of, 135–36; nature advocates of, 117; Race and Resettlement Office, 125; Seifert and, 133
- Thomas, David, on desertification, 158
- Thomson, William, 17. *See also* Kelvin, Lord
- thoughtless deforestations, 56
- Three Great 'A's,' The* (Sörgel), 104–5
- Times, The* (newspaper), 67
- Todt, Fritz: death of, 136; German Autobahn and, 106; Seifert and, 131, 133–34
- Travels and Discoveries in North and Central Africa* (Barth), 22
- Treaty of Ksar Said, 62
- Treaty of Versailles, landscapes lost by Germans in, 119–20, 122
- Treitschke, Heinrich von, on Slavic rule over Germans, 120
- Trolard, Paulin, Reforestation League, 56
- Trottier, François, on reforestation in Algeria, 56
- Truman, Harry, 109
- Tyndall, John: greenhouse effect and, 18; mechanism of climate change, 50–51; rate of glacial retreat, 19
- Ukraine, 135, 151
- Ukrainian steppes, 142
- UN Conference on Environment and Development, 157
- UN Conference to Combat Desertification (UNCCD), 157–58, 160
- UNESCO, 204n42, 224n7
- United Nations: desertification claims, 156–57; desertification debate, 158
- United Nations Conference on Desertification (UNCOD), 157
- United Nations Environment Program (UNEP), 157
- United Nations Sahelian Office (UNSO), 157
- United States: Dust Bowl, 82, 132–33, 137, 198n22; Great Plains, 130
- Universities of the East, *Ostuniversitäten*, 124
- Unternehmen Wüste, Operation Desert, 106
- Urbain, Ismayl, exploring Sahara, 54
- US Forest Service, 225n14; directional trends of desertification, 159
- van der Rohe, Mies, urban and building design, 93
- van Laak, Dirk, study of European imperial projects, 60
- variability of the climate, 31
- Verein deutscher Ingenieure, journal of, 103
- Verlag, Perthes, knowledge as power motto, 26
- Verne, Jules: *Hector Servadac*, 185n4; *The Invasion of the Sea*, 39, 48, 71
- Versailles Treaty, 115
- Versteppung*, 154; concept of, 151; connecting "blood" and "soil," 116–17; debates about, 214n38; desertification, 74, 112–13, 114; in Eastern Europe, 122; fate of, 149–52; German interest in, 118; Google Books Ngram of, 131; steppification or, 12; term, 207n6; Wiepking, 12, 144–46
- "*Versteppung of Germany*", Seifert, 132–34, 135
- Voegtler, Heinrich, on Germany's energy demand, 79

- Vogelstein, Hermann, on agricultural practices in Palestine, 33
- Voisin, Françoise Philippe, Suez Canal Works, 63
- Volksboden*, national soil, 122–24
- Voltaire, Frederick the Great and, 115
- Wächtler, Fritz, on defensive landscapes, 144
- Walchensee Power Plant, 74, 78, 79
- Walker, Martin, on massive re-education project, 164
- Walther, Johannes: definition of steppe, 130; on desert environment and climate change, 36–37; law of desert formation, 36, 37; on Leopoldina, 122
- Wehrlandschaft*, Wiepking concept of, 144–45
- Weimar Republic: debate between technology and doomsayers, 203n28; land reclamation projects, 121; SdVK and *Ostforscher* in, 124
- Wells, H. G., *Outline of History*, 76
- Weltanschauung*, Atlantropa, 92
- Welzenbacher, Lois: design of Sörgel’s project, 94; Kunstakademie, 94
- White, Richard, on technology, 202n19
- white coal, 78
- Wiepking-Jürgensmann, Heinrich: on counteracting desertification, 4; “The Encroachment of the Steppe into the Woodland,” 138; on environmental argument, 119; on Frederick the Great, 115–16; on hedgerows and forests, 145–46; as landscape expert, 117, 125; planned landscapes of, 136–40; RKF planner, 116, 134, 142–46, 143, 212n27; Seifert and, 134, 137–39; *Versteppung* argument, 12, 144–46; well-managed kitchens, 220n21
- Wilcox, Howard, global warming trend, 162
- Wilkening, Ken, on Earth system problem-framework, 172n9
- Wolschke-Bulmahn, Joachim, on adaptation of culture to nature, 121
- World Meteorological Organization, 27, 224n7
- World Power Conference, 78
- World War I. *See* First World War
- World War II. *See* Second World War
- Worthington, E. Barton, on agriculture in West Africa, 83
- Zamość Uprising, 147
- Zimmerer, Jürgen: on fertile land and death in Belorussia, 149; on Nazi *Ostland*, 117
- Zischka, Anton, on Sörgel’s project, 109–10
- Zittel, Karl Alfred von: on evidence of climatic changes, 24; on glaciology, 122; on idea of submerged Sahara, 57; Jaekel and, 132; on Roudaire’s claim on Sahara, 55, 56
- Zoch, Wilhelm, 136