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Chapter 5

Extracting Growth

The Phosphate Mining Infrastructure on Nauru and Angaur (1906–1913)

Jasper Ludewig

1. Introduction

The German chemist Baron Justus von Liebig, writing in the mid-19th century, fundamentally reorganised the place of agriculture within industrial capitalism.¹ Liebig's enquiries into the chemical composition of soils and plant metabolism informed his 'mineralist' model of fertility management in which plant growth was viewed as the result of highly specific chemical interactions that could be understood on a systematic basis and, thereby, controlled (Liebig 1848, 29–30). From his celebrated 'knowledge factory' in Giessen, Liebig attacked traditional crop-and-fallow methods in favour of a new model of what he called 'rational agriculture' premised on the application of synthetic fertilisers. These would contain the building blocks of plant growth identified by Liebig – nitrogen (N), phosphorus (P), and potassium (K) – and could be used to maximise agricultural yields: whereas potassium and nitrogen assisted crops in fighting off disease, storing water, and photosynthesising; phosphorus drove flowering and fruiting. Over the course of the 19th century, NPK fertilisers contributed to an eighty-fold increase in the productive capacity of agricultural soils around the world. As a result of their newfound chemical commensurability, the world's soils could henceforth be subjected to similar management strategies across different landscapes (Marchesi 2020, 206).

Liebig's disaggregation of the molecular life of plant growth identified new resources and sites in the global expansion of agricultural production. Chemical fertilisers accompanied homesteaders in the westward expansion of the United States, protected colonial populations in South Africa, Australia, and New Zealand against food shortages and drought, dramatically increased the productive capacity of European farmland,

and gave rise to a global search for the raw materials of which they were comprised. In particular, Liebig's research – following earlier experiments by Alexander von Humboldt – emphasised the potential of guano: the naturally occurring deposits of dried bird and bat excrement known to contain large quantities of nitrogen, phosphorus, and potassium. Unlike nitrogen and potassium, only very small amounts of phosphorus circulate as part of the atmosphere; instead, phosphorus accumulates through organic and inorganic cycles that produce sedimentary deposits in water bodies or in Earth's crust, such as in the form of guano (Dixon 2018, 769).

A first phase of guano mining followed closely on the heels of Liebig's studies, ultimately centring on approximately one hundred islands in the Pacific Ocean predominantly annexed by American companies under the United States Guano Act of 1856. Mining activity on some islands intensified around the turn of the 20th century following the discovery of large deposits of rock phosphates, which held even greater promise than guano as an industrial fertiliser.² Rock phosphates are formed over millennia through combinations of guano, decomposed marine life and water, leaving behind minerals that transform the coral substrate of cays and atolls into a fossilised, chalk-like substance. The experiments of John Bennet Lawes, who is credited with producing the world's first chemical fertiliser in the early 1840s, revealed that when rock phosphate is treated with sulphuric acid – producing what is known as superphosphate – it becomes sufficiently soluble for crops to access the phosphorus it contains, increasing yields and improving plant metabolism. As the sociologist Marion W. Dixon has observed, from 1870 to the First World War, during the period of the first Green Revolution, 'all the imperial states were securing access to phosphate rock deposits, either domestically or abroad, and superphosphate fertilizer became the main fertilizer in a new class of chemical fertilizers' (Dixon 2018, 769). While the Pacific rock phosphates were not as large as those discovered in North America, Tunisia, Algeria, and Europe, they were by far the most pure of any deposits found anywhere in the world.

This chapter considers two islands within German Micronesia – Nauru and Angaur – where rock phosphate was mined for the burgeoning superphosphate industry of the early 20th century. Although small shipments of guano had been mined by the Neuguinea Companie on Purdy Island in the Bismarck Archipelago in the early 1890s, Nauru and Angaur were the only rock phosphate deposits in German colonial territory deemed commercially viable (Scharpenberg and Müller 1977, 149). Nauru was added to the

German Marshall Islands through annexation in 1888 and was first worked by an Anglo-German consortium, the Pacific Phosphate Company, in 1906; whereas Angaur, an island of Palau eventually administered from German New Guinea, was mined by a German consortium, the Bremen-based Deutsche Südseephosphat Aktiengesellschaft (DSPAG), starting in 1909. Both companies provided chemical wholesalers in Germany, Australia, New Zealand, and Japan with high-grade Pacific phosphate until the start of the First World War. As the following discussion will demonstrate, attending to the infrastructure on Nauru and Angaur reveals a curiously ‘para-colonial’ figure: the *Regierungsbaumeister* (Government Architect or Superintendent) Wilhelm Schöinian, a hydraulic and mining engineer whose career within and beyond the *Bauverwaltung* (colonial building administration) connects the development of both islands across the 4,000 kilometres of open ocean that separates them.³ On Nauru, Schöinian served as a representative of the Colonial Section of the German Foreign Office in negotiations with the PPC; on Angaur, he was engaged directly by the DSPAG on the basis of his experience throughout the German Marshall Islands. As the following sections will elaborate, Schöinian’s changing status – from colonial official to becoming an employee of a private mining company – is complicated by his close association with the Altona-Hamburg-based engineering and construction company, F. H. Schmidt, which supplied the early buildings and equipment for both Nauru and Angaur. In tracking Schöinian’s movements between these roles and colonial territories, the discussion provides a detailed overview of the mining operations established on both islands, drawing on previously overlooked primary source material. It engages this evidentiary base in keeping with a series of questions at play within the wider volume of which this chapter forms part: what roles did buildings and other spatial technologies play in extracting raw materials from German colonial territory? How were they designed and constructed? By marshalling whose expertise? And how can an analysis of the phosphate industry established throughout German Micronesia inform an understanding of the governmental practices of the German colonial state?

Crucially, the archival record emphasises that the infrastructural development of Nauru and Angaur must be understood in relation to the global fertiliser market that both islands supplied. As the chapter will argue, the question of what constitutes ‘German colonial architecture’ becomes less important from this perspective than the ways in which buildings and other structures located in German territory – commissioned, conceived,

and constructed by German companies and engineers – deepened the imbrications of European imperialism more broadly with the vicissitudes of industrial capitalism. This is not to substitute an architectural analysis for an economic one; rather, it is to offer an analytical framework attuned to the manner in which colonial governance was in fact practised on Nauru and Angaur as a basis for understanding the role of different kinds of infrastructure in linking industrial mining, manufacturing, and agriculture between colony and metropole. In a similar vein, Dirk van Laak has located German colonialism within a broader *Weltverkehrspolitik* in which territorial and state expansion remained secondary to the ‘technical penetration’ of the globe in pursuit of transaction and exchange (Van Laak 2004, 80). As the following sections intend to substantiate, Schönian’s various roles throughout German Micronesia, where his engineering-cum-administrative activities transcended neat distinctions between public and private, company and state, arguably embody Laak’s *Weltverkehrspolitik*. Propelled by the assertive agendas of rival powers in the region, the colonial industry in which Schönian deployed his design and engineering expertise established new forms of labour, technical apparatus, and modes of governance within an entrenched global phosphate imperialism that – to paraphrase Edward D. Melillo – fused the changing nature of work with the work of changing nature (Melillo 2012, 1,028).

2. Nauru and the PPC

Nauru is a 21 km², roughly circular island located more than 300 kilometres from its closest neighbour, Banaba (Ocean Island). A 200-metre-wide strip of flat and fertile land runs around its perimeter, which rises up to a central plateau approximately 70 metres above sea level (Fig. 5.1). Prior to contact with Europeans in the late eighteenth century, Nauruans are believed to have lived in relative isolation from other Micronesian populations, sustained by the coconuts and pandanus fruit that thrived in the tropical conditions, as well as the marine life found on the substantial coral reef that fans out from the island into the South Pacific Ocean. Whalers and traders continued to land at Nauru until the late 19th century by which time the island had been annexed as part of the German Marshall Islands protectorate, administered by the Hamburg-based Jaluit Gesellschaft under corporate charter. Trade was modest and the island

The Pacific Islands Company moved quickly, entering into prolonged negotiations with the German Imperial Government and the Jaluit Gesellschaft, which held exclusive mining rights throughout the German Marshall Islands under the terms of its charter. The negotiations culminated in the establishment of the Pacific Phosphate Company (PPC) in 1902. One-third of the PPC's board was occupied by members of the Jaluit Gesellschaft; the remaining two-thirds comprised a cast of influential advocates for British expansion in the Pacific (Ludewig 2022, 353). With the consortium in place, work eventually commenced on industrial facilities and an administrative settlement in 1906. As *Regierungsbaumeister*, Wilhelm Schönian was instrumental to the early work on Nauru, described in PPC reports as a 'competent engineer' responsible for the original layout of facilities, and the specification and contracting of the buildings and equipment (Ellis 1936, 128). Sites were selected at a remove from the villages of the 1,500 Nauruans living on the island who were deemed unsuitable as an industrial labour force. Instead, 50 Chinese workers were contracted from the German concession of Kiautschou to commence digging and to erect the company settlement as soon as possible.

F. H. Schmidt was engaged to fabricate the PPC settlement and initial industrial equipment for Nauru, further imbricating its commercial geography with the expanding frontiers of German imperialism. Since its establishment in 1845 in the Danish-ruled town of Altona near Hamburg, the company had expanded in size and scope, keeping pace with Germany's rapid industrialisation. In 1867, F. H. Schmidt moved into an enlarged facility, complete with a sawmill, joiner's workshop, and metal workshop in addition to a factory in Wilhelmsburg dedicated to the manufacture of structural iron. Early work included villas and suburban houses, high-rise buildings, bridges, and maritime infrastructure around Hamburg before the company entered into the prefabrication of buildings for export in the 1880s, coinciding with German colonial expansion into Africa (Anonymous 1905/1906). Itohan Osayimwese has shown that despite fierce competition from rival companies – Christoph & Unmack (Niesky), Philipp Holzmann AG (Frankfurt), Drenckhahn & Sudhop (Braunschweig), and the Deutsche Barackenbaugesellschaft (Cologne) – F. H. Schmidt quickly rose to become the colonial government's supplier of choice (Osayimwese 2017, 210–211). Five prefabricated government dwellings constructed using a hybrid system of iron and timber framing were prepared in Hamburg before being erected along the coast of Dar Es Salaam in German East Africa in the early 1890s, followed six years later by three timber houses

for high-ranking German officials in Qingdao (Osayimwese 2017, 220). Although comprehensive company records prove elusive, it seems F. H. Schmidt established a substantial presence in Qingdao from the late 1890s on, employing a large local labour force, and designing and constructing barracks, government buildings, a brewery, hospitals, factories, offices, and villas, as well as much of the civic and maritime infrastructure throughout the German concession⁴ (Jin 2015, 31; Yokell 2018, 1,919).

By the early 20th century, F. H. Schmidt was already deeply involved in colonial construction projects around the world, having provided prefabricated dwellings, warehouses, wharves, bridges, and industrial facilities for companies and various levels of government throughout China, Cameroon, Tanzania, Togo, and New Guinea. In its promotional material, the company regarded its various engineering and logistical achievements as part of a wider narrative of German colonial ascendancy: ‘Since Germany has acquired its own colonies,’ one such pamphlet observed in 1906, ‘the company has substantially developed its activities in turn.’ But it also recognised the broader cultural task (*Kulturaufgabe*) it faced as a global agent of German expertise, ‘to secure a home for German work and building science (*Bauwissenschaft*) abroad’ (Anonymous 1905/1906). Its contracts eventually extended to Romania, Turkey, Serbia, India, Burma, Vietnam, Madagascar, Peru, Argentina, Uruguay, and Chile (Schmidt c.1930). As Osayimwese suggests, ‘F. H. Schmidt became a multinational company with a range that mirrored the geography not only of German colonialism but of the entire European colonial project’ (Osayimwese 2017, 224–225). Among the most spectacular examples beyond the German empire – and perhaps the most relevant project to the company’s imminent contract for Nauru – was the loading and discharging facility constructed for the Paris-based *la Société Le Nickel* in the middle of the Pacific Ocean, off the coast of New Caledonia (Fig. 5.2). Reflecting on this and the many other projects it had completed by 1906, F. H. Schmidt was happy with its progress to date, claiming that it had, ‘for a number of years already, successfully elevated the reputation of German companies, German work and German ability through its building operations’ (Anonymous 1905/1906).

F. H. Schmidt proved an easy choice for *Regierungsbaumeister* Schöniar, whose brief for the company fell squarely within the purview of its highly regarded technical expertise: prefabricated housing, workshops, stores, mining equipment, and harbour facilities. Intriguingly, records suggest that during his involvement with the PPC on Nauru, Schöniar

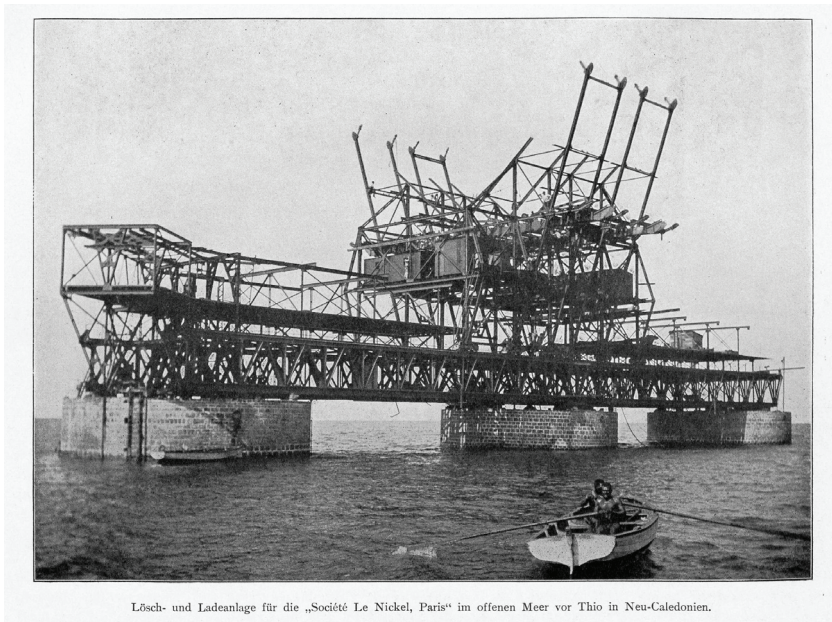


Fig. 5.2: Bulk loader constructed in the open ocean by F. H. Schmidt near Thio, New Caledonia on behalf of the Société Le Nickel, Paris ('F. H. Schmidt, Bauunternehmung, Altona, Hamburg, Tsingtau', *Historisch-biographische Blätter. Der Staat Hamburg* 7 (1905/1906), n.p.)

was simultaneously employed as the technical director of F. H. Schmidt while also fulfilling the role of *Regierungsbaumeister*. The implications of this arrangement will be developed further below in relation to the phosphate mines on Angaur. Nevertheless, Schöinian's dual role as both a colonial official and an employee of a private construction company raises numerous questions regarding the degree to which F. H. Schmidt, as a technical consultant of sorts, was entrenched within the German colonial state apparatus. Neither Nauru nor Angaur are mentioned in the company's promotional material discussed above, either indicating that its involvement in German Micronesia was undertaken on different terms, or that it viewed Schöinian's work with the PPC and DSPAG, and therefore also his post as *Regierungsbaumeister*, as somehow distinct from its purely commercial ventures.

By the middle of 1907, numerous F. H. Schmidt buildings were already being erected at Yangor, the PPC's main settlement in Nauru. These included a variety of timber houses for PPC employees, ranging from larger residences to smaller, single-room dwellings. All were painted

entirely in white, with raised floors, covered verandas, window shutters, and stack ventilation to mitigate the hot and humid conditions. The larger dwellings clearly resembled the timber buildings included in F. H. Schmidt's catalogues, in particular the so-called 'planter's house for tropical climates', manufactured using the company's own prefabrication system (Fig. 5.3a) (Schmidt c.1930, 7). Eaves on gabled roofs were tied down with additional external brackets to protect against high wind loads, as were the covered verandas, which employed F. H. Schmidt's characteristic branched columns to further reinforce the timber roof structure. The smaller dwellings supplied by F. H. Schmidt in Nauru may have been adapted from the patented Döcker collapsible barrack system (Fig. 5.3b) (Osayimwese 2017, 192–195). F. H. Schmidt's designs for Nauru adopted an almost identical layout to the Döcker buildings, which were supplied by rival firm Christoph & Unmack to German companies and government agencies in Cameroon and Tanzania, barring the covered veranda, which is unique to the dwellings in Nauru. Additionally, the PPC buildings were not designed to be transportable and were therefore constructed from more robust materials. Therefore, the PPC residences in Nauru, along with the general office buildings and company canteen, sit somewhere in the middle of the spectrum of F. H. Schmidt's overseas projects: significantly less ornamented and refined than the prefabricated houses provided to colonial officials in German East Africa, yet more considered in composition and construction than the industrial buildings shipped, for example, to Cameroon.

The same cannot be said about the accommodation provided by F. H. Schmidt for the non-white workforce in Nauru. Within only a year of commencing operations, the number of Chinese labourers contracted to the island by the PPC already exceeded 600 people, soon joined by labourers from Japan and from the PPC's recruiting grounds throughout the Pacific Islands. As I have discussed elsewhere, labour was heavily racialised – a fact reflected in the distribution and design of the different workers' dormitories on the island (Ludewig 2022, 357–360). Unlike the dwellings considered above, the dormitories for Chinese, Japanese, and Pacific Islander labourers were not raised from the ground to increase passive ventilation and were provided with only minimal external shading (Fig. 5.3c). The design for the initial buildings supplied by F. H. Schmidt to house the PPC's original Chinese workforce resembled a modified version of the warehouse and workshop buildings in Nauru, with the exception of the concrete slabs poured for each dormitory. The



Fig. 5.3: (a) and (b) Prefabricated officers' dwellings in Nauru, manufactured by F. H. Schmidt; (c) and (d): 'Coolie barracks' in Nauru, manufactured by F. H. Schmidt (Nauru Photos Attached to Report by A. H. Gaze, 1907, National Archives of Australia 671741)

buildings' timber framing was clad with painted timber boards, incorporating minimal ventilation at the gable ends. Internally, conditions were cramped, but differentially so – a prevailing idea being that Japanese workers were more 'space efficient' than their Chinese and Islander counterparts, able to be packed into their accommodations in greater numbers and, therefore, at less cost.⁵ Pairs of glazed highlight windows, spaced along every second structural bay of the dormitories, illuminated the small areas assigned to each worker internally (Fig. 5.3d). The stifling and cramped conditions undoubtedly exacerbated the health issues and mortality rates experienced by the PPC workforce over decades. Two hospital buildings provided by F. H. Schmidt were set within the central precinct of the Yangor settlement, enabling the PPC to deliver healthcare to white company staff separately from its contracted labourers.

The PPC organised an inspection of the F. H. Schmidt buildings and mining facilities erected in Nauru under Schöinian's supervision in 1907. It appointed the Melbourne-based engineering company J. M. & H. E. Coane for the job and its director, John Montgomery Coane, arrived at Yangor in early June. This led to the cancellation of a number of contracts with F. H.



Fig. 5.4: Limestone pinnacles in Nauru left behind after the rock phosphate was removed (Elschner, Carl. 1913. *Corallogene Phosphat-Inseln Austral-Oceaniens und ihre Produkte*. Max Schmidt, illustration v)

Schmidt, whose turnaround time for the storage bins, phosphate dryers, and numerous other industrial buildings, once shipping from Germany was taken into account, was deemed too slow compared with hiring contractors from Australia. Nevertheless, Schönián had already overseen the construction of the railway system on the island, which carried rock phosphate from the inland deposits to the crushing, drying, and loading facilities located at its outer edges (Fig. 5.4). Passages from Coane's report betray the gruelling work involved in prying the phosphate from the coral substrate of the island. 'The actual stirring of the phosphate and filling into skips or cars,' noted Coane, 'will probably always have to be done for the most part by hand, as the presence of numerous coral pinnacles would prevent the use of self-filling scoops or drag buckets.' This presented a problem in retrieving the loosened product from the increasingly deep lacerations being made into the island's bedrock, 'but if the lifting of it out of the cuts by means of baskets or wheel barrows could be avoided,' Coane continued, 'it might be found possible to get the stirring and filling carried out at reasonable contract rates by Chinese, Japanese and Kanakas, or even by Spanish and Italian labourers, who have been found very satisfactory on the Panama Canal Works' (Coane and Coane 1907, 11). What

F. H. Schmidt delivered to the PPC was therefore the foundations upon which to develop a full-scale industrial mining operation. Coane advised the PPC that far greater mechanisation was required in Nauru wherever possible, along with improved communication systems, additional loading points, an increased power supply, water harvesting facilities, a sewerage system, and further harbour improvements. These would all come in the following decades – often by repurposing the original building stock provided by Schöonian and F. H. Schmidt as machines, equipment, and bulk storage all grew larger to keep up with the increasing global demand for superphosphate.

3. Angaur and the DSPAG

Angaur is the southernmost island in the Palau archipelago and is approximately half the size of Nauru, its limestone forests covering almost the entire ten-square-kilometre area of the island (Fig. 5.5). Angaur's highest point, sitting roughly at its centre, is 40 metres above sea level, grading down across jagged terrain to swampy land in the southeast and staying higher to the north. Steep cliffs run along the edges that give way to small natural harbours and beaches, offered little protection by the thin reef that encircles the island. Human inhabitation of Palau is estimated to have occurred 3,000 years ago, based on a matrilinear society organised around a system of villages spanning the archipelago (Clark and Wright 1952). Following the Spanish-American War, Palau was sold to Germany in 1899 as part of the Caroline Islands, which were administered from Yap at a district level but formed part of the larger German New Guinea protectorate.

Following the discovery of phosphates in Angaur by District Commissioner Arno Senfft in late 1905, German New Guinea's enterprising governor, Albert Hahl, initially offered the deposits to Wilhelm Wischer – a German chemist and manufacturer of superphosphates in Melbourne. The discovery came at a fortuitous time for Hahl who was seeking to develop the productivity and administration of the protectorate. Upon analysing the samples sent to him, Wischer quickly arranged to travel to Angaur to inspect the deposits in person. As in Nauru, preliminary surveys suggested that the majority of the island was covered in phosphate (Hahl 1980, 117). Wischer expressed his interest in establishing a company to mine and import the phosphate to Victoria to which Hahl consented

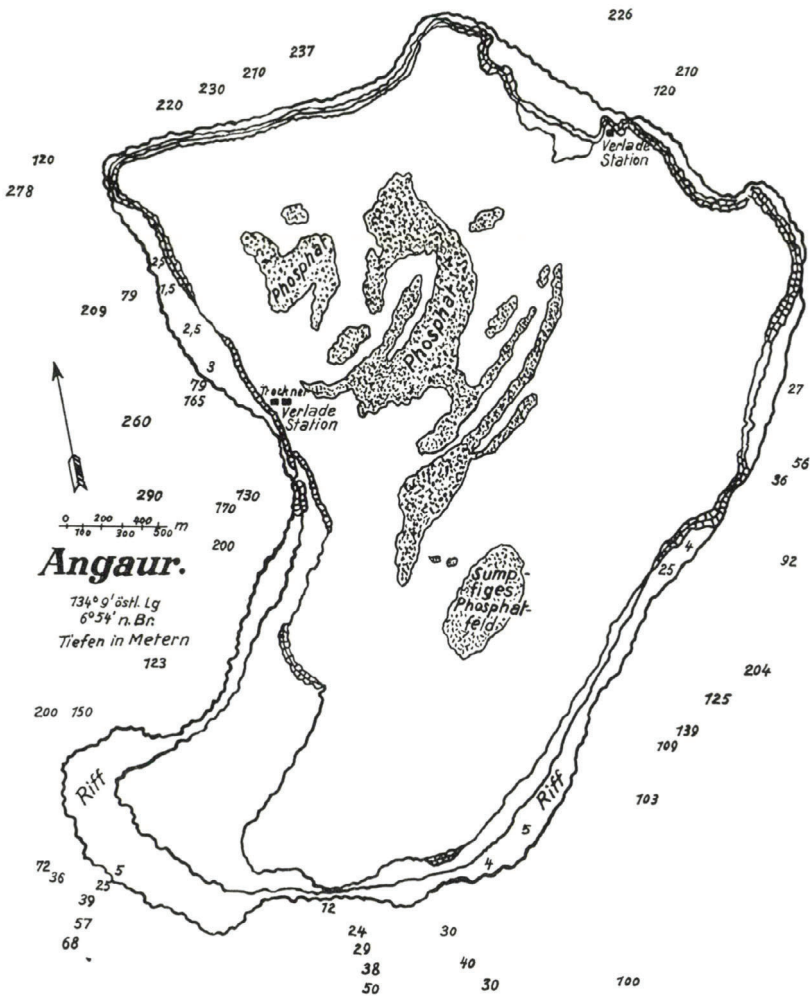


Fig. 5.5: Map of Angaur showing the different phosphate deposits on the island (hatched). The German South Sea Phosphate Company's drying and loading facilities are located on the west coast and an additional loading station is situated on the northern cliffs (Elschner, Carl. 1913. *Corallogene Phosphat-Inseln Austral-Oceaniens und ihre Produkte*. Max Schmidt, plate XII)

in principle on the proviso that the company would be formed through primarily German capital. Prior to granting him a mining concession, however, enquiries were made into Wischer's character by the German Imperial Government, in particular his commitment to German national interests given his naturalisation as Australian. The German imperial consul in Melbourne, W. A. Brahe, sent the imperial chancellor in Berlin,

Bernhard Fürst von Bülow, a withering assessment of Wischer, explaining that he was 'a good German, but only insofar as this can be reconciled with his own interests ... I do not think that the Germans settled here would be interested in investing their money in his attempt to mine an island in the Pacific Ocean [Stillen Ocean], because no one trusts his word' (Brahe 1906, 30).

Investigations into Wischer continued into June 1906 when a confidential, deidentified letter was sent from Sydney to von Bülow outlining Wischer's plan to undertake the Angaur venture together with his competitor, Cuming, Smith & Co. The companies were located directly next to each other in Yarraville and competed for market share in supplying the Wimmera wheat district with superphosphate fertiliser. Clearly, both had closely followed the developments of the PPC in Nauru and now spotted an opportunity to cut out their common middleman. Ever since Wischer had returned from his trip to Angaur, the letter explained, 'the relationship between the two companies has become friendly and they have started cooperating'. Cuming, Smith & Co. 'will bring the capital and he [Wischer] will bring the concession. The financial success of the Pacific Phosphate Company clearly shows that the two companies, if they can mine their own phosphate, stand to make significant savings,' transforming Wischer from one of the weakest into one of the strongest manufacturers in the Australian fertiliser market (Krauss 1906, 46). Sceptical of Wischer's motives but willing to proceed, the Colonial Office drafted terms for the Angaur concession, stipulating that any third parties involved in the venture must legally reside in the protectorate of German New Guinea. Wischer prevaricated and Hahl became impatient, returning to Germany to find a more suitable candidate. Although they had missed the opportunity to secure their own supply of raw rock phosphate, Wischer and the other Australian fertiliser producers would remain closely linked to the Angaur deposits as clients of the company Hahl was hoping to form while in Germany.

At the same time as Hahl was undertaking his trip, Bernhard Dernburg was appointed as head of the Colonial Office, espousing a reformist agenda for the German colonies based on the fusion of state power with private German capital and expertise. Angaur became one of the first matters to which Dernburg turned his attention in his new role at Hahl's request (Hahl 1980, 118).⁶ In Bremen, Hahl met with the general manager of the Norddeutscher Lloyd shipping company, Heinrich Wiegand, to outline the commercial viability of the Angaur deposits, believing that the company was uniquely placed to work the deposits on the island given its existing

shipping activities throughout German Oceania. The Norddeutscher Lloyd agreed, stating: 'The great importance of the further economic development of the South Seas protectorate for our steamship lines prompted us last year to send an expedition to explore the mineral resources of the island region in conjunction with a number of associated companies' (Scharpenberg and Müller 1977, 141). This voyage was led by Wilhelm Schönian and confirmed Senfft's earlier findings, as well as identifying a further phosphate deposit on the island of Fais, located north-east of Yap (Hahl 1980, 118).

The Deutsche Südseephosphat Aktiengesellschaft was established in the year following the Schönian-led inspection tour as a substantially more German affair than the PPC. In fact, the major shareholders in the DSPAG arguably epitomised Germany's 20th-century financial-industrial-chemical complex: two seats were occupied by the Norddeutscher Lloyd, which viewed the venture as an opportunity to extend the broad network of companies amassed under Wiegand's leadership; two were held by the Frankfurt-based mining and chemicals company Beer, Sondheim & Co; the Deutsche Nationalbank zu Bremen held one position on the board, administered the company's investment capital and hosted its annual board meetings; the Deutsche Bank in Berlin and H. & E. Albert of Wiesbaden-Biebrich, a superphosphate fertiliser producer formed in the immediate wake of Liebig's discoveries, also held one seat each. H. Mueller & Co., a Rotterdam-based mining and shipping company, occupied the final seat on the board of the DSPAG. Notably, draft documents relating to the formation of the DSPAG list the construction company F. H. Schmidt of Altona-Hamburg as an additional founding member; however, the company's name was struck-through and removed from final versions of the agreement (Naumann 1907, 20). Was F. H. Schmidt, having had an insider's view of the Nauru project via Schönian, now interested in investing in the DSPAG directly? Or was Schönian's initial role as technical advisor to the DSPAG seen as an extension of his position at F. H. Schmidt? In any case, initial DSPAG budgets include a one-off severance payment of 70,000 mark paid directly to F. H. Schmidt 'for Schönian', suggesting his resignation from the construction company to work exclusively for the DSPAG in Angaur (Anonymous 1909b, 35). In 1911, Schönian was elevated from lead engineer to managing director of the entire company. The implication is that, while working in Nauru as *Regierungsbaumeister*, Schönian remained an employee of F. H. Schmidt, to whom the contract for the early PPC facilities was awarded. This does not seem to have been known by the PPC, who

viewed Schöinian as a representative of the German colonial administration. The strategic entanglements of colonial governance and extractive industries therefore also delivered benefits to, and drew on the expertise of, Germany's overseas construction industry – including in German Micronesia where all three domains were at times blended entirely.

Schöinian's most pressing task in his new role with the DSPAG was to negotiate terms for a mining concession with the government of German New Guinea and the Colonial Office in Berlin. A contract was prepared in November of 1909 that at the same time both transferred the ownership of Angaur from nine island chiefs – representing a population of 150 Angaurese permanently residing on the island – to the treasury of German New Guinea, while also granting the DSPAG exclusive mining and settlement rights over approximately 600 hectares – that is, 80 per cent – of the island for 35 years.⁷ The contract left the Angaurese community with a 150-hectare reservation in the south-eastern corner of the island and a one-off payment of £60. At the same time, the treasury of German New Guinea received a payment of 1200 mark for the mining rights in addition to a 1.25 mark levy per tonne of exported phosphate to a minimum of 30,000 mark in the first four years – terms considerably less favourable than those adopted for Nauru. The same contract permitted the Angaurese to collect food and timber anywhere on the island, except in areas occupied by the DSPAG, and any existing plantations located beyond the reserve were protected until such time as all other deposits had been exhausted. This ran against a 1906 mining law for the German colonies, which enabled the proprietor of a mine to 'use the landed property of third parties as far as it is necessary for the working of the mine and the accessory installations' (Grosser 1907). The DSPAG seemingly preferred to adhere to the earlier law and the company promptly removed most of the plantations on Angaur much sooner than agreed, refusing to replant them with food-bearing species (coconut, taro, and so forth), and insisting that it was obliged and permitted to secure firewood for the furnaces it used to dry the phosphate prior to export.

Twenty Chinese tradesmen, recruited by Schöinian in Hong Kong, were brought to Angaur in 1909 to begin constructing the facilities required by the DSPAG, followed by 60 more in the following year. To manage this process while he oversaw the wider operations of the DSPAG, Schöinian engaged the engineer Heinrich Hagedorn as technical assistant and foreman of works. Prior to his role in Angaur, Hagedorn had also been employed by F. H. Schmidt as both a technician and site manager and may

have been involved in preparing the PPC's early facilities in Altona prior to shipment to Nauru. This explains the importance of Hagedorn's early duties after joining the DSPAG, which included the preparation of designs and drawings for all the buildings and technical equipment brought to Angaur (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223). Unsurprisingly, given the overlap in personnel, the contract to fabricate and supply the DSPAG's initial facilities in Angaur was again awarded to F. H. Schmidt. Steamers departed from Bremen and Hamburg in the autumn of 1908 carrying the first shipment of 'buildings, technical equipment and necessary materials' to commence operations on the island as quickly as possible. This included a full arsenal of locomotives, wagons, rails, and sleepers, storing and loading equipment, prefabricated Pitch Pine (*Pinus rigida*) buildings, water treatment facilities, as well as the electrical and transmission devices required to establish a radio connection with the telecommunications hub at Yap (Anonymous 1909a).

Early company records include costings for a director's house for Schönian, separate houses for each of the four managers of the phosphate works, ten houses for company officials, twenty houses for supervisors, seven workers' dormitories, three transportable warehouses, a twenty-six-bed hospital, a separate mess hall for DSPAG officials and workers, a kitchen, office building, laboratory, and goods stores (Anonymous 1909b, 35). A large casino was erected for the entertainment of the officers in the evenings, containing a bowling alley, a billiard table, a piano, and 'the latest newspapers, albeit that they are already three to four months old by the time they get here' (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223, 178). A large company settlement and provisional mining infrastructure were established within a year. Hagedorn was a prolific photographer during his four-year residence in Angaur, carefully recording the development of these facilities (Fig. 5.6a). As Hagedorn reflected:

We also worked on Angaur in the Palau Islands for several years, helping to set up a large industrial operation to mine phosphate. The work has begun, the bush has been cleared and the houses have been erected. The beginning of the construction of the colony. You see a lot of small houses, these are the houses of the officials, so each European has a small house for himself with a room, a veranda at the front and back, and a large garden at his disposal. All the materials, houses, machines etc. have of course been brought over from Germany, as there is no opportunity to make them over there. (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223, 222)⁸



Fig. 5.6: (a) Prefabricated housing for the European employees of the German South Sea Phosphate Company in Angaur, supplied by F. H. Schmidt, c.1909; (b) Manual phosphate mining underway in the early period of the DSPAG's activities on Angaur. A tramway has been cleared through the old growth forest. Up to five metres of phosphate have already been removed in some areas, c.1909 (Deutsches Bundesarchiv, Sammlung Heinrich Hagedorn, Bild 223–158 and 223–153)

Over time, the DSPAG also constructed a sawmill, a shipyard, and a carpentry workshop, as well as water reservoirs and rain harvesting systems. Despite its smaller size, Angaur hosted roughly the same extent of industrial facilities as Nauru during the German colonial period.

The total volume of the Angaur deposits was estimated at 2.5 million tons of about 86 per cent phosphate of lime, buried under a thin layer of humus and cleaved between the limestone pinnacles dotted throughout most of the island (Fritsch 1911). Once the trees and soil covering a given deposit had been removed, the phosphate was initially shovelled by hand into hoppers on a narrow-gauge tramway that led to improvised loading facilities in the north-east and west of the island (Fig. 5.6b). Here, the phosphate was dried and stored under cover until a steamer arrived to collect it. After being loaded back into the hoppers, the phosphate was then deposited into a fleet of 20 boats that ferried small quantities between the tidal natural harbour and the steamer anchored in deeper water. This loading method proved extremely labour intensive and could take up to three weeks to load one vessel for export (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223–017). When Guangdong Province banned the recruitment of Chinese labour by German companies due to their use of corporeal punishment, withholding of wages, reduced lunch breaks, and inadequate rations, the DSPAG focused on recruiting Caroline Islanders from throughout Palau, Yap, and the surrounding atolls instead. Poor working conditions soon led to further complaints from the DSPAG's workforce, sparking a protracted

discussion between Schöinian, district officials in Yap and the colonial administration in Berlin. By 1910, the lack of labour was so severe that Schöinian redirected the entire workforce to process phosphate only, temporarily abandoning any further construction on the island (Anonymous 1910). Following the suppression of the rebellion in Pohnpei, 100 prisoners were brought to Angaur in 1911 as forced labourers under police guard. Hagedorn's photographs capture the *Schutztruppe* employed to suppress any potential rebellions by the workforce, which had grown to approximately 800 people by 1912, as well as the deforestation and excavation with which the labourers were tasked (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223–005).

With a secure labour supply in place, attention could once again be directed at increasing the productivity of the operations on Angaur (Firth 1978, 36–52). These efforts ultimately centred on the so-called '*Gute Hoffnungshütte*', a hulking 18-metre wide by 18-metre high, 100-metre-long multipurpose cast-iron structure – of 'dazzling construction' in the words of Hagedorn – located close to the phosphate fields in the island's interior (Fig. 5.7a) (Sammlung Heinrich Hagedorn zu deutschen Südseekolonien (Palau) 1908–1912, 223–140). The *Hoffnungshütte* integrated numerous critical aspects of the works on Angaur, while also dramatically increasing the rate at which rock phosphate could be prepared and stored ahead of export. It seems to have been designed as a reaction against the legal minutiae of colonial regulation following a dispute between the DSPAG and the Colonial Office in Berlin concerning the correct procedure for calculating the moisture content of exported phosphate. Whereas the DSPAG argued that moisture levels should be calculated once a shipment arrived at its destination port and thereupon be valued at an agreed rate with the purchaser – which would reduce capital investment in drying equipment in Angaur – the Colonial Office insisted that the moisture content must be measured prior to export, the justification being that these were the same terms set for the PPC on Nauru (DSPAG 1910). The real reason, however, is likely to have been the aforementioned levy raised on phosphate exports from German New Guinea, which flowed directly to the treasury of Hahl's administration. By insisting that moisture content must be measured prior to export – that is, when the phosphate was at its heaviest – the Colonial Office was effectively protecting the balance sheet of German New Guinea, which derived between 50 and 75 per cent of all taxation revenue from the DSPAG. Moreover, the export levy placed on the DSPAG was set to increase by 10 per cent after twenty-five years, which

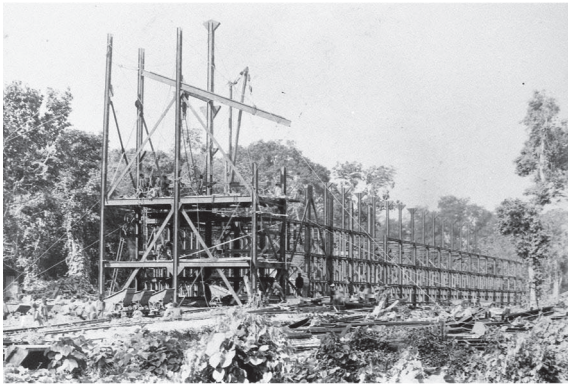


Fig. 5.7: (a): The 'Gute Hoffnungshütte' under construction; (b) Concrete mixing underway in Angaur, the end section of the 'Gute Hoffnungshütte' is visible in the background, c.1912; (c) Preliminary tracks, carts, and loading equipment in Angaur, provided to the Deutsche Südseephosphat Aktiengesellschaft by F. H. Schmidt. A Lloyd steamer waits to be loaded in the background, c.1908 (Deutsches Bundesarchiv, Sammlung Heinrich Hagedorn, Bilder 223–227; 223–046 and 223–046).

further incentivised investment in technology that could increase the rate of extraction and export while the DSPAG's tax burden was at its lowest (Scharpenberg and Müller 1977, 156).

The Hoffnungshütte was an innovative example of German colonial engineering, minimising the footprint of the total plant required on Angaur in order to maximise the area available for mining. Its two-storey configuration meant that damp phosphate could be conveyed to its upper level by a cable railway and into large driers heated by furnaces from the level below, fuelled by timber harvested from the old growth forest on the island (Fig. 5.7b). Once dried, up to 5,000 tons of export-ready phosphate could be stored in the Hoffnungshütte, which also incorporated a mechanical workshop, forge, and storage shed for the DSPAG's five locomotives. These carried the product along ten kilometres of tracks laid on the island to upgraded loading facilities on the coast where a newly installed mechanical loading arm – designed by Schöniar – cantilevered 60 metres out to sea (Fig. 5.7c). This enabled the phosphate to be loaded directly into the hull of a ship via a continuous conveyor belt. Two steam-powered cranes completed the loading facilities on the island.⁹ Together, these upgrades significantly reduced the time required to load a vessel from three weeks to twenty-four hours, saving on freight costs while also minimising the export levies payable to the administration of German New Guinea. The effects were immediate and dramatic: annual exports from Angaur climbed by 40 per cent from approximately 9,000 tons in 1909 to more than 36,000 tons in 1910 before continuing to rise to 89,000 tons in 1913 – totalling 307,000 tons of exported phosphate by the end of 1914.

4. Extracting growth

Nauru and Angaur reflect a colonial paradigm in which the core fascinations of state governance focused on the circulation of value (in the form of phosphate) within a world market – a process that was central to agricultural industrialisation and modern state building efforts more broadly (Dixon 2018, 771). Bismarck had first articulated such a programme for German colonialism in the 1880s, describing a form of 'commercial sovereignty' or 'mediated government' protected by the German state in lieu of a 'complicated colonial administration' that demarcated its sovereignty directly through expensive public construction projects in remote locations and an increased civil service (Zollmann 2020, 281–283). As Peter Humpenstall has

argued, the legacies of this administrative paradigm throughout German New Guinea can be seen in the discrepancy between the paltry European population figures up to the First World War and the fact that the territory was – comparatively speaking – heavily developed by this time, containing 10,000 hectares of plantations, roads, industrial infrastructure, a functional taxation system, and a ten-year plan for future works prepared by Albert Hahl, the *Landeshauptmann* (state chairman) of the German New Guinea Company prior to his appointment as governor of the protectorate in 1901 (Hempenstall 2018, 143). As stated by Dernburg following his appointment as Secretary of State for the Colonies in 1906, German colonial methods should focus on precisely this kind of development, substituting the means of destruction (*Zerstörungsmitteln*) of the past with German medical, missionary, and engineering expertise aimed at the ‘utilization (*Nutzbarmachung*) of the earth, its treasures ... and especially the people’ (Dernburg 1907, 5). Although the real-world impacts of Dernburg’s official rhetoric remained limited throughout the wider German colonial sphere, the establishment and administration of Nauru and Angaur as industrial sites within German New Guinea, managed by corporate proxies for the German state, nevertheless provide an example of the particular form of colonialism both Bismarck and Dernburg endorsed (Conrad 2012, 64). According to Stewart Firth, in its administration of both islands, the German state effectively functioned as an agent of ‘private companies, providing legality for whatever the companies wished to do’ and supplying them with ‘cheap land, long mining leases, low royalties and a disciplined, underpaid labour force’ subject to minimal regulation (Firth 1978, 37; 51).¹⁰ When these arrangements failed, the state would take over and administer the colonies directly.

One repercussion of this liberal approach to colonial governance in German Micronesia was that by 1913 annual phosphate exports totalled almost 200 million kilograms. Overall, half of this material was shipped to Germany, one-third to Australia and New Zealand and one-sixth to ports in Asia (Hofmann 2016, 178). The export destinations for the PPC and the DSPAG differed considerably, reflecting the original interests of the founding members of each company. Nauruan phosphate was almost exclusively sent to ports in Australia and New Zealand, especially Melbourne, Adelaide, Auckland, Fremantle, Newcastle, Lyttelton, Port Kembla, and Port Chalmers (British Phosphate Commission 1920–1925). Independent superphosphate manufacturers were stationed at each port, ready to receive and process the rock phosphate prior to bagging and distribution. Once primitive mixing works developed into substantial complexes, integrating fertiliser

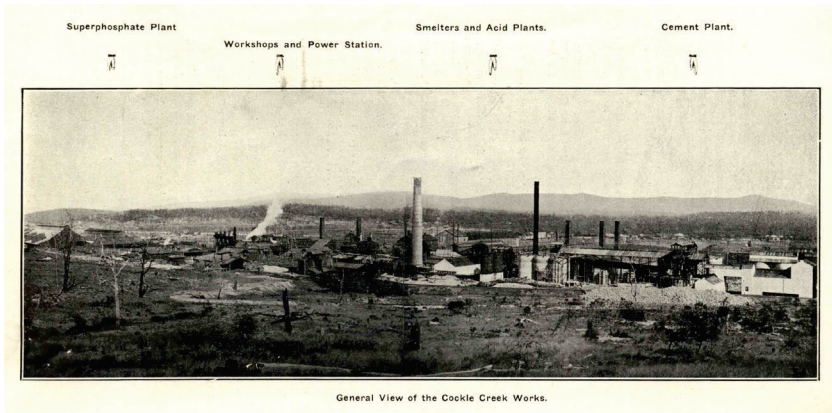


Fig. 5.8: View of the Cockle Creek Works of the Sulphide Corporation. The superphosphate plant is shown on the left (England, E. 1926. *Sulphide Corporation Limited Cockle Creek Works*. Sulphide Corporation Limited)

manufacturing into multiple other industrial processes in order to repurpose chemical by-products and diversify production. At the Sulphide Corporation in Newcastle, cargoes of rock phosphate arrived at the port before being transported by rail to the works at Cockle Creek (Fig. 5.8). Here it was crushed finely enough to pass through a mesh screen before being weighed on an automatic scale and mixed with sulphuric acid. ‘After thorough but rapid mixing,’ stated a company brochure, ‘the material is dropped into a den from the mixer. ... The moist, hot superphosphate is transported by conveyor belt to the storage sheds, there to complete the ripening and drying process.’ Demand for superphosphate was so high on the other side of the First World War that a new storage shed was required, bringing the total storage capacity to 35,000 tons at Cockle Creek alone. ‘It is in these storage sheds,’ continued the brochure, ‘that the final chemical reactions take place, and from these the fully-matured superphosphate is bagged ready for market’ (England 1926, n.p.). By adopting a variety of techniques to promote the benefits of their different blends of chemical fertiliser, including travelling displays, competitions, and demonstration farms, manufacturers such as the Sulphide Corporation played an important role in educating Australian farmers about the benefits of Pacific phosphates. Combined with innovations in agricultural machinery and further penetration into the country’s agricultural districts, the effect was to transform Australia into the world’s highest user of superphosphate prior to the First World War (Byerlee 2021, 100).

Reflecting on the German superphosphate industry in 1913, the chemical engineer Carl Elschner saw a similar transition: from the 'once primitive facilities' to the 'highly developed superphosphate factories' of the present day (Elschner 1913, 116). Just as the Sulphide Corporation's Cockle Creek works had invested in new state-of-the-art superphosphate facilities, chemical fertiliser producers in Germany now boasted 'larger, ventilated storage and working spaces, rationalised crushing facilities with increased capacity', alongside widespread automation and mechanisation of the production process (Elschner 1913, 116–117). Elschner argued that it was important to view the modernisation of the superphosphate industry as on par with the successes of the more celebrated chemical industries in Germany – especially paints and pharmaceuticals – for which the country had become known in recent decades. 'If one were to briefly consider the history of the superphosphate and artificial fertiliser industry, especially in the last thirty to forty years,' Elschner hypothesised:

then I imagine one would come to the conclusion that it readily sits alongside the other branches of German chemical engineering – indeed, I would like to assert that it far surpasses them all, even if the majority of the German people have no real idea of the tremendous value that fertilisers represent annually and, much less, of the incalculable increase in the monetary value of our agricultural products that have been achieved as a result of the German artificial fertilizer industry. (Elschner 1913, 118)¹¹

At the time Elschner was writing, only 40 per cent of Germans lived in rural areas compared to almost 70 per cent at the time of unification in 1871. Despite this rural exodus, however, the value of annual harvests in Germany had doubled over the same period as rates of chemical fertilisation increased by more than 1,000 per cent in line with Liebig's entrenched model of rational agriculture. The DSPAG was established to service this industrialisation and close to 60 per cent of its early exports arrived in Europe. As founding members of the DSPAG, Beer, Sondheimer & Co. (Frankfurt) and W. H. Mueller & Co. (Rotterdam) held exclusive importation rights and the majority of rock phosphate seems to have arrived at three manufacturers: Chemische Fabrik Kalk (Cologne), Superphosphatfabrik AG Nordenham/Guano Werke AG (Bremen), and the superphosphate works at Zwijndrecht (Netherlands).¹² Japan and Australia shared the remainder of the pre-war Angauerse exports: manufacturers in Japan purchased approximately 25 per cent of all exports and the remaining

20 per cent arrived on Australian shores, including in Yarraville, at the superphosphate plants of Wischer & Co. and Cuming, Smith & Co, who had missed the early opportunity to establish a vertically integrated model of superphosphate production. As Anneliese Scharpenberg and Hartmut Müller have argued, no German colonial-political measures were adopted in the phosphate industry 'that would have incentivised exportation to the motherland and thus shifted the market position in favour of European sales'. Instead, trade relations in German Micronesia 'were governed exclusively by global economic considerations', influenced by factors such as comparative freight costs, more recent discoveries of phosphate deposits closer to Europe, and the introduction of new types of synthetic fertiliser. Given these factors, Scharpenberg and Müller contended that the gradual shift of sales towards the Japanese and Australian markets in the 1910s was the inevitable outcome of fluctuations in the world phosphate market (Scharpenberg and Müller 1977, 168).¹³ The wartime seizure of Angaur by Japanese and Nauru by Australian troops therefore ended a period in which the phosphate industry in German Micronesia had delivered substantial returns to investors in Bremen, Berlin, Frankfurt, Rotterdam, London, Liverpool, Sydney, and Melbourne, as well as to the German colonial state, which bemoaned the loss of its 'orderly mining operations' as a result of the Treaty of Versailles (Schnee 1920, 164, 319).¹⁴

Wilhelm Schöniar is an intriguing para-colonial figure against this wider backdrop, first appearing on Nauru as a representative of the German state, responsible for contracting further German expertise into the Pacific, before being hired by the DSPAG directly and rising to the position of company director.¹⁵ His close relationship with F. H. Schmidt over the duration of his changing engagements in German Micronesia provides an insight into how governmental objectives overlapped with and reinforced those of commercial actors and vice versa, establishing continuity and connection within seemingly ever-changing administrative structures. Moreover, Schöniar's development of the phosphate mining facilities in Nauru and Angaur connects both islands to a much broader history in which European imperialism became wedded to a techno-scientific paradigm intent on controlling the means and benefits of sustained global growth – a possibility first described by Liebig in relation to rationalised agricultural production in the mid-19th century. Dixon has suggested that the long history of this paradigm – and the place of superphosphate fertilisers within it – is best understood as one of increasing 'chemification': a series of interlinked processes through

which ‘imperial states gained territories (and land, labour, etc.) through industrial power built on assemblages of production, energy, and materials connected via a handful of chemicals’ (Dixon 2018, 783). The phosphate mining infrastructure established in Nauru and Angaur prior to the First World War – funded, designed, and manufactured by German individuals, companies, and government agencies – contributed directly to the chemification of industry, agriculture, and the economy in Germany, Australia, New Zealand, and Japan. ‘In world-ecological terms,’ Dixon suggests, ‘this historical moment was the beginnings of a long wave of accumulation – of a great expansion in the scope, scale, and speed of appropriation of unpaid work/energy’ through which nature was brought ‘into the circuits of capital’ (Dixon 2018, 772). Approaching the history of Nauru’s and Angaur’s phosphate mining infrastructure in these terms reveals the role the built environment played in enabling certain privileged populations to intervene in the fundamental processes that govern the biosphere. As a result, we get to see the artificial stratifications inherent to this intervention – between certain types of life, matter, groups of people, forms of value, and political legitimacy – alongside the various delimitations that rendered the German colonial state as but one, highly ambivalent actor within a much broader and enduring project.

Notes

- ¹ This chapter is adapted from the following reports, originally prepared as part of the Society of Architectural Historians H. Allen Brooks Fellowship: Jasper Ludewig, ‘On Form: Infrastructuralism and the *Schutzgebiet*’, 2023; ‘On Territory: Extractive Sovereignty and Australian Empire’, 2024; ‘On Layering: Surviving Angaur’, 2024; ‘On Improvement: Waste, Wheat and White Possession’, 2024.
- ² Prior to the major Pacific rock phosphate discoveries considered throughout this chapter, phosphate was first mined in South Carolina (1867) and Florida (1890) before deposits were located in France, Belgium, and Algeria. Today, Morocco is estimated to hold approximately 70 per cent of the world’s reserves of phosphate, although the United States is the world’s largest producer of phosphates (Strotmann, Herment, and Page 2021, 5).
- ³ Wilhelm Schönlank is listed as having graduated as a hydraulic engineer in 1901 (Unknown 1901, 141).
- ⁴ An excerpt from a promotional brochure published by F. H. Schmidt depicts a Chinese labour force working on government buildings in Kiautschou (Source: ‘F. H. Schmidt, Bauunternehmung, Altona, Hamburg, Tsingtau’, *Historisch-biographische Blätter. Der Staat Hamburg* 7 (1905/1906), n.p.).
- ⁵ The workers’ barracks designed by J. M. & H. E. Coane were the most cramped and basic, providing bunks and an earthen floor, albeit it with more ventilation than the buildings provided by F. H. Schmidt.
- ⁶ My translation: ‘Die große Bedeutung, die die weitere wirtschaftliche Entwicklung des Südseegebietes für unsere dortigen Dampferlinien besitzt, hat den Norddeutschen Lloyd im verflossenen Jahre veranlasst, in Verbindung mit befreundeten Firmen eine Expedition zur Durchforschung der Erdbodenschätze des Inselgebietes zu entsenden.’

- ⁷ The signatories listed in the contract are transliterated as follows: Ugerbalau, Ungerbunch, Gagelbai, Riguchel, Midechulsch, Gaithan, Thalowak, and Guang. Contract of Acquisition. Imperial District Administrator Fritz and Director Schöinian of Angaur, 20 November 1909. University of Hawai'i Library A21.
- ⁸ My translation: 'Auf Angaur in den Palauinseln waren auch wir mehrere Jahre tätig, um bei der Errichtung eines großen industriellen Betriebes beim Abbau von Phosphat mitzuwirken. Die Arbeit hat begonnen, der Busch ist abgeholzt die Häuser sind aufgestellt. Der Anfang des Aufbaues der Kolonie. Sie sehen lauter kleine Häuser, es sind dies Häuser der Beamten, so hat jeder Europäer ein kleines Häuschen für sich mit einem Zimmer, vorn und hinten eine Veranda und einen grossen Garten zur Verfügung. Sämtliche Materialien, Häuser, Maschinen u.s.w. sind natürlich von Deutschland fertig mitgenommen worden, da dort drüben keine Gelegenheit zur Anfertigung derselben ist.'
- ⁹ Interestingly, the DSPAG sought quotes for this equipment from English companies, not from F. H. Schmidt (Scharpenberg and Müller 1977, 158).
- ¹⁰ For a discussion of the *Schutzgebiet* as applied in the Pacific, see Cait Storr, 2020. *International Status in the Shadow of Empire: Nauru and the Histories of International Law*. Cambridge University Press.
- ¹¹ My translation: 'Wenn man die kurze Geschichte der Superphosphat- und Kunstdünger-Industrie, besonders in den letzten 30 – 40 Jahren überblickt, so glaube ich, da sie sich ruhig den genannten Zweigen chemischer Technik an die Seite stellen kann, ja, ich möchte noch behaupten, da sie dieselben an wirtschaftlicher Bedeutung bei weitem überragt, wenn auch ein großer Teil des deutschen Volkes keine rechte Ahnung davon hat, welche gewaltigen Werte die Produkte der deutschen Dünger-Industrie eines einzigen Jahres repräsentieren und, noch mehr, welche ins Unberechenbare gehende Steigerung des Geldeswertes unserer landwirtschaftlichen Produkte durch die Anwendung der Erzeugnisse der deutschen Kunstdünger-Industrie erzielt wird.'
- ¹² This was the case in the early years of the operations on Angaur (DSPAG 1909, 55).
- ¹³ My translation: 'Irgendwelche kolonialpolitische Maßnahmen, die eine Ausfuhr des Kolonialproduktes nach dem Mutterland begünstigt und dadurch die Absatzverhältnisse zugunsten des europäischen Absatzes verschoben hätten, bestanden nicht. Die Handelsbeziehungen regelten sich ausschließlich nach weltwirtschaftlichen Gesichtspunkten. Da die Absatzbedingungen nähergelegener Gebiete Asiens und Australiens sich vorteilhafter für die Deutsche Südseephosphat AG gestalteten, war die zunehmende Absatzorientierung nach Japan und Australien selbstverständlich.'
- ¹⁴ My translation: 'geregelte bergbauliche Betriebe'.
- ¹⁵ According to the German Colonial Lexicon, *Regierungsbaumeister* were typically organised into 'Referenten für Hochbau, Seebau, Wegebau, Wasserbau [und] Eisenbahnbau'; however, only one 'Baureferat' was afforded in the Südseeschutzgebiete (Schnee 1920, 153).

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