



Solving Aridity

Water had transformed Klein-Windhoek. Now a more affluent suburb of Namibia's capital, the settlement is located on the central plateau east of downtown Windhoek. In the 1890s, it grew steadily as more and more German settlers arrived. According to some estimates, between February 1892 and September 1894 seven steamships brought twenty-five families, or a total of fifty-five individuals (thirty-three of them men) mainly to that region. They joined twenty-two former colonial soldiers and five settlers with German origins. The latter had migrated to the area from neighboring South Africa.¹ Soon the region turned into a *Kleinsiedlung*, a small-scale settlement best described as a self-sufficient agricultural homestead. To incentivize settlement, prices for land were kept low.² Plus, organizations such as the *Südwestafrikanische Siedlungssyndikat* (Southwest African Settlement Syndicate), founded in 1892 and tied to the German Colonial Society, supported settlements and gardens.³ In 1893, one newspaper noted, "German Southwest Africa is, there can be no doubt anymore, the only one among our colonies that appears suitable to satisfy one of the main demands of the creators of Germany's colonial movement, namely to possess our very own overseas territory that is partially capable of absorbing the stream of German emigration."⁴ Between 1898 and 1902, just the government alone sold 1,093,694 hectares of land to settlers.⁵ Concession companies sold even more. Such transactions meant a permanent loss for Herero in central Namibia. The first two German settlers in Klein-Windhoek had received their land in 1892; ten years later an official counted forty-three white settlers and between 200 and 250 black workers. The availability of water had made the location desirable. By 1902, settlers could count on about 670 cubic meters of water per day from surrounding springs. That was enough to sustain fifteen hectares of vineyards and twelve hectares of gardens cultivating vegetables, fruits, and grain.⁶ Yet water was not endless. In 1892, Geographer Karl Dove had already warned that Klein-Windhoek could at best sustain seven to eight families.⁷ Some wondered about investments. Traveler Baron Edgar von Uechtritz und Steinkirch outlined that just a little work tied to digging irrigation channels would go a long way to possibly sustain forty-five families.⁸ By

then it was clear that any future growth, or even sustaining Klein-Windhoeck long-term, required irrigation structures.

Solving the water question was essential for the transformation of South-west Africa into a sustainable settler colony. African societies had long navigated arid spaces. Later, Europeans saw only problems. According to a British description from 1884, “The whole of the territory, excepting the beds of the Kuisup [*sic*] and Swakop rivers, is an arid and sandy desert, with no appreciable rainfall, and almost entirely devoid of vegetation. Rain only falls for 5 to 6 days in the year (between November and April), and probably does not amount to one inch.”⁹ As a result, concerns around water fundamentally shaped colonial thinking and overall activities. After all, to follow such rhetoric and narratives, once the *Mole* allowed people to land in Swakopmund and a train reached the central plateau the transformation of arid landscapes into a settlement colony for Germans could begin. Water was essential for that. Efforts fully took off once experts such as Hydrologist Engineer Theodor Rehbock and Engineer Alexander Kuhn surveyed the region; both also provided decision-makers with an array of photographic evidence, elaborate blueprints, endless reports, and specific proposals. All of such documents envisioned a white settler future. Their ingenuity, it seemed, could squeeze water out of even the most arid landscapes, creating structures that turn existing wastelands into a German settler paradise.

Organized chronologically, chapter 4 focuses on environmental infrastructure meant to unearth water. It begins with existing understandings and structures before exploring early efforts at entry ports and along main access routes. In line with scholarship discussing irrigation, the mastery of nature, and broader transformations, German colonialists believed in progress, technology, and their own superiority.¹⁰ Their dismissal of pre-colonial environmental infrastructure, African expertise, and a general misunderstanding of natural forces partially explains repeated setbacks. The chapter then follows German attempts to make sense of arid lands. The expeditions of Theodor Rehbock and Alexander Kuhn, two experts personifying certain imperial mentalities and mindsets, are front and center. Their proposals capture visions of the colony as storylines of conquering and transforming nature yet again defined colonial minds and stories.

Existing Structures

Oral histories and traditions speak volumes about the importance of water in Namibia's past. Legends point to its significance—such as one about a crying princess forming the Fish River.¹¹ When interviewed for the Michael Scott Oral History Project in December 1985, interviewee Kenapeta Tjatindi out-

lined the significance of rain for Herero culture. “In times of drought people would come to him [the head of the Mbanderus, the late Kahimemua Nguvauva] to beg him to pray for rain. He asked for the rain, and it did rain.”¹² Others sharing their recollections talked about similar rituals: “A sheep had to be slaughtered and the fat put in the fire: and then they called God: the smoke used to go up as a sign that their request would be answered: the rain came.”¹³ Places with water mattered greatly as well. Tjiponda of Kamarenga, for instance, spoke about the journey home from the sea when noting, “The place where he turned back is called Ekotokero, meaning the place of return where he got fresh water.”¹⁴ The Herero had long dug up drinking water here and rested before moving on with their cattle. The description became a kind of praise poem used by subsequent travelers to orient themselves. According to Henrichsen, the *omutandu* (pl. *omitandu*), or song of praise, a genre tied to a specific space and role for Herero history, marks places of water that are essential for cattle.¹⁵ Henrichsen points to an extensive network or topography of wells among the Herero: *Otjizeva* (waterholes), *Otjondjomboimue* (single wells), *Oviombo* (large wells), *Ombujomatemba* (well of water trough), and *Otjiamangombe* (the place where cattle are kept).¹⁶ Imperative markers etched onto the landscape, like gravesites, could also help find the precious liquid.¹⁷ Within Herero culture, geographies, directions, and spatial knowledge are deeply intertwined with this source of life.

Herero had lots of experiences and expertise around the construction of wells and how to access water. According to Henrichsen, and based on the descriptions of individuals like Missionary Büttner, they were the most famous *Va-Schimba* (well-diggers) in central Namibia in the nineteenth century.¹⁸ Büttner, who at one point described the social structure of Africans as a “quaint mixture of social democracy and feudalism,”¹⁹ demeaned such environmental infrastructure as no more than “pits . . . which with the most primitive of methods water is ladled-up.”²⁰ African societies long employed iron tools acquired through trade networks to dig their wells. According to oral interviews and other records, the Herero generally picked locations for settlements near or in dried up riverbeds. Known as *ondjombo* (singular) or *ozondjombo* (plural), those wells were about three to five meters deep though could reach up to twenty.²¹ Use was communal. Construction was a collective effort, both the digging process and then getting the water out of the well. Büttner at one point described the process of retrieving the water noting that it generally involved five to six men lowest on the social hierarchy passing along buckets to the top while “singing and having fun.”²² Such structures even reached into the Kalahari Desert. There, the Herero had created up to twenty so-called field and sand wells (sg. *ombu*; pl. *ozombu*). These were about seven-meter-deep clay-made pools meant to collect groundwater.²³ German Missionary Heinrich Vedder wrote that the Herero “dug wells untiringly with a pointed stick hard-

ened in the fire, and drew water from a depth of fifteen feet [about 4.5 meters] and more, pouring it into wooden troughs for his thirsty animals.”²⁴ Whereas disputes over water could lead to broader conflicts,²⁵ wells were “points of intersection (*Schnittpunkte*) of economic and social (male) life.”²⁶

Other groups equally made use of landscapes that seemed empty and hostile to outsiders. Archaeologist John Kinahan has written extensively about groups living near the Hungorob Ravine and the Khuseb River Delta, both areas that have become case studies for further investigations surrounding settlement, trade, and pastoralism.²⁷ As noted in chapter 1, close adaptations to existing environmental conditions required groups like the Topnaar to settle in small homesteads a few kilometers away from a reliable water supply.²⁸ Other Nama were also experts and had long manipulated nature. According to one oral history describing Nama migration into modern-day Namibia, “The southern deserts are pitted with deep canyons and pockmarked with mountains and extinct volcanoes. Human life is made possible only by the existence of underground water. As the Nama trekked north into this unknown territory, they were guided by dogs trained to sniff out hidden waterholes. Where the dogs stopped the Nama dug their wells and built their settlements.”²⁹ Historians Brigitte Lau and Christel Stern noted broadly that Nama used water resources “extremely successful and in careful harmony with patterns of natural renewal.”³⁰ The use of rain- and groundwater resources was certainly widespread in the earlier part of the nineteenth century. Of course, those home in the region had expertise regarding climate, underground water in dry river beds, or the proximity of certain plants to water. As described by Vedder, “What really mattered [to the Nama-Witboois] was not the outside limits of the territory, but the river courses, on the banks of which wells could easily be made to provide water for man and beast.”³¹ German Missionary Büttner made similar observations about the Damara when writing, “Besides it is to be remarked that the Berg-Damara have rather an inclination for gardening, and if they can get somewhere a secure spot which offer them some garden land and water, they are soon ready to make a small garden, to plant tobacco, dacha, pumpkins, and melons.”³² Knowing where to find and accessing water had long mattered in Southwest Africa.

German newcomers often belittled such environmental infrastructure and overall ingenuity, or at least favored their own observations and efforts. That response was in line with settler colonialism more broadly. Historian David Lowenthal, who writes about the Americas, noted that “[a]t the outset, imperial settlers were hardly aware of indigenous impacts, blind to signs of non-European occupation. They assumed that they saw virtually untouched virgin lands, ‘almost fresh from the Maker’s hands.’”³³ Missionary Vedder described existing footpaths as primitive and outdated when claiming, “There were no roads in South West Africa in those days; there were just narrow footpaths, which very often coincided with the tracks made by elephants.”³⁴ At least he

added the voice of old Tjimba of the Kaokoveld and realized that those were connections between different water holes that humans had long depended on in search of water.³⁵ Nonetheless, for Vedder these paths were useless because they were much too narrow and mountainous for ox wagons. Other newcomers seemed intrigued by the abilities of San to survive in barren landscapes; but they too remained dismissive in their descriptions or failed to include their voices.³⁶ According to Kreike, “to colonial observers, ‘native’ constructions were of little value and hardly, if at all, transformed a wilderness environment (for the better).”³⁷ Racist undertones at times surely prevented settlers from learning from local groups. One German farmer dismissed the indigenous population’s settlement near water, commenting that “enemies of any physical labor they only believed those places to be of value, where water comes to the surface or can be dug up easily.”³⁸ Sometimes German officials also rejected local ingenuity simply because it did not fit into colonial topographies and plans. For them, waterholes away from German travel routes eventually became spaces just for nomads, not for white settlers.³⁹ Of course, and as the colonial presence increased, the local population became increasingly secretive toward intruders. Settler Margarethe von Eckenbrecher wrote about how local groups survived in arid landscapes by eating certain plants and roots—and adding that they would not share this knowledge with the Germans.⁴⁰

The inability or unwillingness of newcomers to see existing structures and modifications of landscapes were not surprising. As more broadly discussed by Lowenthal, “Any impacts that settlers did note seemed to them trivial, wasteful or unproductive. Indigenous unable or unwilling to abandon ‘primitive’ practices for permanent settlement were thus held doomed to give way to superior races with advanced technologies.”⁴¹ In Namibia, Herero had long moved their cattle along with ecological patterns. German encouragement to settle down made little sense to them. Their minds were not changed once they saw repeated crop failures by those newcomers that themselves misunderstood rain patterns, soil, and climate.⁴² A far cry from the artificial division between nature and culture that lay at the heart of colonial narratives around development and progress, they had their own modern structures. German colonists, on the other hand, looked down on semi-nomadic traditions. Maybe, at best, they pointed to previous efforts by Herero as the baseline for much-needed development and technology.⁴³ One commentator in a German colonial newspaper spoke about “decades of mismanagement” by Herero when describing the work that lay ahead for German colonizers;⁴⁴ individuals such as geographer Karl Dove later used the word *Pfütze* (puddle) to belittle existing structures.⁴⁵ Already in February 1888, a sequence of articles in one newspaper had blamed the indigenous population for not maintaining wells before outlining a bright future under German rule.⁴⁶ More often than not, an underlying ethnocentrism left little room for anything non-German.⁴⁷ After all, African landscapes

in no way matched long cultivated German *Kulturlandschaften*. To Germans, this indicated that Africans had done little to make the area habitable, sustainable, or profitable. Curt von François encapsulates some of these attitudes. Steeped in Prussian military traditions, a colonial mindset, and a good dose of racial supremacy, he pointed to the wide availability of water to easily grow corn, wine, and even rice.⁴⁸ In his view, Africans had simply not done enough to make use of the “waterless steppe of Namaland.”⁴⁹

For the Germans such attitudes had drawbacks as well as benefits. For one, it resulted in several mishaps. According to two scholars, missionaries at times “diverted and destroyed springs by unskilled experimentation with dynamite to establish agricultural settlements.”⁵⁰ Take the mission station in Keetmanshoop. Built in a dry riverbed that newcomers either knew little about or could not fathom would ever become a problem, it washed away during heavy rains in 1890. Head missionary Tobias Fenchel had to rebuild on a hill nearby.⁵¹ Another missionary, who had pushed the local population toward gardening and agriculture, saw his dam in the Nossob riverbed washed away.⁵² But for colonists the inability to see transformations of landscapes also had its upsides. According to Lowenthal, “it suited colonial incomers to overlook signs of native alteration: the apparent absence of indigenous ‘improvements’ helped justify the removal of indigenous tribal lands.”⁵³ By the 1890s German authorities certainly employed different avenues to strengthen their colonial rule—and access to water mattered greatly in that context. As outlined by Gewalt, Herero pastoralists living in Okombahe and Berg-Damara farmers had been within a rich symbiotic relationship for some time. However, the Germans believed the Herero had subjugated and enslaved Berg-Damara.⁵⁴ Efforts framed as “help” became useful avenues for German colonists when trying to divide and conquer, limit Herero power, restrict overall movement, and gain access to labor, land, and water. Local groups, on the other hand, tried to situate themselves within shifting power structures. That turned out to be a complex process, particularly in times of divisions among the Herero. German authorities removed gardens, lands, and Berg-Damara from the Herero.⁵⁵ For them, that opened up spaces for settlers to transform landscapes while ending a supposed waste of resources. After all, for colonialists this was a struggle against destructive forces.⁵⁶ Agriculturalist Richard Hindorf, who spent about a year in Southwest Africa, pointed to the need to transform and improve upon nature with wells, dams, and all kinds of irrigation systems, all to easily sustain agriculture.⁵⁷ That there would be no room for the existing population within such transformation was implied or sometimes stated directly. To follow a popular German novel about German Southwest Africa by Gustav Frenssen published later, “These blacks have deserved death before God and man not because they murdered 200 farmers and rose up against us [Germans in 1904] but because they have built no houses and have dug no wells.”⁵⁸



Figure 4.1. “Spring in the Grootfontein region,” Scheel, *Deutschlands Kolonien*, 83, HathiTrust/public domain.

Nonetheless, African environmental infrastructure provided the foundation for the German settler topography. Expeditions used existing routes like the Baiweg or dry riverbeds both for convenience and the potential of underground water.⁵⁹ Since there existed few reliable maps of the interior they also trusted local guides both when searching for water and when scouting out new travel routes.⁶⁰ Although “[t]he great variety of toponyms did not satisfy the Europeans’ demand for geographical unambiguity,” to follow one scholar,⁶¹ such indigenous knowledge still influenced German understandings of their surroundings, of course without giving Africans much if any credit. Key German writers such as Victor Franke and Heinrich Vedder built on the knowledge of Kakurukouye (alias Kasupi) from the western Kaokoveld in Ombepera and the “big man” Tjongoha of Kaoko Otavi, respectively.⁶² Similarly, missionaries out to convert generally settled next to indigenous groups that themselves had taken root near sources of drinking water.⁶³ Take Winterhoek, as Jonker Afrikaner called it, today’s Klein-Windhoek and a location known for its hot springs.⁶⁴ There and elsewhere missionaries built small dams and dug wells, thereby adding to existing structures.⁶⁵ Nomenclature of certain topographies, or simple terms such as *Fontein* (spring) or *Vley* (waterhole or pond), spoke about such a transfer of knowledge as well (Figure 4.1). Klipfontein (now Bethanie), a village located in the south originally known as Ui- \neq gandes, got its name due to the discovery of water (*fontein*) under a rock (*klip*).⁶⁶ Franz-

fontein, to follow a farmer in a magazine later on, was an area that used to be inhabited by a Khoikhoi group. It soon housed the farm of Hubertus Janson and Carl Schlettwein.⁶⁷ A quick look at the list of German settlements included in the 1901 German Colonial Handbook outlines numerous imposed features that took over existing waterholes.⁶⁸ Indigenous water topographies were thus the unsung heroes at the heart of German settler structures.⁶⁹

From a German perspective, real development began with their arrival. Missionaries had done some work already, of course; but real improvement defined by broader national and colonial efforts took off in 1884. “Certainly, the possibility of well systems is an extremely important factor concerning the cultural development of the country,”⁷⁰ noted Hugo von François. Soon soldiers worked on the improvement and new construction of water holes along major travel routes, especially the Baiweg.⁷¹ A report by François illustrated some underlying misconceptions of original observations concerning rivers—it turned out that in several instances previously described streams were no more than “unimportant sidearms” and rivulets, or were not even connected to other rivers.⁷² The seasonal character of rivers, and their force once flushing down a long-dried up riverbed, surprised Germans as well. As François noted at one point, “Southwest Africa’s rivers have the odd peculiarity that they hold no water in the dry time of the year. And even in the rainy season they only flow at times.”⁷³ A lack of knowledge did not hold back bold claims, however, including that certain springs could easily sustain “an infinite number of cattle.”⁷⁴ Reports mostly published in the *Deutsches Kolonialblatt* newspaper gave potential newcomers the impression that these were sustainable locations for German settlements.⁷⁵ Even Hugo von François pushed such claims. “It is a misconception to apply the traditional understandings of arid barren Africa readily to our protectorate,” he noted. “Southwest Africa has lots of water; one just has to learn how to find and develop it.”⁷⁶

Western experts also began studying ways to solve the perceived waterlessness. In 1892, geographer Karl Wilhelm Dove surveyed “the climatic and hydrological circumstances with attention to the possibility for more intensive soil utilization”⁷⁷ for the German Colonial Society. In his view, a network of measuring stations and rain gauges easily manned by citizen scientists doing their patriotic duty could provide essential data regarding temperatures, precipitation, and more. Dove’s overall report, published in sections in a bulletin later, included some cautionary tales concerning the limits to agriculture.⁷⁸ Though his assessment disrupted some initial fantasies regarding the potential for large scale settlement ploys namely around Windhoek,⁷⁹ Dove actually saw the problem not with aridity. In his view, the issues lay with a lack of scientific ingenuity. He compared the region to neighboring South Africa, noting that in Southwest Africa scientific research “plays the role of a maker, pushing this landscape towards happiness and prosperity, and maybe that one towards the silence of the death.”⁸⁰

Meanwhile farmers had already begun dealing with aridity; they also framed their efforts as fights against nature. Farmer Ludwig Dominikus, who had owned Farm Stolzenfels since 1871, claimed that the alluvial soil along the riverbed is excellent. He added that “it will be up to the available means whether agricultural endeavors at the Orange River will be profitable” or not—he certainly needed more financial resources to expand his efforts.⁸¹ In 1891, he wrote to a colonial newspaper demanding support for drilling, reservoirs, and dams.⁸² Missionary Büttner had by then mentioned efforts at Stolzenfels, including a pump powered by a donkey that sustained the cultivation of tobacco.⁸³ Carl Schlettwein, who came to the colony in 1896 and became an important voice for farmers throughout the colonial period, pointed to the use of domesticated animals for pumping up water efficiently at Groot Spitzkop in 1899.⁸⁴ A certain Mr. Nitze, “in tireless diligence” and lots of hard work, had turned a wasteland into a blooming garden elsewhere.⁸⁵ According to the already mentioned Dominikus, examples of newly built water reservoirs or dams near Ukamas (Walser), near Arris (Rautenbach), or at the Bakflus showcased further possibilities.⁸⁶ German farmer Petersen, who settled at Außenker along the Orange River by 1885, emphasized the lack of labor when trying to build any irrigation structures and also saw a bright future.⁸⁷

Berlin’s growing commitment to the protectorate eventually brought a somewhat more comprehensive approach to the solution of the water question. The appointment of Governor Theodor Leutwein in 1894 transferred naval staff surgeon and veterinary expert Ludwig (Louis) Sander to the colony. Leutwein himself had explained that there was “an urgent need for improvement as far as water supplies and pasture land are concerned.”⁸⁸ He also saw the issue of water in the context of a potential war with the Bondelswarts. “The country is so deficient in water and pasture land that a force of 100 men would pose an almost insoluble supply problem. We would be defeated not by the people, but by Nature, to say nothing of the fact that our headquarters at Windhoek are a long way off.”⁸⁹ In any case, Sander accompanied the governor on several expeditions. Although mostly focusing on animal diseases and pandemics, his publications also touched on water issues. His *Proposal for the Development of Southwest Africa* in particular outlined that this is a land “that struggles with a massive shortage of water under its natural conditions.”⁹⁰ Apart from pointing to the scarcity of that resource and the limits imposed on agriculture, cattle farming, settlements, and exports, Sander discussed the fertile soil within the region. In his view, it is full of mineral nutrients. “Just resolving the water [issue] is missing to make it accessible for plants.”⁹¹ There seemed to be little to learn from African societies. At least Sander did not point to them. In his view, German colonists could learn much from the experiences and successes around irrigation schemes in the neighboring Cape Colony. Regarding costs, he simply suggested doubling regular expenditures given anticipated “African

difficulties.”⁹² The *Deutsches Kolonialblatt* newspaper certainly endorsed such optimism when noting that the colony “was far from being arid.”⁹³ Sander was particularly confident about the future of dams and other structures meant to support the cultivation of potatoes, barley, legumes, and turnips, reforestation and even the introduction of fish.⁹⁴ Newcomers should also begin growing wheat, corn, and rye given “that the population is largely German.”⁹⁵ This last comment plainly outlined his vision for a productive *white* settler space.

Such calls for action faced support and criticism. Georg Hartmann, who had arrived in the protectorate in 1893 and traveled extensively for several private companies, confidently pointed to “an abundance of water laying in the ground;” he also saw a need for infrastructure to access it, specifically wind power: “There is enough water around. It is just resting in the depth and must just be unearthed by force. Nature with its year-round winds already provides the power to do so.”⁹⁶ In his view, much is possible in this only outwardly arid landscape. Early settlers like August Seidel also chimed in. He claimed that the colony had been underestimated in value and that settlers just needed to start digging for water: “I myself already built four wells and always strike water.”⁹⁷ Seidel also referred to dams and other infrastructure. An article in the *Deutsche Kolonialzeitung* newspaper pointed to problems that Sander might have underestimated. Overall, however, that paper also supported irrigation schemes.⁹⁸ At the same time calls for investments into irrigation structures, or at least the employment of an actual hydrology engineer expert, met concerns. According to the *Deutsches Kolonialblatt* newspaper, decision-makers wondered about “profitability.”⁹⁹ Governor Leutwein, forced to work with a tight budget, had to weigh costs and benefits of any major investment. Uncertain about future settlements, and receptive to the anxieties of local farmers, he favored private irrigation initiatives. Those had materialized in the Keetmanshoop district on the farms Ukamas, Kais, Nonchas, Klipdamm, Jamahaalen, Korzibib, and Aronab. Plus, some farmers like Mr. Brand had built dams already, in his case in Mariental.¹⁰⁰ For those awaiting government assistance regarding irrigation at least the formation of the *Kolonialwirtschaftliches Komitee* (Colonial Economic Committee) in 1896, meant for “the economic elevation of the protectorates,”¹⁰¹ gave some hope.

Yet it took massive lobbying efforts and broader shifts in colonial policies to move forward. The Colonial Department of the Foreign Office, the Colonial Society, and several well-known private entities got involved. On 14 June 1895, those entities formed a syndicate in Berlin, the *Syndikat für die Bewässerungsanlagen in Deutsch-Südwest-Afrika*.¹⁰² Ernst Vohsen, a well-connected former German consul in Sierra Leone, together with Sander, took the lead. Vohsen had an impressive resume. After working for the French company *Compagnie du Sénégal* in Freetown, Sierra Leone, he became German consul on site. He later worked for the East African Society in Zanzibar before taking over as di-

rector from Carl Peters in 1888. Three years later he stepped down to run the publishing house Ernst Reimer. Vohsen was also part of the German Colonial Society, which channeled funds to the syndicate right away—including 20,000 Marks for irrigation systems in German Southwest Africa.¹⁰³ Sander, who broadly sketched out the creation of the syndicate in the press, pushed for scientific expeditions to evaluate potential locations for large structures near Rehoboth, Otjimbingue, Seeis, and Hatsamas.¹⁰⁴ He was certainly excited about the syndicate's prospects. And, he was confident that forthcoming investments would generate a report indicating “that it was not legitimate at all to decry Southwest Africa as a desert.”¹⁰⁵

Water Structures

Sander's call for experts found a good fit in hydrology engineer Theodor Rehbock. Often described as a pioneer, his resume outlined his expertise when it came to all things water.¹⁰⁶ Later to follow in the footsteps of renowned hydrology engineer and straightener of the Rhine River, Johann Gottfried Tulla, he was born the son of a businessman in Amsterdam in 1864. Rehbock studied civil engineering at the Technical University in Munich and Berlin-Charlottenburg. He worked in Berlin, including for architect Paul Wallot in the final stages of the construction of the Reichstag parliament building.¹⁰⁷ He also spent two years as the assistant of renowned hydrology engineer Ludwig Franzius in Bremen, a position that shifted his interests toward hydrology. After a research trip tied to irrigation that included visits to the American Southwest, Rehbock eventually moved to Berlin to open an agency. Such experiences and interests made him a perfect candidate for a stint to Southwest Africa funded by the syndicate.¹⁰⁸

Rehbock's expedition to the colony faced numerous delays and challenges. In his travel descriptions, he wrote about “a rather pleasant” journey aboard the steamer *Mexican*.¹⁰⁹ He arrived in Cape Town on 20 August 1896. With a working space in the German consulate, Rehbock hired Chemist James Charles Watermeyer as his assistant. At the time working in the agricultural ministry in Cape Town, the latter had “been highly recommended to him” not least because he had helped in previous endeavors tied to what contemporaries referred to as civilizing structures.¹¹⁰ While Watermeyer waited to get approval for release time, Rehbock spent his days studying everything related to water, exploring town, and entertaining all kinds of dinner invitations. He saw an aged Theophilus Hahn, in Rehbock's view “the best expert on the country I have ever met.”¹¹¹ He got around, traveling first to Port Elizabeth, later to Oudtshoorn to see the Grobbelaars River and maybe the large ostrich farms, and ultimately on to the Touwsrivier. After boarding the steamer *Leutwein*

to Southwest Africa on 7 October he made a rare admission of ignorance: he had envisioned conditions in the Cape Colony “from Europe in a rather incorrect manner.” Rehbock added, “I had anticipated finding an abundantly rich land and instead, I found a sterile soil, that only strenuous work can get meager fruits out, because for the largest part of the land the nourishing water is missing completely.”¹¹² Maybe fittingly, a drought then welcomed both him and Watermeyer when landing in Swakopmund. They could not find anyone willing to take them inland and thus stayed busying trying to find ways to sustain the growth of the town. It took five and a half weeks until they finally had horses as well as the help of five Berg-Damara to leave the coast. Rehbock later complained about a lack of wells and watering holes along the Baiweg, their route to the interior prior to any railway.¹¹³ Once the rainy season caught up with them the expedition suddenly faced flash floods. In one instance at the Khan River the situation got dangerous: “One of the oxen would have certainly drowned if it was not for the help of some of the Herero, at the risk of their own lives, saved it,” he wrote.¹¹⁴ The trek finally reached Windhoek with “its cultivated gardens and numerous shady trees,” as Rehbock would later describe it to an audience in Berlin.¹¹⁵ It was the day before Christmas Eve.

Rehbock’s expedition was elaborate. According to his own report, they covered a stunning 8,000 kilometers by ox wagon and horse.¹¹⁶ First, he and Watermeyer spent time in the area around Windhoek. Apart from meeting with local colonial officials and farmers, including Sander, they also assessed options tied to large dams near Awispoortand in Hatsamas.¹¹⁷ In Rehbock’s view, “Based on this kind of climate Europeans are not just able to do intellectual work but are also able to do extensive physical labor. Given the small number of natives and the inability of a large part of them when it comes to ongoing physical labor the development of the country will need to be based primarily on a white labor force.”¹¹⁸ Second, the expedition visited structures meant to solve the water question. With little interest in engaging with African experts long familiar with existing landscapes, Rehbock and Watermeyer only spent time with German settlers and farmers. The recent 1896 drought had brought some careless settlers to their senses, Rehbock commented, and farmers “have begun to take better advantage of their surroundings by digging wells and by building small dams, which will prevent the repetition of major losses in the future.”¹¹⁹ Mr. Wheeler of Farm Seeheim, for one, presented a plan that included a centrifugal pump, powered by two oxen, for irrigation of grain, fruit, and vegetables.¹²⁰ Several settlers had since gotten to work: Farmer C. Walser of Ukamas in district Keetmanshoop had built a dam in a dry riverbed by the mid-1890s;¹²¹ Farmer Voigtland of the company Wecke & Voigts near Windhoek, and the Farms Hoffnung (hope) and Unverzagt (undismayed) of the settlement society, and Farmer Gessert of Inachab near Bethanien had begun building earth dams.¹²² Farmer Hermann Brandt of Marienthal, who had emi-

grated to Namibia from Germany via South Africa, had anticipated damming a lake of 39,200,000 cubic meters. He planned to irrigate an area of 1,000 hectares.¹²³ The Wecke & Voigts company also had irrigation setups that relied on a Bakkiespump (a bucket-and-chain setup) on their farm near Okahandja.¹²⁴ Plus, there had been efforts to drill for water and install pumps along main trade routes.¹²⁵ Settler Farmer Ferdinand Gessert, who at one point traveled to Egypt to study irrigation, particularly dominated early discussions surrounding irrigation schemes in Southwest Africa.¹²⁶ Seen by many contemporaries as an independent mind and pragmatist with deep German roots and pride, Gessert believed that dams and wells would turn the colony into an oasis for all kinds of fruits such as figs and grapes.¹²⁷ Although Rehbock himself was more interested in larger projects, like a dam at the gap of the Löwenfluss,¹²⁸ conversations with locals such as Gessert influenced his plans. On the surface, this showcases the role of German knowledge. However, such expertise was, in the end, grounded in existing African understandings and experiences. After all, German newcomers had originally relied on the help of their workers, guides, and other Africans when trying to make sense of their surroundings. Apart from the reliance on German settler knowledge, British South Africa remained Rehbock's main point of reference. While waiting in Cape Town, Rehbock had studied local hydrology literature, especially an array of blue books tied to land management; he had also visited some actual sites, including the last remaining forest areas, Knysna Forest and Titsikamma Forest. He would later talk about intricate irrigation systems and dams, as well as fruit trees, gardens full of grass, clover, grain, and bamboo.¹²⁹ "The blessing of artificial irrigation in arid areas is apparent with surprising clarity," he outlined to an audience in Berlin.¹³⁰ Eleven months later he made time to return to Cape Town. There, he visited what he described as "the biggest and most famous dam of South Africa, the van Wyks Vley."¹³¹ Barely in use due to the ongoing drought, Rehbock later pointed to "faulty assumptions" regarding its construction.¹³² He concluded without much humility that if South Africa, "which has also not been blessed any more by nature," can provide a comfortable life for many, then German Southwest Africa could certainly do so.¹³³

Once back in Germany, an elaborate marketing campaign pushing for investments into large-scale structures took off right away. It all began with a presentation in Berlin on 26 November 1897, a Friday. Many attended the gathering taking place in the big ballroom of the exquisite Hotel Kaiserhof.¹³⁴ With little time to analyze his findings, as Rehbock himself readily admitted, his talk was no more than an overview of the journey to the local chapter of the Colonial Society. Soon articles about specific opportunities in Hatsamas and elsewhere popped up.¹³⁵ In 1898, Rehbock then published a massive volume about the potential for the economic development of Southwest Africa. Of course, he emphasized large-scale irrigation projects. Organized in ten sections, and full



Figure 4.2. 116-357-028, Theodor Rehbock, March 1897, courtesy of the Bundesarchiv Koblenz.

of beautifully illustrated color sketches of proposed setups, the volume packaged main findings and vision for transforming the land. Accompanied by numerous articles in the press,¹³⁶ photographs sustained Rehbock's claims and overall narrative that these were far from arid wastelands. That storyline also defined a larger photo book published the same year.¹³⁷ Beautifully bound and containing a total of ninety-six snapshots, it disclosed Rehbock's own viewpoint and perspective. Photos show roadways, means of transportation, structures, panoramic outlooks onto landscapes, and domesticated animals—and one photo of a man, likely Rehbock himself, gazing onto water ready for use (Figures 4.2 and 4.3). Such a standpoint was meant to outline the dynamism and potential of this German colonial space, a storyline soon slopped all over the media.¹³⁸ The local African population, on the other hand, remained little more than a backdrop, situated within untamed, arid landscapes or in group photos and close-ups that have long defined the imperial gaze.

This promotion of what Rehbock called “Germany’s duties in Southwest Africa”¹³⁹ pushed two main points. First, water can be accessed with little effort by drilling wells or by constructing dams, all of which could lead to “extensive livestock breeding”: cattle in Hereroland and sheep, horses, and ostriches in Namaland.¹⁴⁰ Second, several locations in the Herero and Namaland are suitable for larger dams. That infrastructure could easily become the basis for



Figure 4.3. 116-357-067, Theodor Rehbock, June 1897, courtesy of the Bundesarchiv Koblenz.

broad irrigation schemes feeding fertile alluvial soils. As a result, expansive agricultural production could sustain inhabitants in several centers (Figure 4.4).¹⁴¹ Rehbock specifically proposed the construction of six major dams, four of them near Windhoek and two further south—the largest of those should hold 67 million cubic meters of water.¹⁴² Watermeyer agreed with Rehbock’s endorsement of drilling crews, pumping stations, wind power, dams, and irrigation systems.¹⁴³ It was equally clear to him “that gardening and agriculture can only be successful on alluvial soil or in completely leveled terrain on prime soil that can be watered extensively,” and that the solution of the water question—including along major travel routes—was vital for the future development of the colony.¹⁴⁴ In that sense, neither Rehbock nor Watermeyer believed that natural forces and circumstances could hold back the economic development of the colony once investments into infrastructure materialize. In their view, and in the view of the Syndicate more broadly, “diligence and care,”¹⁴⁵ so German ingenuity in the conquest of nature, could transform wastelands into blooming agricultural spaces.

These proposals saw widespread support among other experts. Geographer Karl Dove largely agreed with Rehbock or at least saw his contributions as essential for the development of the colony. In 1899, he outlined the need for dams and irrigation systems for agriculture and farming; he also pointed to the importance of small private dams.¹⁴⁶ Support also came from professor

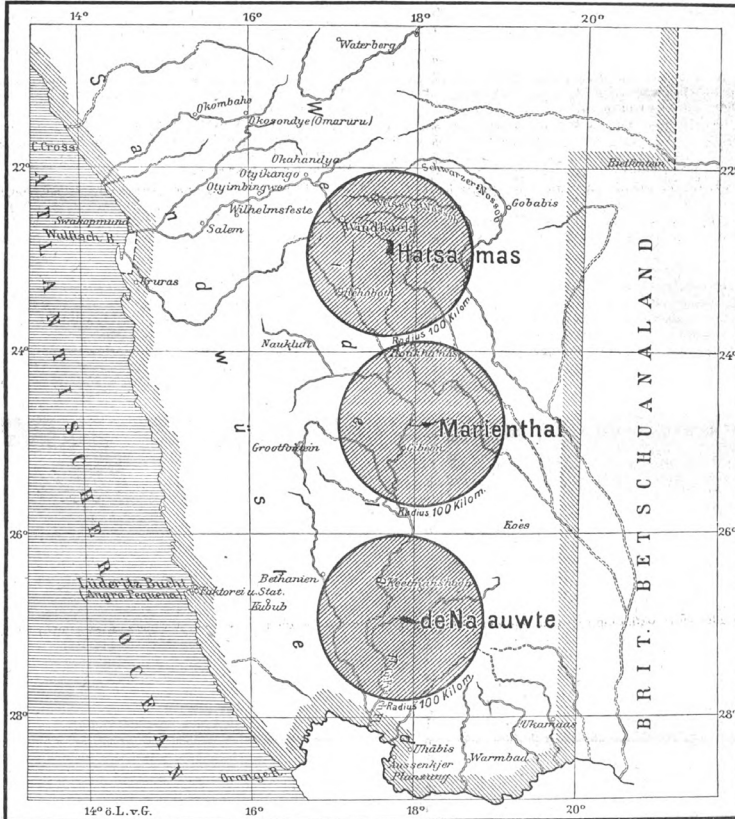
auch sonst im südlichen Hererolande die günstigsten örtlichen Verhältnisse für die Besiedelung bietet.

Am Ramalande würde dann ferner für die Gründung landwirtschaftlicher Kolonien zunächst die Form Marienthal ins Auge zu fassen sein, die eine für die Anlage eines großen, wenn auch etwas flachen Staueses besonders geeignete Stelle besitzt, dessen Zuflussgebiet freilich nur auf 225 qkm angegeben wird, und eine

von den bewässerbaren Alluvialflächen entfernt liegen, sobald kostspielige Zuleitungen erforderlich werden.

Sollten genauere Untersuchungen gegen Erwarten ein ungünstiges Resultat ergeben, so müßten Nachforschungen nach anderen geeigneteren Stellen im Ramalande vorgenommen werden.

Selbstfalls haben aber die in Deutsch-Südwestafrika ausgeführten Untersuchungen bereits den Nachweis erbracht, daß es in diesem



Die Bewässerung von Deutsch-Südwestafrika.

Stelle am Löwenfluß oder Chamob bei de Naauwte, die ein sehr bedeutendes Speisungsgebiet von 6000 qkm aufweist und ebenfalls für die Herstellung eines billigen Staueses vortrefflich geeignet ist.

An diesen beiden letzten, auf der Kartenskizze angegebenen Stellen sind bisher eingehende technische Vorarbeiten noch nicht angestellt worden. Es ist indessen mit ziemlicher Bestimmtheit anzunehmen, daß sie alle Vorbedingungen für die Gründung von landwirtschaftlichen Kolonien besitzen, wenn auch die Staualanlagen etwas weit

Schutzgebiete an Vertikalitäten, welche die Anlage landwirtschaftlicher Kolonien begünstigen, nicht fehlt.

Es verbleibt noch die Aufgabe zu zeigen, in welcher Weise die Verwirklichung der besprochenen landwirtschaftlichen Kolonien herbeigeführt werden kann.

Da das Reich nicht gewillt sein wird, die bedeutenden einmaligen Ausgaben für die Gründung solcher Kolonien, auch wenn auf eine angemessene Verzinsung gerechnet werden kann, selbst zu tragen, wird es erforderlich sein, hierzu Gesellschaften heranzuziehen,

Original from

Figure 4.4. "The irrigation of German-Southwest Africa," *Deutsche Kolonialzeitung*, "Die Besiedelung Deutsch-Südwestafrikas, III," 4 October 1900 (Rehbock), Hathi-Trust/public domain.

Ferdinand Wohltmann, who later became deeply involved in colonial agriculture. According to him, Rehbock and Watermeyer had brought light into “the mysterious darkness” that had long characterized the colony. Their proposal might solve the water question altogether. After all, he continued, the soil samples they had submitted “downright invited” the transformation into valuable agricultural lands.¹⁴⁷ Although he later acknowledged that all that might not turn Southwest Africa into a major settler colony due to broader “natural circumstances,”¹⁴⁸ addressing the issue of water would finally make up for previously missed opportunities. Organizations such as the Hatsamas-Gesellschaft society, which was grounded in Rehbock’s ideas, soon became the venue meant to implement proposals.¹⁴⁹ Chairman Consul Vohsen in Berlin took the lead again. Rehbock himself worked out the charter. Soon supporters approached the imperial government hoping for an interest guarantee of 3 million Reichsmark joint capital for the society.¹⁵⁰ Rehbock’s vision of large-scale irrigation schemes supporting broad settlements seemed to come together.

However, there had been some criticism as well, especially from farmers in Southwest Africa. One voice saw Rehbock’s proposal as “a remarkable submission” yet pointed to more cost-efficient earth-dams given financial implications; others outlined broader misconceptions about the region.¹⁵¹ In 1899, Rehbock had responded to criticism from Georg Hartmann in a thirty-two-page memorandum.¹⁵² Now settler and farmer Ernst Hermann from Nomtsas (formerly Kubub) criticized the “rosy calculations” put forward by the syndicate.¹⁵³ In his view, it was simply too early for large-scale dams. He also worried about the sole reliance on such structures.¹⁵⁴ Hermann had traveled throughout the colony for the German Colonial Society for Southwest Africa before settling down to breed sheep in 1890. His farm was destroyed during the war led by Hendrik Witbooi.¹⁵⁵ When it came to Rehbock’s broader proposal tied to irrigation, farming, and settlement he had concerns about costs and viability.¹⁵⁶ Rehbock, on the other hand, defended the need for adequate preliminary surveys, technical expertise, and, engineers;¹⁵⁷ he also claimed that farmers simply feared competition.¹⁵⁸ Yet funding did not materialize. Governor Leutwein, likely influenced by local sentiments against large-scale projects, ultimately did not endorse the proposal.¹⁵⁹ Whereas the governor emphasized “technical concerns,”¹⁶⁰ in a letter to Rehbock dated August 1899 he also outlined “that there is no market for settlers” to sell their products.¹⁶¹ Fears of failures, and the potential creation of “an unhappy proletariat” that no one will then be responsible for, loomed large as well.¹⁶² In the end, high officials in Berlin, including Kaiser Wilhelm II, seemed to be swayed by those concerns and denied the request of interest guarantees.¹⁶³ Although some funding into small-scale drilling efforts spearheaded by Watermeyer did come through,¹⁶⁴ only additional examinations and data by experts could possibly save large-scale projects.

Engineering Water

“The Country Needs Engineers!”¹⁶⁵ These were the words Alexander Kuhn wrote to consul Vohsen in July 1901, just three and a half months after arriving in Swakopmund. Although the government had hesitated to invest in large-scale projects, another expedition had made its way to the colony. Kuhn, an engineer himself, had been put in charge. Getting to that point had not been easy. Only once concerns about neglected responsibilities began haunting some officials did the expedition get funding.¹⁶⁶ The syndicate wasted little time in finding an engineer. They approached Philipp Holzmann AG, a Frankfurt-based construction company, to come up with a proposal; that company was also to suggest an engineer. Several months passed before formal recommendations brought Engineer Alexander Kuhn into the limelight. He was a good fit. Born in 1853 in St. Pölten, Lower-Austria, Kuhn had received a technical education. He later joined the Austrian civil service before starting to work for Philipp Holzmann AG in 1896.¹⁶⁷ After some delays tied to finalizing a contract, Kuhn got to work. Together with Engineer Skutari, who had been part of a survey for the infamous Baghdad Railway project,¹⁶⁸ their overall instructions were clear. As outlined by none other than Theodor Rehbock, “The reason for the expedition is to supplement already existing preliminary work for dam structures near Hatsamas, Marienthal and de Naauwte”; it also included efforts to work on broader irrigation systems for agriculture.¹⁶⁹ Apart from suggested readings by Dove, François, Sander, Rehbock, and others, that plan proposed an ambitious schedule: arrival in Swakopmund 5 February and return to Berlin 10 September.¹⁷⁰ According to Kuhn, the mission was about “sending an engineer with practical building experience to Southwest Africa, and based on the survey and assessment of that expert, make a binding proposal for the construction of a larger dam at Hatsamas.”¹⁷¹ In early February 1901, with concerns regarding the *Rinderpest* still lingering, Kuhn and Skutari traveled to the colony to complete “extensive preliminary work for promising . . . irrigation systems”—especially tied to the large dam system and its connection to the agricultural colony near Hatsamas.¹⁷² Their mission ultimately had three distinct objectives. First, Kuhn was to figure out possibilities tied to the construction of a large dam near Hatsamas. Second, he was to complete and expand the earth dam of Farmer Brandt in Marienthal (District Gibeon). Finally, Kuhn was to look into options tied to a large dam near Naauwte along the Löwenfluss southwest of Keetmanshoop.¹⁷³ Such efforts were meant to decisively dispel all those still following the “sandbox-theory,”¹⁷⁴ or the view that the colony had nothing to offer but desert.

Kuhn’s letters to Consul Vohsen and Theodor Rehbock buried in an archive in Karlsruhe showcase the engineer’s ambitious vision for transforming the colony. Running well behind schedule, Kuhn arrived in Swakopmund on 12 March. He had read much about the area beforehand—and there “was thus no

surprise once presented with the dismal sand desert of Swakopmund.¹⁷⁵ Kuhn met with long time farmer, trader, and ‘old African’ Gustav Voigts; he also listened to Governor Leutwein’s concerns.¹⁷⁶ Kuhn saw the *Rinderpest* as a warning regarding large-scale cattle-farming.¹⁷⁷ And he understood complaints, quarrels, and disagreements among settlers as a sign that honest, hard-working settlers, and “please no colonial soldiers” should settle the land.¹⁷⁸ Engineers instead of lawyers, judges, and administrators, he proclaimed.¹⁷⁹ Once he got to work, his surveys concluded that both the Hatsamas and the Naauwte dam were feasible large-scale projects.¹⁸⁰ He imagined much broader transformations of nature, however. “Once the dynamos are running and the first arc lamps of the whole protectorate blink in the silent hermitage,” he stated, “then peace and solitude of this valley are surely gone forever.”¹⁸¹ Elsewhere he painted a similar picture regarding the makeover of colonial spaces when stating that “[i]t would be of great lament if this by nature so favored a spot within a by nature so neglected land would not initiate a path towards more sensible conditions.”¹⁸² Private dams, he claims, were “primitive,”¹⁸³ and would do little to alter the region.

Kuhn’s findings eventually initiated another expedition. But first he published an extensive report following his return to Frankfurt in December 1901. Kuhn outlined “the necessity for irrigation schemes on a grand scale.”¹⁸⁴ In his view, this was the government’s job, not that of private entities.¹⁸⁵ “Either one creates larger irrigation systems in German Southwest Africa and with that, the opportunity for dense settlement by non-adventurers as well as the sustainable productivity of the land—or one stands at the same point fifty years from now where we are today granted the government and the Reichstag are willing to pay 8–10 million a year for the ‘protection’ of the land. There is not a third [option]!”¹⁸⁶ A whole wish list referencing projects and investments followed. Kuhn even outlined ways to harness the forces of nature with hydropower. First, however, surveys finding worthy locations for dams as well as observation posts collecting more data tied to climate, precipitation, and flash floods would be needed.¹⁸⁷ “The land is worth it that something happens!”¹⁸⁸ A second part then offered detailed reports, blueprints, and calculations regarding costs for the Hatsamas, Mariental, and Naauwte projects, all ventures he supported. Rehbock quickly endorsed the publication. In his view, the colony needed a dose of “American boldness” as embodied by Kuhn and his ideas.¹⁸⁹ Yet the acquisition of investments from parliament remained difficult. A working group had at least approved additional surveys in Southwest Africa and support for local dam-building projects; that entity had noted that expeditions to South Africa, Egypt, and North America could be useful to learn more about large irrigation schemes.¹⁹⁰ An official in the foreign office eventually approached the *Wohlfahrtslotterie* (charity lottery) for funding.¹⁹¹ Thankfully for those hoping for investments, it financed another expedition, this time to the Fish River. Kuhn’s second trip had three objectives: First, the creation of

a geographical map of the entire Fish River area at 1:100,000. Second, a cost estimate tied to damming structures in that region. Finally, and arguably most importantly, the expedition was to provide “encouragement and instruction” to farming associations and local authorities.¹⁹²

The Fish River Expedition ultimately sketched out even more extensive structures and investments. Beginning in 1903, and widely reported on at the time,¹⁹³ Kuhn first traveled to South Africa. He saw much potential when visiting Worcester. “The neighborhood is held up as a surprising example of what is and what might be done once employing irrigation.”¹⁹⁴ He was also excited about a specific crop when noting, “I was rather pleased from what I had seen in the last three weeks, and mainly overwhelmed by the success of alfalfa [also known as lucerne] cultivation, that I decided to initiate the development of a medium-sized dam system meant for alfalfa cultivation”—the area near Keetmanshoop seemed to be fitting for that purpose.¹⁹⁵ Joined by Rehbock’s former travel companion Watermeyer for parts of the journey,¹⁹⁶ Kuhn frequently compared what he saw in the Cape Colony with the German protectorate: “The development that the German Protectorate has gone through in the last twenty years since its takeover has certainly been comparatively quicker.”¹⁹⁷ At the same time, he acknowledged that more unfavorable climatic circumstances in German Southwest Africa were a problem—although “the higher intelligence of the average German settler compared to the majority of English [settlers]” could in his view easily make up for that.¹⁹⁸ Kuhn arrived in German Southwest Africa in early May. He was slightly deflated when he landed in Lüderitzbucht: “I thought I would return differently: with a plethora of artisans and workers, with a ship full of tools, construction equipment, locomotives, and dynamos.”¹⁹⁹ Instead, it was yet another expedition meant to collect mostly information. From the Atlantic coastline, the expedition moved inland, trekking through the Namib Desert by horse. Extensive travels to Gabachab, Itsabisis, Bethanien, Bersaba, Seeheim, and other locations along and near the Fish River defined the coming months. Apart from gathering intelligence tied to geographical, topographical, and environmental factors Kuhn commented on future possibilities. At Farm Seeheim he noted that a garden located on an island in the middle of the Fish River had long relied on a natural dam to cultivate orange trees as well as tobacco, various vegetables, barley, melons, and corn. Investments into a steam-engine pump, small mills, and another natural rock barrier further downstream could easily expand such schemes.²⁰⁰ Elsewhere the expedition began planting alfalfa, an effort settlement commissioner Rohrbach later described as a distraction from the needed hydrology work.²⁰¹ Of course, and as Kuhn readily acknowledged, the time on the ground was again “much, much too short.”²⁰²

Kuhn’s second expedition accomplished its objectives. The mission ended up completing topographical records of more than 1,900 kilometers and a map became available quickly.²⁰³ Kuhn also outlined a variety of additional prospects

pointing to earth dams with an overflow area as the most promising setup for farmers.²⁰⁴ For the Fish River he had a larger irrigation scheme in mind, a ploy meant to sustain “space for thousands of German emigrants.”²⁰⁵ His overall vision of transforming presumed wastelands into productive landscapes also included the cultivation of alfalfa and afforestation.²⁰⁶ An understanding in line with those long dreaming about the “greening of Southwest Africa,”²⁰⁷ supporters of these efforts such as Hans Schinz, Moritz Eduard Pechuel-Loesche, and Karl Dove tended to blame Herero for deforestation and overgrazing.²⁰⁸ Desiccation followed, they argued, “the drying up of surface water, a declining ground water level and a decrease in rainfall; all this was a result of human misuse of natural resources.”²⁰⁹ Thankfully, they claimed, German ingenuity, specifically engineers, would be able to re-green arid landscapes. Finally, the expedition had reached out to local farmers. Kuhn thus became aware of practical concerns and issues, including the need for tools like scrapers and plows.²¹⁰ This realization encouraged him to broadly sketch the basics for “an effective assistance” that included financial support from the government;²¹¹ it also helped him to more directly address their needs in his reports.

There had been some movement toward the support of solving the water issue up until that point. Sure, and to follow Lehmann, by the early 1900s, “the German administration had built only a single dam thirty-five kilometres east of Windhoek,” Neudamm.²¹² However, the apparent need for watering places had increasingly made boring for water a priority. That in turn led to the installation of the first drilling crew funded by the charity lottery.²¹³ According to one estimate, the crew would drill fifty-two holes by early 1904 with twenty-one considered a success.²¹⁴ By then the colonial administration had also begun compiling lists of existing farms to get a sense of locations, size, and sources of water.²¹⁵ The arrival of settlement commissioner Paul Rohrbach in 1903 and geologist Heinrich Lotz a year later also pointed toward forthcoming efforts regarding irrigation.²¹⁶ Whereas some of Kuhn’s more elaborate proposals still remained a hard sell at the time, the charity lottery ended up earmarking 2 million Marks for water development in Southwest Africa.²¹⁷ Kuhn remained optimistic, writing to Rehbock in late January 1904, “Came back from Southwest Africa, to where I plan to return to for maybe a longer time soon after the end of the stupid shootout and for the realization of construction, I am currently busy completing the report.”²¹⁸

Although the 1904 war disrupted such momentum, and ultimately put Kuhn’s proposals on ice,²¹⁹ the debate about solving aridity lingered for some time. Those in favor of massive investments as well as large-scale irrigation schemes and settlements did not give up easily. Rehbock complained in January 1904 that “again nothing will come from [the latest expedition] except paper.”²²⁰ In his view, “The whole story [of irrigation] will become rather important soon after the end of the Herero-shootout because the indigenous question may certainly not be solved comfortably with powder and lead,

but as a serious social problem, which elegant instrument includes work and pay.²²¹ Rehbock also believed that “fresh life” would be put into economic development after the war.²²² He already begun planning for it. Deeply worried about losing Kuhn’s expertise in the meantime, he left no stone unturned to speak favorably about the engineer.²²³ Both Rehbock and Kuhn also continually published in newspapers.²²⁴ Meanwhile settlers such as Carl Schlettwein and Gustav Voigts argued against large-scale investments and questioned the credentials of outsiders. In their views, those without personal experience of living in the colony should not be taken seriously.²²⁵

Yet an array of setbacks ultimately disrupted the work of irrigation proponents. For one, Watermeyer, who worked for drilling operations on the ground in Southwest Africa, died in the war.²²⁶ As that conflict dragged on it also became more and more difficult to hold on to Kuhn. By April 1904 he had agreed to work for the colonial government in Southwest Africa. According to his contract, he was to project and estimate irrigation systems, oversee construction, and further support economic development—all beginning by December 1904.²²⁷ By February 1905, Kuhn wrote to a high official in Southwest Africa that he planned to come to the colony by the end of April.²²⁸ Apart from avoiding a still conflict-ridden colony, that deferment allowed him to travel to North America to learn more about irrigation schemes, specifically in the American Southwest.²²⁹ At that point he chimed in on the indigenous question. Unlike many of his contemporaries, and in line with some comments in his letters from Southwest Africa,²³⁰ Kuhn pushed for a trade education system similar to what he saw in the United States. Not all graduates will turn into a Booker T. Washington, he noted, yet decent, reasonable, and useful citizens capable of doing trade jobs could certainly emerge.²³¹ Another delay until June 1906 then gave Kuhn a window to travel to South America.²³² His sudden death likely due to meningitis in Chile that year came as a shock. As noted in one obituary, this tragedy robbed the government yet again of a man many hoped would solve Southwest Africa’s water question.²³³ Rehbock, by now heading the River Hydrologic Laboratory in Karlsruhe, tried his best to carry on the torch.²³⁴ In subsequent years he would repeatedly push for the implementation of existing proposals; he also continued to write directly to Colonial Secretary Bernhard Dernburg. Engineers are needed, he argued tirelessly, to avoid mismanagement and financial waste in the future.²³⁵

The water question defined Southwest Africa. Long before the arrival of German colonists Herero, Nama, and other African societies had relied on ways to survive in outwardly arid and hostile wastelands. German newcomers generally dismissed their local expertise and environmental infrastructure—though both

spilled into emerging colonial topographies. Efforts to solve the water issue took off with the installment of Governor Leutwein in 1894. Yet initial surveys, expeditions, and reports lacked coherence. It took experts such as Sander, Rehbock, and Kuhn to formulate German visions. The latter two in particular outlined large-scale transformations of the colony and showcased a belief in massive irrigation schemes. In their view existing desert wastelands in Southwest Africa were just awaiting German investments, awakening, and makeover.²³⁶ Until 1903, progress was slow, to follow Helmut Bley.²³⁷ At the same time, pressure to invest seemed to build. In 1902, for instance, the withdrawal of funds earmarked for dams to sustain Windhoek resulted in a media outcry.²³⁸ Plus, momentum increased following Kuhn's second expedition. The 1904 war disrupted all of that—"what had been created has been largely destroyed," to follow one commentator that year.²³⁹ By then there had been 276 farms, 200 wells, and 40 dams. To quote a colonial official later on, "All of these efforts were destroyed by the indigenous rebellion, yet at the same time exactly that showcased the necessity to put forward larger means for the development of water sources."²⁴⁰

The presumed conflicts between human ingenuity and natural forces shaped colonial narratives. Initial German water topographies more or less built on indigenous understandings and environmental infrastructure. However, grand narratives of German conquest silenced such inputs to claim ingenuity and superiority. Colonial storylines defined progress and development based on the creation of a profitable or at least self-sustaining settlement colony comparable to neighboring South Africa. Rehbock and Kuhn, who most directly encapsulate the imperial expert as drivers of modernization, pointed to technology and willpower. In their view, only major investments and large transformations of existing landscapes would solve the water question and make deserts bloom. Part of a global network that repeatedly referenced the American Southwest, they clashed with settlers in Southwest Africa. Schlettwein, Voigts, and Brandt saw themselves as the real experts, with knowledge about natural forces and actual experience working the land. For them, small dams would be needed, not large projects. Although such disagreements and broader hesitations stalled initial investments, these views agreed on the need to solve the water question to allow for the creation of living space for white settlers; they also all framed it as a battle against nature.

Notes

1. Kundrus, *Moderne Imperialisten*, 49.
2. Daniel Joseph Walther, *Creating Germans Abroad: Cultural Policies and National Identity in Namibia* (Athens, 2002), 10.
3. Gerstenhauer 1903, 217, as quoted in Schneider, "Bewässerungswirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 124.

4. *Deutsche Kolonialzeitung*, "Die Lage in Deutsch-Südwestafrika," 19 August 1893. See also Walther, *Creating Germans Abroad*, 9.
5. Walther, *Creating Germans Abroad*, 17.
6. *Der Tropenpflanzer*, "Siedlungsgesellschaft für Deutsch-Südwestafrika," no. 8 (August 1902).
7. Kundrus, *Moderne Imperialisten*, 50.
8. Edgar von Uechtritz und Steinkirch, *Berichte des Barons Edgar von Uechtritz und Steinkirch aus Windhoek, Hoachanas und Tinkas 1891–92* (Berlin, 1892), 5.
9. Hydrographic Office, ed., "Chapter VI," 21. See also *Petermanns geographische Mitteilungen* 33, "Karte des unteren !Khusebthales," 1887, 202–14 (Stapff).
10. Donald Worster, *Rivers of Empire: Water, Aridity, and the Growth of the American West* (Oxford, 1985), 11; Blackbourn, *The Conquest of Nature*, 191–92.
11. Martha Hyman, "The Legend of the Fish River Canyon," 13–15, here 15, in *Muzimbikana and other Namibian Adventures*, ed. Namibia Oral Tradition Project (Windhoek, 1997). See also Schneider, "Bewässerungswirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 111–16.
12. Kenapeta Tjatindi, "Kahimemua," 123–33, here 124, *Michael Scott Oral History Project*.
13. Willy Njanekua and Kasisanda Muuondjo, "Herero Clans and Customs," 28 January 1986, 134–149, here 148, in *Michael Scott Oral History Project*.
14. Njanekua and Muuondjo, "Tjiponda, Kahivesa, and the Wars of the Hereros," 28 January 1986, 168, in *Michael Scott Oral History Project*.
15. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 7–8.
16. *Ibid.*, 3–5. See also Christel Stern and Brigitte Lau, *Namibian Water Resources and Their Management* (Windhoek, 1990), 4–5; Hoffmann, "Since the Germans Came It Rains Less," 24–29. Some research even outlines abilities to sustain a pastoral lifestyle in the Omaheke (Otjherero for "sand field") Desert. Karl-Johan Lindholm, "Wells of Experience: A Pastoral Land-Use History of Omaheke, Namibia" (PhD diss., Uppsala University, 2006).
17. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 10.
18. *Ibid.*, 3.
19. Büttner, *Walfischbai und Angra Pequena*, 21.
20. *Deutsche Kolonialzeitung*, "Deutschland und Angra Pequena," no. 14, 1884.
21. Interview no. 26 (Viruuo Gotthard Yoshua Kamberipa, 2.4.1990, WDH, translator Ebson Kapuuo), as referenced in Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 3.
22. Büttner, 1883a, 533, as quoted in Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 6.
23. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 4. See also Lindholm, "Wells of Experience," 20–21; Karl-Johan Lindholm, "A New Approach to the Archaeology of Livestock Herding in the Kalahari, Southern Africa," *Antiquity* 83 (2009): 110–24, here 118.
24. Heinrich Vedder, *South West Africa in Early Times*, trans. Cyril G. Hall (London, 1966), 47.
25. Chief Omusindi's neighbor Kambungu agreed to the construction of a well in a riverbed near their own. Whereas both groups got along originally, the proximity eventu-

- ally resulted in conflict, at least according to Vedder. See Vedder, *South West Africa in Early Times*, 159.
26. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 6.
 27. Kinahan, *Pastoral Nomads of the Central Namib Desert*, 87.
 28. Kinahan, "From the Beginning," 34–35, in Wallace, *A History of Namibia*.
 29. Oral history interviews with various Nama elders (NAN, NiD/NaDS Accession) as referenced in *The Kaiser's Holocaust*, 23. See also Casper W. Erichsen, *What Elders Used to Say: Namibian Perspectives on the Last Decade of German Colonial Rule* (Windhoek, 2008). Nama oral traditions speak widely about water as "the centre of everyone's life in this dry land." See Braam Naude, "The Young Girl of Ani-Abes," 16–18, here 16, in Namibia Oral Tradition Project, *Muzimbikana and Other Namibian Adventures*.
 30. Stern and Lau, *Namibian Water Resources and Their Management*, 5.
 31. Vedder, *South West Africa in Early Times*, 364. See also Brigitte Lau, "Conflict and Power in Nineteenth-Century Namibia," *The Journal of African History* 27 (1986): 29–39.
 32. Büttner 1879, 285–294, as quoted in Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 109.
 33. David Lowenthal, "Empires and Ecologies: Reflections on Environmental History," in *Ecology and Empire: Environmental History of Settler Societies* (Seattle, 1997), 229–36, here 234.
 34. Vedder, *South West Africa in Early Times*, 191.
 35. Ibid. See also Klaus Dierks, "Pfade, Pads und Autobahnen: Verkehrswege erschließen ein menschenleeres Land," in Becker and Hecker, *1884–1984*, 25–34, here 27; Dierks, *Namibian Roads in History from the 13th Century till Today*.
 36. *Petermanns geographische Mitteilungen* 33, "Karte des unteren !Khuseibthales," 1887, 202–14, here 213 (Stapff).
 37. Emmanuel Kreike, *Re-Creating Eden: Land Use, Environment, and Society in Southern Angola and Northern Namibia* (Portsmouth, NH, 2004), 13.
 38. Schlettwein, *Der Farmer in Deutsch-Südwest-Afrika*, 16–17.
 39. François, *Nama und Damara*, 40.
 40. Eckenbrecher, *Was Afrika mir gab und nahm*, 51.
 41. Lowenthal, "Empires and Ecologies," 235.
 42. Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 111–12.
 43. Schöllnbach, *Die Besiedelung Deutsch-Südwestafrikas bis zum Weltkriege*, 58.
 44. *Deutsche Kolonialzeitung*, "Zur Wasserfrage in Deutsch-Südwestafrika," 2 April 1892 (Schweinitz-Dieban).
 45. Karl Dove, "Südwestafrika in wirtschafts-geographischer Hinsicht," in Schwabe, *Mit Schwert und Pflug*, 374–83, here 378.
 46. *Deutsche Kolonialzeitung*, "Zur Wasserfrage in Südwestafrika," 4 and 11 February 1888 (Nolte).
 47. Germans assumed superiority "manifested in material, technological, managerial, and disciplinary preeminence over non-Europeans." Hull, *Absolute Destruction*, 34.
 48. *Deutsches Kolonialblatt*, "Gesundheitszustand der Schutztruppe und Landesverhältnisse im südwestafrikanischen Schutzgebiet," 1 April 1890. See also *Deutsches Kolonialblatt*,

- “Die Landschaft um Windhoek (Südwest-Afrika) nach einem Bericht des Lieutenants v. François,” 15 August 1891.
49. François, *Deutsch-Südwest-Afrika*, 112.
 50. Stern and Lau, *Namibian Water Resources and Their Management*, 5.
 51. Baumann, *Van sending tot kerk*, 117; Michael Hofmann, *Deutsche Kolonialarchitektur und Siedlungen in Afrika* (Peterberg, 2013), 177.
 52. Baumann, “Die Missionare–Europa kommt nach Afrika,” 93, in Becker and Hecker, *1884–1984*.
 53. Lowenthal, “Empires and Ecologies,” in *Ecology and Empire: Environmental History of Settler Societies*, ed. Tom Griffiths and Libby Robin, 234 (Seattle, 1997).
 54. Gewalt, *Herero Heroes*, 93. A colonial official reported in 1912 that “[t]he residents of Okombahe have been cultivating crops for a long time already, some by irrigating the alluvial land, others in the riverbed itself after the river has come down in flood.” See ZUB W.II.n.4., as quoted in Lau and Reiner, *100 Years of Agricultural Development in Colonial Namibia*, 23. See also Baumann, *Van sending tot kerk*, 134–41.
 55. Gewalt, *Herero Heroes*, 93–94.
 56. Bülow, *Deutsch-Südwestafrika*, 358.
 57. Richard Hindorf, *Der landwirtschaftliche Werth und die Besiedlungsfähigkeit Deutsch-Südwestafrikas* (Berlin, 1895), 21–22.
 58. Gustav Frenssen, *Peter Moors Journey to Southwest: A Narrative of the German Campaign*, trans. Margaret May Ward (London, 1908), 236. Some of these colonial narratives were internalized. One San individual belittled her account when noting, “black people know nothing. Here we are sitting on top of water, but we are too stupid to drill it even on our own land.” Magdalena/Oxurus in Erichsen, *What the Elders Used to Say*, 35.
 59. *Deutsches Kolonialblatt*, “Deutsch-Südwestafrika. Anlage von Brunnen,” 15 January 1895; François, *Nama- und Damara*, 165, as quoted in Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 27. See also Schneider, “Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit,” 107.
 60. Isabel Voigt and Kathrin Fritsch, “Transcultural Aspects of Exploring and Mapping South West Africa between 1850 and 1914,” *Journal of Namibian Studies* 9 (2011): 61–83, here 62.
 61. *Ibid.*, 70.
 62. Bollig, *Shaping the African Savannah*, 86/87.
 63. Schneider, “Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit,” 107. See also Hindorf, *Der landwirtschaftliche Werth und die Besiedlungsfähigkeit Deutsch-Südwestafrikas*, 19.
 64. Baumann, *Van sending tot kerk*, 23.
 65. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 25; Schneider, “Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit,” 109–11.
 66. Jonathan Solomons, “Exploring the Historically Rich South,” *The Namibian*, 2 July 2019.
 67. *Kolonie und Heimat*, “Aus dem Farmerleben in Südwest,” 2 August 1908 (Jason).
 68. *Deutsches Kolonial-Handbuch*, vol. 1, 2nd ed. (Berlin, 1901), 167–204.
 69. Henrichsen, *Herrschaft und Alltag im vorkolonialen Zentralnamibia*, 32.

70. François, *Nama und Damara*, 44. His brother also described early efforts tied to accessing water for the military. See François, *Deutsch-Südwestafrika*, 77 and 79. See also Otto Wipplinger, "Grenzen des Wachstums? Die Wasserversorgung eines Wüstenlandes," 80–86, here 80, in Becker and Hecker, *1884–1984*.
71. François, *Deutsch-Südwestafrika*, 102. See also *Deutsche Kolonialzeitung*, "Koloniale Aufgaben in Südwestafrika," 17 August 1895 (Dove). Early on, drilling expert Conradt writes about problems when dealing with sand constantly filling up boreholes. Conradt, *Erinnerungen aus zwanzigjährigem Händler- und Framerleben in Deutsch-Südwestafrika*, 65.
72. "Bemerkungen zu der Karte der von Hauptmann v. François und Lieutenant v. François gemachten Aufnahmen in dem deutsch-südwestafrikanischen Schutzgebiete," in *Mittheilungen von Forschungsreisenden und Gelehrten aus den deutschen Schutzgebieten*, ed. Freiherrn von Danckelman, 72–73, here 73 (Berlin, 1892).
73. von François, *Nama und Damara*, 29.
74. "Bericht des Hauptmanns v. François über eine Reise zwischen Windhoek und Gobabis," in Danckelman, *Mittheilungen von Forschungsreisenden und Gelehrten aus den deutschen Schutzgebieten*, 97–100, here 98.
75. Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 123.
76. François, *Nama und Damara*, 39.
77. *Deutsches Kolonialblatt*, 1893, 363, as referenced in Uwe-Ulrich Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," *Namibia Wissenschaftliche Gesellschaft/ Namibia Scientific Society* 44 (1993/94), here 71. See also Karl Dove, *Über meteorologische und verwandte Beobachtungen in Südwestafrika* (Berlin: Sittenfeld, 1893); Karl Dove, *Südwest-Afrika: Kriegs und Friedensbilder aus der ersten Deutschen Kolonie*, 2nd ed. (Berlin, 1896), 1.
78. Karl Dove, "Beiträge zur Geographie von Südwest-Afrika, Fortsetzung," *Petermanns geographische Mittheilungen* no. 41 (1895): 92–96, here 93. See also Karl Dove, "Deutsch-Südwest Afrika: Ergebnisse einer wissenschaftlichen Reise im südlichen Damara-Lande," *Petermanns geographische Mittheilungen* (Ergänzungsheft), 1896; BArch-B, R 1001/1502, Geographie und Kartographie.
79. Schwabe, *Mit Schwert und Pflug*, 367. Traveler, writer, and farmer Joachim Pfeil agreed. Schwabe, *Mit Schwert und Pflug*, 368.
80. *Deutsche Kolonialzeitung*, "Koloniale Aufgaben in Südwestafrika," 10 August 1895 (Dove).
81. *Deutsche Kolonialzeitung*, "Deutsche Kolonie Stolzenfels am Oranjefluß," 15 June 1887.
82. *Deutsches Kolonialblatt*, "Wasserbeschaffung in Südwest-Afrika," 15 March 1891. See also *Deutsche Kolonialzeitung*, "Ueber die Entwicklung des Südlichen Theils Südwestafrikas," 7 February 1891; Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," 70.
83. *Deutsche Kolonialzeitung*, "Deutsche Kolonie Stolzenfels am Oranjefluß," 15 June 1887 (Büttner). See also Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 118.
84. *Windhoeker Anzeiger*, "Ein Ersatz für die Pumpe im Farmbetrieb," 2 March 1899 (Schlettwein).

85. *Windhoeker Anzeiger*, "Locale Nachrichten," 24 November 1898.
86. *Deutsches Kolonialblatt*, "Wasserbeschaffung in Südwest-Afrika," 15 March 1891. Dominikus showed Consul Goering future investments possibilities in July 1890. See *Deutsche Kolonialzeitung*, "Mitteilungen aus der Gesellschaft," 21 June and 4 October 1890.
87. Petersen 1889, 90–92, as reference Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 119–20.
88. Imp. Col. Off. File 2100, 101, Leutwein to Hohenlohen-Schillingsfürst, 13 Dec. 1894, as quoted in Drechsler, "Let Us Die Fighting," 85.
89. Imp. Col. Off. File No. 1566, 39–46, Leutwein to Hohenlohen-Schillingsfürst, 2 April 1895, as quoted in Drechsler, "Let Us Die Fighting," 83.
90. Sander, *Ein Vorschlag zur wirtschaftlichen Erschließung Deutsch-Südwestafrikas* (Berlin, 1895), 1.
91. *Ibid.*
92. *Ibid.*, 8.
93. *Deutsches Kolonialblatt*, "Brunnenbau in Südwestafrika," 1 September 1898.
94. Sander, *Ein Vorschlag zur wirtschaftlichen Erschließung*, 11 and 13. He favored *Fangdämme* coffer dams. Sander, *Ein Vorschlag zur wirtschaftlichen Erschließung*, 2.
95. Sander, *Ein Vorschlag zur wirtschaftlichen Erschließung*, 10.
96. Georg Hartmann, *Deutsch-Südwestafrika im Zusammenhang mit Süd-Afrika* (Berlin, 1899), 9. See also "Hartmann, Georg," 41, *Deutsches Kolonial-Lexikon, II*; Georg Hartmann, *Meine Expedition 1900 ins nördliche Kaokofeld und 1901 durch das Amboland* (Berlin, 1903).
97. Seidel, *Deutschlands erste Kolonie*, 21. See also Hartmann, *Deutsch-Südwestafrika im Zusammenhang mit Süd-Afrika*, 11.
98. *Deutsche Kolonialzeitung*, "Künstliche Bewässerung in Südwestafrika," 17 August 1895.
99. *Deutsche Kolonialblatt*, "Deutsch-Südwestafrika. Künstliche Bewässerung," 1 March 1896.
100. Jahresbericht 1896/1897, 119, as referenced in Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," 72.
101. Busse, "Kolonialwirtschaftliches Komitee," 346, in *Deutsches Koloniallexikon II*. See also Laak, *Imperiale Infrastruktur*, 122–23. By 1902, the Committee turned into an advising body of the German Colonial Society.
102. Theodor Rehbock, *Deutsch-Südwest-Afrika: Seine wirtschaftliche Erschliessung* (Berlin, 1898), IX.
103. BA Abt. Berlin-Lichterfelde, Deutsche Kolonialgesellschaft, R 8023 Nr. 249 Bl 1–12: Bericht über Vorstandssitzung vom 3. Dez. 1896, as referenced in Laak, *Imperiale Infrastruktur*, 116. Support also came from the Siedlungsgesellschaft settlement society. See Ernst Vohsen, *Denkschrift über die bisherige Thätigkeit der Siedlungsgesellschaft für Deutsch-Südwestafrika* (Berlin, 1902), 13.
104. *Deutsche Kolonialzeitung*, "Das Syndikat für Bewässerungsanlagen in Südwestafrika," 13 March 1897 (Bauer). See also Sander, *Ein Vorschlag zur wirtschaftlichen Erschließung*, 5.
105. *Deutsche Kolonialzeitung*, "Der Landbau in Südwestafrika," 8 August 1896 (Sander).

106. *Badische Presse*, “Zum 75. Geburtstag und 40-jährigen Dozenten Jubiläum: Ein Pionier des Wasserbaues wird geehrt,” 15 April 1939. See also *Deutsche Kolonialzeitung*, “Pioniere der deutschen Kolonialpolitik,” 11 January 1900; *Karlsruher Journal: Wegweiser durch Karlsruhe—Chronik*, “Vor 50 Jahren gestorben: Theodor Rehbock war ein Pionier des Wasserbaus,” as accessible in KIT, Nachlass, 27025, 385.
107. Peter Larsen, “Theodor Rehbock,” 224–27, in *Badische Biographien Neue Folge, Band IV*, ed. Bernd Ottnad (Stuttgart, 1996); Institut für Wasserwirtschaft und Kulturtechnik, ed., “100 Jahre Forschung im Wasserbau—das Vermächtnis von Theodor Rehbock,” Festschrift zur Jubiläumsveranstaltung 5./6. Oktober 2000 (Karlsruhe, 2001); Helmut H. G. Müller, “Theodor Rehbock: Ein Leben für den Wasserbau,” 157–76, in *Heimatbuch Landkreis Raststatt* 36 (1997); A. P. Larsen and H.H. Bernhart, “Theodor Rehbock, 1856–1950,” in *Hydraulics and Hydraulic Research: A Historical Review*, ed. Günther Garbrecht (Boston, 1987), 281–91.
108. Geographer Ferdinand von Richthofen (1833–1905) seemed to have recommended him. Retrieved 3 April 2021 from https://www.leo-bw.de/web/guest/detail/-/Detail/details/PERSON/kgl_biographien/11752140X/biografie.
109. KIT, 27025, 18, Kolonialsachen. Beschreibung der Reise-Etappe Southampton Congo Caves-Swakopmund 19.09.1896–12.10.1896 (Afrika I, 23. August 1896). See also Theodor Rehbock, “Reisebilder aus Deutsch-Süd-West-Afrika. Vortrag,” in *Verhandlungen der Abteilung Berlin-Charlottenburg 1897/98*, ed. Deutsche Kolonialgesellschaft, 1–38, here 11 (Berlin, 1898).
110. KIT, 27025, 18, Kolonialsachen. Beschreibung der Reise-Etappe Southampton Congo Caves-Swakopmund 19.09.1896–12.10.1896 (Afrika I, 23. August 1896). See also Rehbock, “Reisebilder aus Deutsch-Süd-West-Afrika,” 4.
111. KIT, 27025, 18, Kolonialsachen. Beschreibung der Reise-Etappe Southampton Congo Caves-Swakopmund 19.09.1896–12.10.1896 (Afrika I, 9. September 1896).
112. *Ibid.*, (Afrika II, 10. Oktober 1896).
113. Rehbock, “Reisebilder aus Deutsch-Süd-West-Afrika,” 8–11.
114. *Ibid.*, 15.
115. *Ibid.*, 16.
116. KIT 27025, 2, Personalia. Liste der empfangenen Auszeichnungen, diverse Lebensläufe, 1892–1946 (Lebenslauf von Professor Theodor Rehbock).
117. Rehbock, “Reisebilder aus Deutsch-Süd-West-Afrika,” 16 and 20.
118. *Ibid.*, 34.
119. *Ibid.*, 26.
120. *Ibid.*, 29–30.
121. *Windhoeker Anzeiger*, “Die Dammanlage bei Marienthal,” 11 April 1900. See also Schöllnbach, *Besiedelung Deutsch-Südwestafrikas bis zum Weltkriege*, 59. The dam of Farmer Brandt in Marienthal, District Gibeon, became a repeated reference point. See Schöllnbach, *Besiedelung Deutsch-Südwestafrikas bis zum Weltkriege*, 60.
122. *Der Tropenpflanzer* I, no. 5, “Stauanlagen in Südwestafrika,” May 1897. See also *Illustrierte Beilage zur Deutschen Kolonialzeitung*, “Bilder aus Südwestafrika,” 26 January 1899; *Illustrierte Beilage zur Deutschen Kolonialzeitung*, “Wasser in Südwestafrika,” 30 March 1899 (KD); *Windhoeker Anzeiger*, “Die Stauanlagen bei Windhoek,” 3 August 1900; *Der Tropenpflanzer* II, no. 3, “Die deutsch-afrikanischen Schutzgebiete im

- Jahre 1896/97," March 1898; Vohsen, *Denkschrift über die bisherige Thätigkeit der Siedlungsgesellschaft für Deutsch-Südwestafrika*, 2.
123. *Windhoeker Anzeiger*, "Die Dammanalage bei Marienthal," 11 April 1900. See also *Windhoeker Anzeiger*, "Noch einmal Hatsamas," 31 January 1901; *Windhoeker Anzeiger*, "Hatsamas," 25 April 1901; *Windhoeker Anzeiger*, "Die Stauanlage im Lichte süd-afrikanischer Verhältnisse," 18 July 1901.
124. *Windhoeker Anzeiger*, "Windhoeker Brief," 17 January 1900.
125. Schwabe, *Mit Schwert und Pflug*, 415.
126. Ferdinand Gessert, "Zur Aufforstungsfrage in Südwestafrika," *Globus* 85 (1904), 134–36, as quoted in Siiskonen, "The Concept of Climate Improvement," 294. See also KIT, 27025, 32, (*Zeitschrift für Kolonialpolitik, Kolonialrecht und Kolonialwirtschaft, Sonderabdruck*, "Die mutmasslichen klimatischen Folgen einer Kunene-Ableitung," von Ferdinand Gessert, Deutsch-Südwestafrika). Gessert published widely in the magazine *Der Tropenpflanzer*.
127. Johannes Semler, *Meine Beobachtungen in Südwestafrika Tagebuchnotizen und Schlußfolgerungen* (Hamburg, 1906), as quoted in Sigrid Kube, "Hier könnten wogende Weizenfelder blühen . . . Farm Sandverhaar bei Goageb," 60–67, here 60–62, in Becker and Hecker, 1884–1984. See also Schneider, "Bewässerungsländwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 137.
128. Rehbock, "Reisebilder aus Deutsch-Süd-West-Afrika," 30.
129. *Ibid.*, 5. He would equally comment on the use of service water for railways. Rehbock, "Reisebilder aus Deutsch-Süd-West-Afrika," 6.
130. Rehbock, "Reisebilder aus Deutsch-Süd-West-Afrika," 5.
131. *Ibid.*, 32.
132. *Ibid.*, 33.
133. *Ibid.*, 34.
134. *Deutsche Kolonialzeitung*, "Deutsch-Südwestafrika," 11 December 1897.
135. *Deutsche Kolonialzeitung*, "Die Anlage einer landwirtschaftlichen Kolonie in Deutsch-Südwestafrika," 25 August 1898 (Sander). See also *Deutsche Kolonialzeitung*, "Die Besiedelung Deutsch-Südwestafrikas, I–III," 20 September 1900/ 27 September 1900, and 4 October 1900 (Rehbock); *Deutsche Kolonialzeitung*, "Die Anlage einer landwirtschaftlichen Kolonie bei Hatsamas," 1 September 1898 (Rehbock).
136. *Globus: Illustrierte Zeitschrift für Länder- und Völkerkunde*, "Die wirtschaftliche Erschliessung Deutsch-Südwest-Afrikas," 25 February 1899.
137. Rehbock, *Deutsch-Südwest-Afrika*.
138. *Deutsche Kolonialzeitung*, "Bilder vom deutschen Ufer des Oranjeflusses," 28 September 1899 (Rehbock). The Syndicate also published materials in support of Rehbock. Syndikat für Bewässerungsanlagen in Deutsch-Südwest-Afrika, ed., *Die Landwirtschaftliche Kolonie bei Hatsamas in Deutsch-Südwest-Afrika* (Berlin, 1899); Syndikat für Bewässerungsanlagen in Deutsch-Südwest-Afrika, ed., *Die Landwirtschaftliche Kolonie bei Hatsamas in Deutsch-Südwest-Afrika*, II (Berlin, 1899).
139. *Deutsche Kolonialzeitung*, "Deutschlands Aufgaben in Südwestafrika," 13 September 1900 (Rehbock). Reviews of his work appeared widely. See *Petermanns geographische Mitteilungen*, no. 45 (1899), 122.
140. Theodor Rehbock, "Vorwort," IV, in Alexander Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischflus-*

- Expedition. Reisen und Arbeiten in Deutsch-Südwestafrika im Jahre 1903* (Berlin, 1904). See also Alexander Kuhn, "Die Fischfluss Expedition," in *Beiheft zum Tropenpflanzer* V, no. 3 and 4 (June 1904).
141. Rehbock, "Vorwort," IV, in *Die Fischfluss-Expedition*.
 142. Kaulich, *Die Geschichte der ehemaligen Kolonie Deutsch-Südwestafrika*, 436. See also Otto Wipplinger, "Grenzen des Wachstums? Die Wasserversorgung eines Wüstenlandes," in Becker and Hecker, *1884–1984*, 80–86, here 82.
 143. James C. Watermeyer, *Deutsch-Südwest-Afrika: Seine landwirtschaftlichen Verhältnisse* (Berlin, 1898), 24. See also James C. Watermeyer, "Notes on a Journey in German South-West Africa," *Transactions of the South African Philosophical* XI, part 1 (1900), 19–33.
 144. Watermeyer, *Deutsch-Südwest-Afrika*, 13–14.
 145. *Ibid.*, 5.
 146. Karl Dove, "Südwestafrika in wirtschafts-geographischer Hinsicht," in Schwabe, *Mit Schwert und Pflug*, 374–83, here 378–79. Schwabe agreed with these sentiments. *Ibid.*, 391–93. See also Karl Dove, *Deutsch-Südwest-Afrika* (Berlin, 1903), 65.
 147. *Der Tropenpflanzer* III, no. 3, "Böden aus Deutsch-Südwestafrika," March 1899 (Wohltmann).
 148. *Der Tropenpflanzer* VII, no. 2, "Die wirtschaftliche Entwicklung unserer Kolonie," February 1903.
 149. *Deutsche Kolonialzeitung*, "Die Besiedelung Deutsch-Südwestafrikas, III" 4 October 1900 (Rehbock).
 150. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 12. See also A. Schenck, "Kleinere Mitteilungen: Bewässerungsanlagen und landwirtschaftliche Kolonien in Deutsch-Südwestafrika," *Geographische Zeitschrift* 5, no 12 (1899), 706–8.
 151. *Deutsche Kolonialzeitung*, "Zur Anlage einer landwirtschaftlichen Kolonie in Südwestafrika." 25 August 1898 (Sander).
 152. NAN, ZBU, 1402 P.III.F.2 Hatsamasprojekt, 1896–1899, Rehbock, Die Landwirtschaftliche Kolonie bei Hatsamas in Deutsch-Südwest-Afrika, 10 February 1899.
 153. *Deutsche Kolonialzeitung*, "Zur Wasserversorgung Südwestafrikas," 24 July 1902 (Hermann). See also *Deutsche Kolonialzeitung*, "Der untere Lauf des Oranjefflusses," 15 March 1900 (Hermann); Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 120. For other criticisms, see *Deutsche Kolonialzeitung*, "Zur Besiedlungsfrage von Deutsch-Südwestafrika," 10 January 1901 (Stephan).
 154. Ernst Hermann, *Viehzucht und Bodenkultur in Südwestafrika. Ratgeber für Auswanderer* (Berlin, 1900), 71–73.
 155. Franz Giesenbrecht, ed., *Die Behandlung der Eingeborenen in den deutschen Kolonien: Ein Sammelwerk* (Berlin, 1898), 121.
 156. *Deutsche Kolonialzeitung*, "Deutschlands Aufgabe in Südwestafrika," 13 September 1900 (Rehbock); *Deutsche Kolonialzeitung*, "Die Besiedelung Deutsch-Südwestafrikas, I–III," 20 September 1900/ 27 September 1900, and 4 October 1900 (Rehbock). See also *Deutsche Kolonialzeitung*, "Südwestafrika," 27 December 1900 (Dove).
 157. *Deutsche Kolonialzeitung*, "Die Anlage einer landwirtschaftlichen Kolonie bei Hatsamas," 1 September 1898 (Rehbock); *Deutsche Kolonialzeitung*, "Die Staudämme des südlichen Namalandes," 14 June 1900 (Rehbock).

158. *Deutsche Kolonialzeitung*, “Landbau in Deutsch-Südwestafrika,” 25 July 1901.
159. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 12. See also NAN, ZBU, 1403, P. III. F.7 Kuhn’sche Fischfluss Expedition (1902–05); *Der Tropenpflanzer* (June 1904).
160. KIT, 27025, 21, Kolonialsachen. Korrespondenz betr. die Erschließung Deutsch-Südwestafrikas, 1894–1900 (Band I, Brief Ernst Vohsen, 29. November 1899). See also Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 2.
161. Vohsen, *Denkschrift über die bisherige Thätigkeit der Siedlungsgesellschaft für Deutsch-Südwestafrika*, 14. The governor also worried about precipitation, locusts, fungus, and frost.
162. KIT, 27025, 21, Kolonialsachen. Korrespondenz betr. die Erschließung Deutsch-Südwestafrikas, 1894–1900 (Band I, Auszug vom 27. Februar 1900). See also *Deutsche Kolonialzeitung*, “Südwestafrika: Warnung vor Entsendung unbemittelter Ansiedler,” 15 January 1903 and 22 January 1903.
163. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 1–2.
164. *Deutsches Kolonialblatt*, “Deutsch-Südwestafrika: Bohrungen mit dem Diamantkronenbohrer,” 1 June 1899.
165. KIT, 27025, 22, Kolonialsachen, Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (29 July 1901).
166. KIT, 27025, 21, Kolonialsachen. Korrespondenz betr. die Erschließung Deutsch-Südwestafrikas, 1894–1900 (Band I, 24 April 1900, Brief Vohsen an Rehbock). Government and syndicate split the bill.
167. BArch-B, R 1002/1066, Alexander Kuhn, Personal-Nachweisung. See also BArch-B, R 1001/1472, Fischflußexpedition des Ingenieurs Alexander Kuhn.
168. Little is known about Skutari (Scutari). He had previously worked for the Holzmann company and later tried to plant cotton in German East Africa. Keller, “Die Aufgabe der Technik in den deutschen Kolonien,” *Zeitschrift für Kolonialpolitik, Kolonialrecht und Kolonialwirtschaft* VI, no. 2 (1904); Moritz Schanz, “Die Baumwolle in den Vereinigten Staaten von Amerika,” *Beiheft zum Tropenpflanzer* XII, no. 3 (1908), 164–65.
169. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas 1901–1918 (18 January 1901, Brief Vohsen). See also KIT, 27025, 22, Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (Instruktion, Rehbock, 10 February 1899); NAN, ZUB, 1402 P.III.F.2 (vol. 2), Hatsamasprojekte, 1899–1908, Instruktion.
170. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918, 27025, 22 (18 January 1901, Brief Vohsen). See also *Deutsche Kolonialzeitung*, “Rundschau: Südwestafrika,” 2 May 1901.
171. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 2.
172. Rehbock, V, “Vorwort,” in *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*.
173. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas 1901–1918 (18 January 1901, Brief Vohsen). See also Kuhn, *Bericht über die von*

der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition, 2.

174. *Deutsche Kolonialzeitung*, “Wasser in Südwestafrika,” 30 March 1899 (Dove).
175. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (Bericht 24 April 1901, Brief Kuhn an Vohsen).
176. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (Bericht 24 April 1901, Brief Kuhn an Vohsen).
177. *Ibid.*, (22 June 1901, Brief Kuhn an Vohsen). See also KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (4 July 1901, Brief Kuhn an Rehbock).
178. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918, (23 May 1901, Brief Kuhn an Vohsen).
179. *Ibid.*, (22 June 1901, Brief Kuhn an Vohsen).
180. *Ibid.* Logistical issues due to a lack of tools and workers limited his abilities to survey the area at the Naauwte in a meaningful way. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (29 July 1901, Brief Kuhn an Vohsen). Vohsen wrote to Rehbock 19 September 1901 outlining that Kuhn seems convinced that the Naute project is feasible. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918, (19 September 1901, Brief Vohsen an Rehbock).
181. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918, (22 June 1901, Brief Kuhn an Vohsen).
182. *Ibid.*, (4 July 1901, Brief Kuhn an Rehbock).
183. August Fitzau, “Geographische Neuigkeiten: Bericht über die Fischflußexpedition,” *Geographische Zeitschrift* XI (1905), 410.
184. Kuhn, *Bericht über die im Jahre 1901 nach Deutsch-Südwestafrika entsendete technische Studien-Expedition für Bewässerungs-Anlagen* (Berlin, 1904), 5. See also Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 2–5; BArch-B, R 151, Stau- und Grunddämme (microfilm roll 83002).
185. Kuhn, *Bericht über die im Jahre 1901 nach Deutsch-Südwestafrika entsendete technische Studien-Expedition für Bewässerungs-Anlagen*, 9.
186. *Ibid.*, 8. See also Vohsen, *Denkschrift über die bisherige Thätigkeit der Siedlungsgesellschaft für Deutsch-Südwestafrika*, 15.
187. Kuhn, *Bericht über die im Jahre 1901 nach Deutsch-Südwestafrika entsendete technische Studien-Expedition für Bewässerungs-Anlagen*, 9. See also Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition* 5.
188. Kuhn, *Bericht über die im Jahre 1901 nach Deutsch-Südwestafrika entsendete technische Studien-Expedition für Bewässerungs-Anlagen*, 19
189. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (19 November 1901, Brief Rehbock an Vohsen).
190. NAN, ZBU, 1403, P. III. F:7 Kuhn’sche Fischfluss Expedition (1902–05), Verhandlungen des Arbeitsausschusses vom 30. Oktober 1902. Georg Hartmann and Farmer Gustav Voigts had been present during the meeting. See also Kuhn, *Bericht über die von*

- der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 2; Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," 74.
191. Golinelli was that official. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 92.
 192. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 92. See also *Deutsch-Südwestafrikanische Zeitung*, "Aus dem Schutzgebiet: Fischfluss-Expedition," 1 January 1903; Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," 74.
 193. *Deutsche Kolonialzeitung*, "Kolonial-Wirtschaftliches Komitee," 13 November 1902. See also *Globus*, "Kleine Nachrichten," 8 January 1903; *Globus: Illustrierte Zeitschrift für Länder- und Völkerkunde*, "Kleine Nachrichten," 2 July 1903; *Globus*, "Deutsch-Südwestafrika im Jahre 1903," 1 April 1904 (Seidel). Kuhn also communicated with Vohsen and Rehbock. See KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (10 July 1903, Brief Kuhn an Vohsen; 5 September 1903, Brief Kuhn an Rehbock).
 194. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 10.
 195. *Ibid.*, 31. Efforts to cultivate alfalfa go back to the mid-1890s. See also *Deutsches Kolonialblatt*, "Anbauversuche mit Luzerne," 1 November 1895.
 196. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 37–38.
 197. *Ibid.*, 51.
 198. *Ibid.* See also Jahresbericht 1902/03 and 1903/04 based on Jäschke, "Wassererschließung und Wassermanagement in der Deutschen Period," 75.
 199. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 54.
 200. *Ibid.*, 62–63.
 201. Paul Rohrbach, *Deutsche Kolonialwirtschaft, I, Südwest-Afrika* (Berlin-Schöneberg, 1907), 479.
 202. BArch-B, R 1001/1472 Fischflußexpedition des Ingenieurs Alexander Kuhn (Brief 7 April 1903, Kuhn an Kolonial-Wirtschaftliches Komitee).
 203. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 39.
 204. *Ibid.*, 98.
 205. *Ibid.*, 108.
 206. BArch-B, R 1001/1472, Fischflussepedition des Ingenieurs Alexander Kuhn (Kuhn, "Aphoristische Gedanken").
 207. Siiskonen, "The Concept of Climate Improvement," 291.
 208. See *Deutsche Kolonialzeitung*, "Zur Bewirtschaftung Südwest-Afrikas," 11 February, 18 August, and 25 August 1888 (Pechuel-Loesche); *Deutsche Kolonialzeitung*, "Zur Bewirtschaftung Südwest-Afrikas, Fortsetzung," 18 August 1888 (Pechuel-Loesche).
 209. Siiskonen, "The Concept of Climate Improvement," 289.
 210. Kuhn, *Bericht über die von der Deutschen Kolonialgesellschaft dem Kolonial-Wirtschaftlichen Komitee übertragene Fischfluss-Expedition*, 109–12.
 211. *Ibid.*, 114.

212. Lehmann, "Between Waterberg and Sandveld," 542–43, Kaulich, *Die Geschichte der ehemaligen Kolonie Deutsch-Südwestafrika*, 437.
213. Paul Range, "Zur Wasserwirtschaft in Deutsch-Südwestafrika," 133–47, here 133, in *Beiträge zur Kolonialforschung*, Band V, ed. Günter Wolff (Berlin, 1943). See also *Deutsches Kolonialblatt*, "Deutsch-Südwestafrika. Anmeldungen auf Wasserbohrungen," 1 April 1901; *Deutsche Kolonialzeitung*, "Die Wasserversorgung Deutsch-Südwestafrikas," 19 September 1901; *Deutsche Kolonialzeitung*, "Deutsch-Südwestafrika: Bohrkolonne," 10 July 1902; Paul Range, "Wassererschließung in den Trockengebieten der deutschen afrikanischen Schutzgebiete," *Tropenpflanzer* 43 (1940), 1–7, here 4. *Deutsch-Südwestafrikanische Zeitung*, "Bohrkolonne nach Deutsch-Südwestafrika," 22 January 1902.
214. Kaulich, *Die Geschichte der ehemaligen Kolonie Deutsch-Südwestafrika*, 437.
215. BArch-B, R 1001/1200, Kaiserliches Gouvernement Windhoek, Bericht 30 September 1903 See also Bley, *South-West Africa under German Rule*, 133.
216. Ousago and Erichsen, *The Kaiser's Holocaust*, 111; Schöllnbach, *Die Besiedelung Deutsch-Südwestafrikas bis zum Weltkriege*, 62. It appears that Schöllnbach is referencing Lotz here. See also *Deutsche Kolonialzeitung*, "Erwiderung: Zur Wasserversorgung in Deutsch-Südwestafrika," 30 April 1903.
217. KIT, 27025, 32, Kolonialsachen. Box mit 59 Veröffentlichungen Dritter zu Fragen der Erschliessung insbes. Deutsch-Südwestafrikas sowie Geschäftsberichte von Kolonialgesellschaften (Jahresbericht der Deutschen Kolonialgesellschaft 1904).
218. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (24 January 1904, Brief Kuhn an Rehbock).
219. Jahresbericht 1903/04, 79, reference in "Wassererschließung und Wassermanagement in der Deutschen Period," 75.
220. BArch-B, R 1001/ 1472 Fischflußexpedition des Ingenieurs Alexander Kuhn (Brief, Kuhn, 15 January 1904).
221. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (24 January 1904, Brief Kuhn an Rehbock).
222. *Ibid.*, (25 January 1904, Brief Rehbock an Kuhn).
223. *Ibid.*, (see, for instance, 4 March 1904, Brief Rehbock).
224. *Deutsche Kolonialzeitung*, "Zur Frage der Wassererschliessung in Deutsch-Südwestafrika," 23 October 1904 (Rehbock); *Deutsche Kolonialzeitung*, "Bewässerungsanlagen in Deutsch-Südwestafrika," 15 September, 22 September, and 29 September, 1906 (Rehbock); *Der Tropenpflanzer* IX, no 7, "Wassernutzung in subtropischen Ländern," July 1905 (Rehbock); *Deutsche Kolonialzeitung*, "Zur Frage der Wassererschliessung in Deutsch-Südwestafrika," 2 February 1905 (Kuhn). See also Schneider, "Bewässerungslandwirtschaft in Namibia und ihre Grundlagen in der Kolonialzeit," 141–43.
225. Carl Schlettwein, "Ackerbau in Südwestafrika. Contra Rehbock," *Zeitschrift für Kolonialpolitik, Kolonialrecht und Kolonialwirtschaft* VI, no. 11 (November 1904); Carl Schlettwein, "Ackerbau in Deutsch-Südwestafrika," *Zeitschrift für Kolonialpolitik, Kolonialrecht und Kolonialwirtschaft* VI, no. 7 (July 1904); Gustav Voigts, "Einige Bemerkungen über Alexander von Kuhns Bericht 'Fischfluß-Expedition' und zu der Frage der Ursachen des Hereroaufstandes," *Zeitschrift für Kolonialpolitik, Kolonialrecht und Kolonialwirtschaft* VI, no. 10 (October 1904). In 1904–5 broader debates took place primarily in the *Deutsche Kolonialzeitung*.

226. *Deutsche Kolonialzeitung*, “J.C. Watermeyer †,” 25 February 1904 (Rehbock).
227. BArch-B, R 1002/1066, Alexander Kuhn, Vertrag 30 April 1904.
228. BArch-B, R 1002/1066, Alexander Kuhn, Brief 25 February 1905. See also BAarch-B, R 1002/1066, Alexander Kuhn, Vertrag 28 February 1905.
229. *Deutsches Kolonialblatt*, “Personal-Nachrichten. Nachruf,” 1 March 1906.
230. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (23 May 1901, Brief Kuhn an Vohsen).
231. Alexander Kuhn, *Zum Eingeborenenproblem in Deutsch-Südwestafrika: ein Ruf an Deutschlands Frauen* (Berlin, 1905), 38.
232. BArch-B, R 1002/1066, Alexander Kuhn, Brief 19 May 1905. See also *Deutsch-Südwestafrikanische Zeitung*, “Aus dem Schutzgebiet,” 31 January 1906; *Deutsches Kolonialblatt*, “Personal-Nachrichten. Nachruf,” 1 March 1906.
233. *Deutsche Kolonialzeitung*, “Ingenieur Alexander Kuhn,” 10 February 1906. See also *Deutsche Kolonialzeitung*, “Alexander Kuhn †,” 3. February 1906; *Deutsches Kolonialblatt*, “Personal-Nachrichten. Nachruf,” 1 March 1906; *Native American* 9, no. 13, “Death of Alexander Kuhn,” 4 April 1908.
234. Engineer Skutari had become part of other projects, most notably the Baghdad train construction. Kuhn actually hoped to hire him—but that was not possible. BArch-B, R 1001/ 1472 Fischflußexpedition des Ingenieurs Alexander Kuhn (Brief 7 April 1903, Kuhn an Kolonial-Wirtschaftliches Komitee).
235. KIT, 27025, 22, Kolonialsachen. Korrespondenz betr. Erschliessung Deutsch-Südwestafrikas, 1901–1918 (13 November 1906, Brief Rehbock an Dernburg).
236. Alfred Hanemann, *Wirtschaftliche und politische Verhältnisse in Deutsch-Südwestafrika* (Berlin, 1900), 3–7.
237. Bley, *South-West-Africa under German Rule*, 133.
238. Wolfgang Uwe Eckert, *Medizin und Kolonialimperialismus: Deutschland 1884–1945* (Paderborn, 1997), 258–59.
239. *Der Tropenpflanzer* IX, no. 1, “Neujahrsgedanken 1905,” January 1905.
240. Range, “Zur Wasserwirtschaft in Deutsch-Südwestafrika,” 133, in *Beiträge zur Kolonialforschung*.