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Tramps Starving for Coal: Coaling Stations in the Pacific, 1884-1900

by

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A thesis submitted in partial fulfillment
of the requirements for the degree of
Masters of Arts in Historical Resources Management
in the Department of History
Idaho State University
Spring 2015

Committee Approval

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ACKNOWLEDGEMENTS

Dr. Ryan Tucker Jones was the first to challenge me to analyze my memories and experiences aboard ship in Pacific in an academic fashion and instill in me that those experiences had real value. He told me “I can’t write the history that you can.” His Pacific History course made me realize how much is missing from the historical record of the Pacific. He inspired me to contribute something that combined my twelve years at sea with my studies, for which I am thankful. After completing this work I realized that there is a gulf between mariners who lived and experienced the constantly changing realm of globalization, and those who study it.

Dr. Kevin Marsh was instrumental in guiding my work. He spent countless hours guiding my research and writing, helping me to narrow a focus on such a broad and all-encompassing topic into the transnational, transcultural themes that are valued in today’s historical record. Containment and contextualization has been Dr. Marsh’s greatest gifts to this thesis, constantly asking me to define what my research means to the broader context of history.

Dr. Robert Edsall, who advised me on the digital portion of my graduate studies, challenged me to think in much different terms. Dr. Edsall showed me that quantifying and presenting historical data requires a different mentality. Visualizing data and presenting it in a historical, digital format requires a unique approach, one that challenges twentieth-century thinking to adapt to a twenty-first-century format. The concept of digital history is what made me choose the Historical Resource Management Program at ISU. I believe that the historical record must make the transition to a digital format. It’s the only way for history to adapt and evolve into something tangible, something of value

to the twenty-first-century student. I only hope that quantifying coaling station data becomes a small part of larger digital history project.

Dr. Paul Sivitz was instrumental in this project as well. Dr. Sivitz was ever-present and his regular visits to the graduate student office became instrumental to the process of graduate studies. If Dr. Sivitz had a moment, he spent that moment popping into the graduate student office and asking, “How can I help?” His advice was always welcome and solid. The value of his visits to the office went far beyond the context of study. The fact that someone from the faculty took time from their schedule to ask me about my day and my struggles, provided insight and guidance to a process new to me but old hat to him, let me know that I was not alone. Graduate school can be a very lonely place if you let it become that. Dr. Sivitz made sure that each student was involved.

To Josh, Kristine, Monte, John, Ian, and all the others I had the privilege of sharing an office with, thank you. The dynamic of sharing and exchange that happened within cramped, cluttered office made all the difference for me. I will always appreciate the daily exchanges I experienced in that office. It was my workplace, my home, my intellectual sanctuary, a place I will not forget anytime soon. I will forever cherish the conversations and experiences I had there.

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TRAMPS STARVING FOR COAL: COALING STATIONS IN THE PACIFIC, 1884-1900

Thesis Abstract – Idaho State University (2015)

In the late nineteenth century, coal-producing companies circulated millions of tons of coal to islands and harbors around the Pacific to fuel the steam-powered cargo vessels called tramps. The office of Naval Intelligence detailed these locations in reports titled “Coaling, Docking and Repairing Facilities of the Ports of the World” beginning in 1884. Analysis of coal production and distribution throughout the Pacific provides a unique perspective on the development of Pacific trade systems. Pacific trade had been cultivated over centuries by Polynesian seafarers. From the sixteenth to the early nineteenth century, Westerners expanded the indigenous system, but by the 1880s technological advancements that created massive steam-powered vessels changed that dynamic. As these vessels entered the Pacific, their enormous appetite for coal and cargo devoured the existing trade system, replacing it with Western capitalism. Examination of these Pacific island’s transformation into coaling stations provides a broader understanding of this change.

Chapter I: Introduction

The purpose of this research is to provide an understanding of the production, distribution, and consumption of coal for steamship purposes of the late-nineteenth century in the Pacific region, the assumption being that those who controlled the coaling industry controlled the new steamship commerce. The significance of this work provides insight into the foundations of modern maritime trade in a historical context and the broader connections to indigenous trade relations, treaties, and foreign policy of Western nations. This work emphasizes the role of the private enterprise from individuals to multinational corporations, because the origins of trade agreements and treaties among nations begins with the entrepreneurs who first engaged in the steamship economy.

As steamships entered the Pacific in the late nineteenth century, they were followed by a tide of transformation. The impact of these ships can be seen in the cultural and commercial relationships between Western entrepreneurs and indigenous nations. This paper attempts to provide a broader understanding of this change first by describing the transnational, transcultural relationship of seafarers of the Pacific, both indigenous and Western, as it was before the steamship's impact in the eighteen-eighties. I then unpack some of the mechanisms that disassembled those relations, as they were devoured by the steamship and the laissez-faire economics, with a focus on coal as both a new trade commodity and what literally fueled this change.

Another significant contribution of this work is to provide a more accessible and usable format to the four underutilized reports from the U.S. Office of Naval Intelligence published between eighteen-eighty-four and nineteen-hundred. These reports contain data collected from coaling station owners and ship captains who operated all over the world.

These reports are titled “Coaling, Docking, and Repairing Facilities of the Ports of the World” and were formulated by the Office of Naval Intelligence, printed by the Government Printing Office, distributed to the Navy Department and the Bureau of Navigation, and used in numerous hearings of both Congress and the Senate. One of the goals of this work is to place this data into a digital, visual form. The maps I created from this data source allow others in the field of history to access and understand the information quickly and easily, as I have digitized the data from three hundred and thirty pages from these reports. The data from 1884 has been placed on one map and the data from 1900 on another, which easily illustrates the change that occurred in that sixteen-year period. This work is therefore a source for future historical studies on similar topics.

The Pacific Ocean is the largest single feature on the planet covering more than one-third of the earth. There are nearly thirty thousand islands within this body of water, each with a long and well-established maritime culture. The history of the Pacific may be summarized by the “age of Polynesian migration” ending in fourteenth century, followed by the “age of Western exploration” in the fifteenth and sixteenth centuries. These explorers were followed by Western entrepreneurs who engaged in a Pacific trade system established by Polynesian seafarers long before the arrival of Westerners. Pacific islanders had a complex trade system, exchanging commodities such as breadfruit, copra, and sandalwood. This trade network was tied together by indigenous mariners with incredible skills in navigation. As Western mariners entered the Pacific, they engaged in this trade system, introducing metal tools, cloth, and weapons and engaging in the production and trade of the Pacific island commodities.

This was a mariner's world, one in which cultural and economic exchanges were carried out by the seafarers of both Western and Pacific worlds, inlanders and outlanders working within this trade system. The mariner's world as a concept is developed for and used in this study as a way to reorient the viewpoint of imperialism in the Pacific. Most people have a limited understanding of trans-Pacific voyages via ship, or the culture and industry aboard ship, the wharfs and docks of port cities, and the numerous transnational ties mariners have. The mariner's world was one in which whole communities centered on ships, what they carried, their arrival and departure. Frances Steel takes a similar viewpoint of the maritime industry in her book *Oceania Under Steam*, where she states, "This reconfiguration of maritime space and its historical significance encourages us to think differently about regional connectivities and interrelationships, as well as the asymmetries of power that both support and are produced by them."¹

Pacific maritime trade systems were not the product of imperialism, nor were the routes that spider-webbed across the ocean. Although this paper has a focus on the impacts of a Western system, it was built upon an indigenous structure. In a Euro-American-centric point of view, Western explorers "penetrated" the vast uncharted Pacific and the entrepreneurs who followed "conquered" the vastness by creating ties between islands and continents. In 1831, the French explorer Jules Dumont D'Urville created the concept of Micronesia, Melanesia, and Polynesia in an attempt to divide the Pacific into more manageable regions to Western minds.² D'Urville may have seen these island archipelagoes as divided, isolated in a faraway ocean. The names of these regions

¹ Frances Steel, *Oceania Under Steam: Sea Transport and the Cultures of Colonialism c.1870–1914* (Manchester and New York: Manchester University Press, 2011), 10.

² Matt Matsuda, *Pacific Worlds: A History of Seas, Peoples, and Cultures* (New York: Cambridge University Press, 2012), 3.

remain, as does the unfamiliarity of the crowded indigenous trade routes, intersections, and exchanges between the peoples of these archipelagoes and Western mariners.

Few twenty-first-century historians of the Pacific move beyond their introductions without crediting Epeli Hau'ofa, who reorients our visualization of the space of the Pacific. In Hau'ofa's most canonical work, *Our Sea of Islands*, D'Urville's regional divisions are broken down, as are other regional titles such as "Southeast Asia."³ His work considers the "Pacific" as "Oceania," where the Pacific is a Western title and description. "Oceania" draws upon a millennium of history that includes Irano-Arabic, Hindu, Buddhist, Malay, Indonesian, Chinese, and Makassan histories of Pacific maritime involvement as a way to illustrate that Westerners are one group drawn together over a millennium among many other groups with overlapping narratives.⁴ Hau'ofa also opposes a viewpoint of many historians in which imperialism is seen in a layer above, while indigenous agency is seen in a layer below. This viewpoint subjugates Pacific Islanders in the historical record.

As Western entrepreneurs became established within the Pacific in the mid-nineteenth century, their revenue increased, allowing for more land purchases on Pacific islands, negotiated between Western ship captains and indigenous island chiefs. Copra, rice, sugar, and breadfruit crop production grew into large plantations, and new industries such as mining became lucrative. These Western businessmen took advantage of the increasing demand in the markets of Europe, South America, China, and Indochina, though the greatest obstacle for capitalist ventures still remained: the ocean's vast distances. The distance between New York and London is under 3,500 miles while the

³ Epeli Hau'ofa, "Our Sea of Islands," *Contemporary Pacific* 10, no. 2 (1994): 148–61.

⁴ Matsuda, *Pacific Worlds*, 5.

distance from Sidney to San Francisco is 7,400 miles, more than one-third around the circumference around the earth. Shipping cargo was performed by wood-hulled square riggers (or schooners) with an average carrying capacity of about ten tons throughout the seventeenth and eighteenth centuries. Steamship development began in earnest in the early nineteenth century, but it was only with the technological advancements of the 1880s in steam propulsion, such as the triple-expansion boilers and steam-turbine engines, that the steamship was able to make the lengthy, trans-Pacific voyages with any efficiency.

The “tramp,” a common class of cargo ship that crossed the Pacific in the 1880s and 1890s, was powered by triple-expansion steam engines and was capable of traveling four times the distance on a ton of coal than the compound-engines of its predecessor of the 1870s that had plied the Atlantic. The tramp was capable of carrying an average of one hundred tons of cargo across the Pacific, stopping once or twice to refuel on coal. Tramps grew in size rapidly through the 1880s and 1890s, their carrying capacity exceeding five thousand tons. These steamships put enormous economic pressure on the Pacific trade system as Western companies scrambled to fill the cargo holds of these new ships by moving labor forces from Asia to the islands to work and increase crop and mine production. These economic strains created competition and conflict among Western companies, who pressured their governments for trade agreements and the annexation of islands along trade routes.⁵

The steamship’s enormous appetite for coal and cargo devoured the existing Pacific trade system of the mariner’s world, and had replaced it with one of Western

⁵ Adam McKeown, “Movement,” in *Pacific Histories: Ocean, Land, People*, ed. David Armitage and Alison Bashford (London and New York: Palgrave Macmillan, 2013), 154.

industrial capitalism by nineteen-hundred. This new Pacific trade system centered on a single energy source: coal. Those who were most efficient and successful at producing, distributing, and selling coal throughout the Pacific would come dominate this new trade system.

In 1871 the United States became a net exporter of coal, and by 1890 its exports outpaced those of the United Kingdom. This created a slight decline in British domestic coal exports, and many in the business sought employment in colonies and other Pacific locales, where coal production was increasing. Although the United States had become the largest coal exporter, very little of it could be found in the Pacific region during the sixteen-year period from eighteen-eighty-four to nineteen-hundred. The distribution of coal among hundreds of Pacific locales was a process that British private companies had become exceedingly efficient at by 1900. The maritime industry of the U.S. West Coast was decades behind the fleets of British private shipping companies operating in the Pacific.⁶

Although the acquisitions of the Philippines and Guam as a result of the Spanish-American War as well as the annexation of Hawaii and the protectorate of American Samoa are seen as watershed moments in American foreign policy, this collection of Pacific islands did little to increase U.S. trade in the region. In terms of global maritime shipping, the United States was a distant second to the United Kingdom; for every ton of cargo shipped by an American merchant, the British shipped ten. In the years from 1914 to 1918, American businessmen took advantage in the Pacific, as the majority of European tramp steamers were called to service in the Atlantic during World War I. U.S.

⁶ Frances Steel, *Oceania Under Steam: Sea Transport and the Cultures of Colonialism c.1870–1914* (Manchester and New York: Manchester University Press, 2011), 4

shipping in the Pacific increased more than threefold during the war but was still a distant second to British companies by 1920. Control of coaling stations, coal production, and its distribution throughout the Pacific maintained British trade dominance during the age of steam.⁷

My interest in studying this topic stems from my twelve years aboard ship on the Pacific. The academic viewpoint of the Pacific Ocean centers on a map: the immovable visual representation that depicts this large body of water as static. My experience of the ocean is far from static, with currents that can move a ship at twelve knots, waves that can swamp the foredeck, and winds that sting as they blow across your face. The major port cities are something to behold, as the tradecraft of the mariner has such prominence, culture, and history at these places. Ships and the ports they frequent are incredibly diverse, as are the multitude of types of businesses performed in the maritime industry. The history of transportation may be better understood as a component of the history of mobility. The mariner's world is a culture of mobility. Within the context of imperialism, colonization, and technological advancements, the vantage point of the mariner's world is a way to draw dock workers, sailors, passengers, local agents, investors, and shareholders together within the Pacific seascape.

It may be of some academic value to view these port cities and the exchange of culture amid this coastal landscape of the Pacific, or at least visualize it from a ship. My twelve years on the Pacific and beyond have provided me with a portrait of the Pacific that may be unique to some readers. The voyage begins in Alaska. From a mariner's point of view, Alaska is no-man's land during the long winter, where everything is dark

⁷ Abraham Berglund, "The War and the World's Mercantile Marine," *American Economic Review* 10, no. 2 (June 1920): 227–58. <http://www.jstor.org/stable/1804864>.

and difficult and the ice floes make navigation too treacherous for all but a few hardy, foolish sailors. The largest wave heights in the world have been recorded here.⁸ The short Alaskan summer is much different world, with a flurry of rushed labor conducted under the extended hours of daylight. The harbors and fjords are lined with steep, rocky, green faces jutting straight up from the deep water. The tide ranges twenty feet from low to high in some places, making wharfs and docks very difficult to build and nearly impossible to keep for more than a few winters. Many of the dockworkers and deckhands are indigenous to Alaska, Kamchatka, the northern Japanese islands, and northern Canada. Sailors who operate here look like their ships, stout and weathered.

The Canadian coast is unique to most of the Americas. The Inside Passage is a route from Southeast Alaska to Seattle through the hundreds of long coastal islands. These islands protect vessels from the westerly ocean waves and wind that have had the whole of the northern Pacific to build. In open ocean, the Canadian coast is difficult to navigate as large rolling waves constantly push you ashore, but in the Inside Passage it is peaceful and calm. The channels are deep enough that a captain can steer so close to shore that a deckhand can reach out to touch the branches of the fir trees as the ship passes by at cruising speed.

The Inside Passage opens into the Straits of Juan De Fuca where coastal towns such as Nanaimo, Victoria, Port Townsend, and Port Angeles are married to the maritime world. Seattle is still a day's travel south into the Puget Sound for most vessels but for mariners, these towns have everything a sailor needs. The seas in the Straits are generally

⁸ National Data Buoy Center; Historical Data. National Oceanic and Atmospheric Administration, <http://www.ndbc.noaa.gov/>.

rough for a vessel headed west into open water, especially during an ebb tide. Once a vessel rounds Cape Flattery and heads south, the full force of the ocean is felt.

The Washington, Oregon, and northern California coastline is mostly cliff faces pounded by the sea, which is a dangerous place for anything that floats. If you can see the cliffs of the coast from your ship, you are too close. The waves here are relentless at best and fatal during a storm. There are sanctuaries such as Greys Harbor, Ilwaco, and Newport that a ship can hide in before the weather turns, but if it doesn't reach these river bar entrances before the waves do, entering can be more dangerous than staying in the open during storms. The Columbia River Bar at Ilwaco has claimed over three thousand vessels since Robert Gray first sailed across it in 1792. The indigenous peoples of this region are hardy and proud, and their artwork and sculptures are vivid and strong. Most of the coastal towns throughout the Pacific have a large population of indigenous peoples in the maritime trade, but here Native Americans retained their own ties to the sea. Centuries of whale hunts and fishing had developed incredible sailors in long canoes.

The danger of cliff faces and big waves subsides once a ship is south of San Francisco. A noticeable change in temperature occurs in both air and water. The mountain ranges in the background seem to have gradually decreased down the coastline, from the enormity of Alaska's snowcapped ranges to small hills around Los Angeles. The white, sandy beaches of the Baja Peninsula are inviting, and the ocean waves subside. Strong ocean currents weaken considerably here. The coastlines from Mexico south to the Equator are between the powerful, clockwise gyre of the north Pacific and the equally powerful, counterclockwise gyre of the south Pacific. The warmth of the water can be felt through the hull of a ship, and bilges that have been forever wet dry up. Working aboard

ship off the coast of Central America seems less strenuous, and the people in these harbors are welcoming.

The coasts of Peru and Chile have some similarities to that of Oregon and Washington, with pounding seas pushing ships towards cliff faces. The water is still blue here, unlike the dark, almost black water of the northern U.S. and Canadian coasts. The northern current is met with constantly opposing winds, building choppy, white-capped waves that stay for months.

The South Pacific season for the journey across is April to December. The voyage can be described as monotonous and uneventful, if the ship manages to avoid any major storm fronts. The landscapes of the islands one may encounter along the way are as diverse as those who inhabit them. Samoa and Tonga are every bit the paradise one would expect, while Majuro makes one wonder how people can survive on so few square miles. Majuro is a horseshoe-shaped ribbon of sand and green tropical vegetation surrounding a lagoon with teal-colored water clear enough to see the coral at a depth of fifty feet. Those native to this island are small in stature and politely reserved, which is in contrast to Samoans, who are large, fearless, and outgoing.

The approach to Darwin, Australia, the most northern town on this island continent, makes Australia seem out of place after island hopping across the South Pacific. Its brown hills and large sand dunes take some getting used to visually. The wind is warm and always more than a breeze. The people are energetic and industrious, quick to laugh and smile. The summer heat is relentless, and dock workers scramble to find shade when a lull occurs in activity. The harbors in Australia are generally shallow and

the tide ranges more than sixteen feet, revealing large alluvial plains of white sand at low tide.

The voyage from Darwin to Singapore illustrates the width and breadth of maritime history in this region. There are over 25,000 islands in the Pacific, with two-thirds of them clustered here. Ship traffic is incredibly dense and at times looks like a congested interstate. Every shape of vessel can be seen here, from dugout canoes with a single occupant and sail to some of the largest ships ever built. The Chinese junk, a boat of twenty to thirty feet in length whose design has not changed in over five hundred years, can be seen sailing out from port in the morning pushed by the offshore breeze and returning to port just before sunset carried by the onshore breeze. There are thousands of indigenous fishermen and their junks in this region.

In Indonesian waters, storms come so fast and hard that it seems unfair. Crews must run about the deck at an emergency pace to ready the ship at the first sign of oncoming weather. Storms can build the wave height to twenty feet in under an hour. Captain and crew must remain diligently aware of weather and other vessels here.

The land Singapore is built upon is of low elevation and so, on approach from a ship, the city is the first noticeable landmark on the horizon. The shores of Singapore are packed with ships, wharfs, and maritime activities that completely obscure the landscape of the shoreline itself. The flurry of activity on the docks never stops, and the dockworkers and laborers come from all over the world. Languages and facial features that once were distinguishable are blurred in Singapore, and the cultural diversity can leave one in awe.

The trip to Hong Kong from Singapore is a short one. The water turns a dark color and the waves from the south are constant, though small. Hong Kong Harbor seems smaller than the maps and navigation chart illustrate. The city is on a steep hill with most of the structures visible from a ship. The flurry of maritime activity is similar to Singapore, but Hong Kong has less space for wharfs and piers, so hundreds of vessels anchor here. Ships at anchor are serviced by a mosquito fleet of skiffs and ferries, moving people and goods from ship to shore like bees buzzing about a hive. The people in Hong Kong are diverse and serious about business. Chinese dockworkers and mariners are some of the most skilled in all the maritime world, moving vessels and cargo with such speed and accuracy that Western mariners may feel ashamed of their own skill.

A voyage from Hong Kong to Vladivostok takes a ship past the snowcapped mountains of northern Japan and back into the higher latitudes of cold. Vladivostok has a similar landscape to Alaska, with patches of tundra grass on the rocky hillsides. The city is deep inside Amur Bay. Its entrance faces south and is protected from the Pacific, except in the winter. Maritime activities are seasonal, with only the foolhardy sailor venturing out into open water in the winter months.

The journey from Russia to Alaska is short compared to the voyage across the South Pacific, but treacherous. The wave height in the North Pacific is generally twelve feet. An increase to sixteen feet indicates an approaching storm front, which may bring wind and waves that will turn this voyage into a fight for survival. The minimal protection of a small harbor, such as Adak in the Aleutians, is paradise after such a crossing. Grey clouds and fog are common in the North Pacific, making any entrance into a port or harbor a challenge. The twenty-two-foot tidal range provides two very different

landscapes from low to high, requiring some previous knowledge of an approach to an inlet. Detailed instructions of how best to navigate Aleutian ports and harbors can be found in nearly every pub and tavern from Japan to Seattle.

Any mariner who has spent more than a few years in the Pacific has a tale of some near fatal storm they have survived. Mariners spend half of their time at sea in the darkness of nighttime navigation. Darkness is welcomed by navigators, as it enables them to check their position with the celestial bodies, but clouds and fog at night can make for uneasy voyages. The voyage from San Francisco to Hawaii is just over three thousand miles. If a navigator is off by a single degree, the ship will pass the Hawaiian Islands by almost three hundred and sixty miles. Mauna Kea, Hawaii's tallest peak at over thirteen thousand feet, is still only visible to ships just beyond the horizon at twenty miles.

Fuel, fresh water, food, and supplies needed to maintain a ship at sea are vital to the survival of the crew as well as achieving their goals of transporting goods. Understanding the critical components of this trade system provides clarity to the formation of global commerce. Of all these components in the late-nineteenth century, coal was king. The success of private enterprise, trade agreements, treaties and naval military conflicts all hinged upon what fueled the new steamship economy: coal.

Coal has a unique place in the historical record of the Pacific. The age of coal-powered steamships is bookmarked by the end of wind-powered cargo ships in the 1880s and the beginning of petroleum-powered cargo ships in the 1910s. The Pacific underwent considerable transformation during this brief period. Islands that had seen little Western ship traffic prior to the steamship became coaling stations financed by Western businessmen who had established large-scale plantations and mining operations in these

Pacific locales. As shippers began to refit their ships with petroleum-fired boilers, some of these coaling stations were also transformed. Acres of land near the wharfs that were once filled with mountains of coal were repurposed for large petroleum tanks. The coal cranes and steam-powered shoots on these wharfs were replaced with pump houses and ten-inch fuel hoses. Petroleum-fired steamships could travel much farther on a ton of fuel oil than a ton of coal, and many of these Pacific islands that had been so vital to maritime trade in the late nineteenth century experienced a considerable drop in steamship arrivals. Some were simply passed by.

Just as the age of the coal-fired steamship is bookmarked by the end of wind and the beginning of petroleum power, this paper is bookmarked by the first coaling station report from the Office of Naval Intelligence in 1884 and the 1900 report, a period in which coal increasingly dominated Pacific trade. Chapter two explains the Pacific trade system and the impacts of the new steamship economy. The case studies of chapter three provide a broader understanding of the impact and outcomes of this coal-fired transformation, as well as to clarify the practices in production, distribution, and sale of coal by private enterprises. The maps I have created are placed within the text of each case study. These maps quantify the data collected from the Office of Naval Intelligence in a visual form which and provide insight into the changes of the coaling industry in each region.

Chapter II: The Mariner's World

The age of steam has a different history in the Pacific than it does in the Atlantic. The story of steamships is one of carbon energy dependence, private enterprise, and imperial superiority through capitalism and entrepreneurship. In the Atlantic in the 1860s and 1870s, ship builders turned the seaway from New York to London into a raceway, as larger, faster ships competed for the fastest speeds and quickest transatlantic crossing. The governments of France, England, Germany, and the United States were in competition with each other as well. These governments commissioned shipbuilders for the largest, most heavily armored warships with the biggest guns. With ample supplies of coal on either side of the Atlantic, this sporting event was one the public followed with enthusiasm. The media kept score of which ships carried the prestige of having the fastest crossing, and the launching of massive warships like the H.M.S. *Dreadnought* and the U.S.S. *Maine* were heralded as outstanding achievements in naval technology.⁹ Triple-expansion engines of the 1870s brought more power per ton of coal, followed by the steam turbine engine of the 1880s that allowed for massive steel-hulled ships of eight hundred feet and greater. As the turn of the century came about, competition between private enterprise seeking to make the fastest Atlantic crossing and governments seeking to possess the most powerful warships became preparation for war.

In the Pacific, many of the same private enterprises involved in the Atlantic arena competed for much different ends. In the Atlantic the focus was shipping the most tons the fastest, and nationalist pride. In the Pacific, competition was for access to land and coal. Many historians have coupled the technological advancements of steamships to the

⁹ Fredrick A. Talbot, *Steamship Conquest of the World* (Philadelphia: J. B. Lippincott, 1912), Chapter 10, "The Blue Ribbon of the Atlantic," 133–49.

imperial expansion in the Pacific of nations such as France, Britain, and Germany, with the United States quickly catching up to them in the late nineteenth century. Such histories are portrayed by Fredrick A. Talbot's *Steamship Conquest of the World* and K. T. Rowland's *Steam at Sea*.¹⁰ These historical works draw a straight line from technological advancement to imperial expansion. Technological innovations explain a selection of causes of imperialism, but the outcomes in Talbot's and Rowland's work are nation-centric, older explanations of the conquering force of steam. I argue that the steamship ended the mariner's world and brought forth a new trade network based on Western capitalism and laissez-faire economics, but with a focus on the individuals and companies who used the tools of innovation and more importantly, by those who could procure the very limited Pacific coal supplies and disperse these supplies among the Pacific Islands.

During the period of 1850–1870, the Atlantic maritime world centered on advanced steel-hulled steamships while in the Pacific, the majority of steam-powered vessels remained wooden hulled and kept the traditional two-masted sail rigs for much of this period. Wooden hulls remained in the Pacific much longer than in the Atlantic because steel production developed later in the Pacific region than in the Atlantic. U.S. shipping companies of the West Coast had access to an abundance of relatively cheap Douglas fir trees, which made for durable ships. Pacific ships kept the masts because of the vast distances these vessels had to cover in a region with little or no facilities for steam engine repair. Using wind power as a back-up to steam was necessary for survival.

¹⁰ K. T. Rowland, *Steam at Sea: A History of Steam Navigation* (New York: Praeger, 1970) and Talbot, *Steamship Conquest*.

Coal supplies were few and far between, and many vessels would steam to a destination and have to sail back to their port of origin.¹¹

The culmination of many technological advancements in the 1880s brought the viability and use of the steamship rapidly to the Pacific. The steamship changed the land and seascape as harbors developed the wharfs and docks to accommodate the larger vessels and their need to move more cargo faster. The need to fuel these larger vessels required coaling stations where mountains of coal were piled on Pacific islands along trade routes. Coal became a new and primary commodity, one on which all other cargo shipments depended.

Although large and powerful multinational corporate shipping companies had entered the Pacific in the early-nineteenth century, the majority of goods were shipped by small independent companies until the late 1870s. The vessels used by these companies were categorized as “tramps” and carried resources extracted from Pacific islands by Western entrepreneurs looking to repeat the commercial success made in Hawaii, Hong Kong, and Shanghai. These tramps sailed with mixed crews of seafarers native to the Philippines, the Aleutians, and New Zealand. They hopped from island to island, anchoring in Pacific island harbors or tying to hastily made wharfs, working with indigenous labor to load cargo destined for Europe and North America. These vessels acted *within* Oceania rather than *upon* it, as trade relations were developed by crews of mixed mariners of the tramps and the native seafarers of the islands. The trade system of the early nineteenth century was still more similar to the Polynesian trade system that had been in place for centuries than it was to Western industrial trade systems. The

¹¹ National Maritime Museum, Royal Museums Greenwich, <http://www.rmg.co.uk/explore/sea-and-ships/facts/ships-and-seafarers/steam-power>

entrepreneurs who contracted these tramps would grow in revenue and come to possess more land in the islands, able to extract more resources and develop larger crops, and from this came desire for larger steamships.

The age of steam in the Pacific begins in the 1880s, as a number of technological advancements in coal mining, communications, and ship construction brought a flood of very large steamships capable of carrying one thousand times the cargo that the wooden square-riggers of old could carry. This put enormous pressures on natural resource extraction, crop production, and the Pacific trade system. Shipping companies competed for dominance in regions of the Pacific and for trans-Pacific trade routes. These companies competed in a laissez-faire arena, one fostered and promoted by British private companies, who had come to be the primary maritime force in the Pacific. Most negotiations concerning coaling stations involved Western shipping company representatives that were usually ship captains, and Pacific Island chiefs or Indonesian Sultans.

In some cases, this competition developed beyond corporate ambitions into a national arena. Germany's string of Pacific island possessions from the Marshall Islands to Samoa was viewed by Australian and New Zealand shippers as an economic threat, and by the governors of these colonies as a security threat.¹² These companies would pressure the governments of the nations from which they came. These governments scrambled for treaties and trade agreements with each other, but it was difficult to enforce Pacific trade agreements because the authority to do so was seated in Europe and the

¹² Peter Overlac, "Bless the Queen and Curse the Colonial Office: Australasian Reaction to German Consolidation in the Pacific 1871–1899." *Journal of Pacific History* 33, no. 2 (September 1998): 133–52.

United States, thousands of miles away. In Borneo, the British-owned North Borneo Company established a trading post in spite of violating numerous trade agreements and treaties, some of which were over a century old. The changes brought by the steamship came so rapidly to the Pacific that many trade agreements and maritime laws had become antiquated by the 1880s. In some cases Western diplomacy failed, leading to a show of military force, as Germany, France, Britain, Russia, China, Japan, and the United States built Pacific and East Asia squadrons consisting of warships armed with twelve-inch guns. Big guns and big cargo define the late-nineteenth century in the Pacific.

These large cargo ships and even larger warships had a huge appetite for coal. Private companies from many Western nations competed for the purchase of land in the harbors of Pacific islands to build coaling stations along trade routes. Multiple coaling stations allowed for multiple trade routes, increasing maritime trade.

Producing and distributing coal in the Pacific region was not conducted by governments, but by private companies and mariners aboard tramp steamers. Pacific imperialism is noted by events such as the American victory in the Philippines in the Spanish-American War of 1898, the Samoan Crisis of 1899, and the Russo-Japanese War of 1904, but these events merely cast a shadow on the daily interactions between Pacific Islanders and the maritime world that developed before the age of steam. The mariners and seafarers of both Western and Pacific worlds carried on during the conflict and compromise of governments and created transnational, transcolonial systems. Entrepreneurs and corporations conducting business in these systems saw varying degrees of support from nation-states, if any. In this view, each business and each ship

becomes a form of micro-imperialism, and their interactions with Pacific Islanders are what truly define the Pacific late-nineteenth century.

There are numerous ways in which to view the Pacific prior to the age of steam, such as that of social anthropologist and native Pacific Islander Epeli Hau'ofa, and his concept of “our sea of islands.”¹³ Hau'ofa reconceptualizes the Pacific by stating that Pacific Islanders were not separated by vast distances of saltwater but rather connected by it. This concept can be taken a step further by adding Western sailors to this connection.

Of all the ways to view the Pacific Ocean, one possible description is this: Oceania belonged to the mariners and seafarers who were connected to the water, by the water, and whose voyages date back to a time forgotten. This was a mariner's world, one in which the relations between the thousands of Pacific Islands and tens of thousands of inhabitants were tied together by the traditions of seafarers. These relations are defined more by the commonalities of the mariners and less by their nationalities or ethnicities. Every ethnicity and every nationality could be found somewhere in Pacific, a world in which people are ruled more by the wind and sea currents and less the laws and trade agreements. The boats and ships used by all those in the Pacific became the symbols that unified the mariner's world, more so than any flag flying from their sterns. This was a dynamic, transnational, transcultural world.

In order to understand the complex connections of Oceania, we have to turn the tide of the imperial narrative by focusing on the mariners of the tramp steamer and the entrepreneurs who employed them. Frances Steel's *Oceania Under Steam* and Nicholas

¹³ Epeli Hau'ofa, “Anthropology and Pacific Islanders,” *Oceania* 45, no. 4 (June 1975): 283–89.

Thomas provide such a viewpoint. In his chapter of *Pacific Histories* Thomas states that “[Oceania] looks different from the inside out.”¹⁴ As Matt Matsuda described Thomas’s work in the Afterword of *Pacific Histories*, “Thomas sails against the current of conventional historiography. His reading of ‘empire’ pays little attention to governors and administrative systems and focuses instead on the kaleidoscopic array [of] shared knowledge of Islanders and outlanders.”¹⁵ Similar to Nicholas Thomas, I argue that governors and administrative systems had far less to do with the formation of coaling stations than did the individuals involved. The case of Tutuila, a coaling station in Samoa, provides an example, as many historians are quick to credit U.S. Navy Commander Richard Meade for negotiating a treaty with Chief Mauga for use of the harbor in Pago Pago. Meade was not there as a representative of the United States, however, but at the behest of James M. Stewart, an investor who had purchased land in Tutuila and had formed the CPLCC (Central Polynesian Land and Commerce Company), an investment group.¹⁶ Shareholder Cornelius Cole, governor of California, sent Meade to Tutuila to clinch a deal with Chief Mauga, a deal that was first pitched to Mauga by a merchant trader, Captain Edgar Wakeman years prior to Meade’s arrival. The treaty would not be completed until five years after Meade’s departure, when in 1876, the Tutuilians sent their own delegate, Le Mamea, to San Francisco to sign documents guaranteeing land to private investors.¹⁷ This example illustrates how an analytical focus

¹⁴ Nicholas Thomas, “The Age of Empire in the Pacific,” in *Pacific Histories: Ocean, Land, People*, ed. David Armitage and Allison Bashford (New York: Palgrave Macmillan, 2014), 76.

¹⁵ Matt K. Matsuda, “Afterword: Pacific Cross-Currents,” in *Pacific Histories: Ocean, Land, People*, ed. David Armitage and Allison Bashford (New York: Palgrave Macmillan, 2014), 329.

¹⁶ <http://amsamoa.net/history> and <http://www.asbar.org/archive/Newcode/treaties.htm#one>.

¹⁷ Barry Rigby, “Private Interests and the Origins of American Involvement in Samoa, 1872–1877,” *Journal of Pacific History* 8 (1973): 75–87.

on imperialism clouds the waters and how refocusing on the individuals involved provides clarification of the event and includes indigenous connections in the mariner's world. The coaling station at Tutuila was not the work of the U.S. Navy and the Samoans, but the work of Wakeman, Mauga, Meade, Stewart, and Le Mamea. It is also important to note that four of these five actors are mariners.

Along with borrowing methodological processes from Steel and Thomas, from Matt Matsuda we have a clear vision of the Pacific as “a historical assemblage of smaller elements: interlocking navigations, migrations, and settlements within regions linked intermittently from the Philippines and the South China Sea, Sulawesi and the Sunda Islands, and the Banda and Tasman seas. The power of naming the ‘Pacific’ imposed an encompassing European vision of endless water on the diverse particulars of Palauan atolls, the Eon Woerr of the Marshalls, the Japanese Nan’yo (South Seas) or the *moana* of the Maori and the Hawaiians.”¹⁸ The “smaller elements” Matsuda described includes the immense global connections coaling stations had. These connections went beyond imperialism and steam-powered commerce. Maritime commerce and the movement of coal can be envisioned as pivotal additions to the already complex system of Pacific exchange established long before Magellan’s sixteenth-century voyages.

One of the ambitions of this work is to quantify and compare British and American influence in the Pacific during this transformation. A common viewpoint is that the Spanish-American War marks both the end of the century and the beginning of American dominance in the Pacific. This will be examined in more detail later in the paper, but the evidence illustrates that is not the case, at least not economically. The

¹⁸ Matt Matsuda, *Pacific Worlds: A History of Seas, Peoples, and Cultures* (New York: Cambridge University Press, 2012).

incoming tide of British commercial dominance in the Pacific had not peaked by 1900, and that tide does not begin to recede until the First World War.

Free trade in the Pacific was an American ambition before its independence. Large profits had been made in Pacific maritime trade long before the Lewis and Clark Expedition. The *Empress of China*, a 360-ton New York merchant vessel, sailed to Canton in 1784, loaded with ginseng, and returned with a \$30,000 profit.¹⁹ Similar profits had been attained in the Alaskan fur-trade of the late 1700s as well. American ambition for westward expansion across the continent during the nineteenth century included the Pacific Ocean. As yeoman farmers moved west in covered wagons across parched deserts and towering mountain ranges in search of gold and arable lands to cultivate, American sailors too ventured west in wood-hulled square-riggers around the Horn in search of whales and maritime commerce.

American commerce of the nineteenth century in the Pacific was developed and defined by the crews of merchant vessels from Boston and New York who engaged in Pacific trade systems developed long before U.S. independence. Any American economic success in the Pacific was built upon the revenues reaped from marine mammals harvested from the ocean. Sea otter furs and whale oil became the foothold that American mariners used to enter the cornucopia of Pacific trade. These whalers and merchants developed economic strongholds in Hawaii and San Francisco, from which American mariners pushed against others from competing nations in Europe and Asia.

The U.S. government had been somewhat absent from the Pacific until the beginning of the Spanish-American War, but after the turn of the twentieth century, it had

¹⁹ Bruce Cumings, *Dominion from Sea to Sea: Pacific Ascendancy and American Power* (New Haven: Yale University Press, 2009), 209.

become a powerful force that pushed hard against the European powers, first through diplomacy, then by military force. The beginning of trans-Pacific political involvement may be defined by the government subsidies given to the Pacific Mail Steamship Company beginning in 1848, whose homeport was San Francisco. This was followed in 1867 with the purchase of Alaska from Russia. Diplomacy was the only tool Washington had for most of the nineteenth century in the Pacific. In 1880 the U.S. Navy was almost nonexistent, especially when compared to the naval power of European countries. After the U.S. Committee of Safety would seize control of Hawaii in 1887, American political involvement developed rapidly. The United States invested heavily in a new steam-powered, steel-hulled, two-ocean Navy, which it used to seize Manila in 1897, Guam in 1898, and American Samoa in 1899. Teddy Roosevelt sent “The Great White Fleet,” a squadron of sixteen Navy warships (painted white), on a victory lap around the globe in 1907, three years after the United States took control of the Panama Canal project.

Despite all this growing U.S. presence, British entrepreneurs remained dominant. The reports from the Office of Naval Intelligence list coaling stations in Samoa and Hawaii as owned by American companies in 1884. The same coaling stations are listed in the 1900 report which illustrates the lack of growth in both the coaling industry and shipping in general. What had begun as an ambition to secure trade with Asia had evolved into a desire for Pacific maritime dominance, something that British private enterprise had securely in its possession. British companies owned or operated 34 percent of the Pacific coaling stations and for every ton of cargo that U.S. businesses shipped in 1900, their British counterparts shipped ten. During the years of the First World War,

U.S. shipping increased 342 percent from 1914 to 1918, but was still a distant second to British maritime commerce.²⁰

Although the nations of Britain, France, Germany, and Japan may have somewhat similar national histories concerning the Pacific, it is possible to separate the ambitions and actions of governments from the day-to-day exchanges that lead to the development of coaling stations in the Pacific. Imperialism obscures the transnational and transcultural exchanges of the individuals involved the entrepreneurs and corporations whose transactions with Pacific Islanders led to the development of these coaling stations. The following example of Tutuila illustrates this type of development and its actors.

During the four years Stewart and the CPLCC took to negotiate a treaty with those native to Tutuila, the German Navy had shelled a village near Apia, on the Samoan Island of Upolu, in order to quell what German businessmen described as a “native uprising.” Although Upolu was seventy-eight miles west of Tutuila, it was enough for U.S. Secretary of State Hamilton Fish to seek out a government representative for Tutuila. He chose Albert B. Steinberger for this post, which did not come with any salary. Unbeknownst to Fish, Steinberger was flat broke and quickly used his new title to secretly enter negotiations with J. C. Godeffroy & Sons, the German trading firm in Apia. Steinberger attempted to exchange trading rights for a lump sum of cash and annual royalties paid to him directly, counter to objectives set by Fish and kept secret from the Grant Administration.²¹ He was caught and forced to resign, but this situation helps to

²⁰ Abraham Berglund, “The War and the World’s Mercantile Marine,” *American Economic Review* 10, no. 2 (June 1920): 227–58. <http://www.jstor.org/stable/1804864>.

²¹ J. W. Ellison, “The Adventures of an American Premier in Samoa, 1874–1876,” *Pacific Northwest Quarterly* 27 no. 4 (October 1936): 311–46.

illuminate the complex exchanges of the individuals involved. This may appear as an attempted exchange between Germany and the United States when in fact, it was simply an attempted exchange between the penniless Steinberger and the Godeffroy Company.

Technological Advancements

The technological advancements that created huge, steel-hulled, steam-powered vessels changed the dynamic of the mariner's world. As these vessels entered the Pacific, their enormous appetite for coal and cargo devoured the existing trade system, replacing it with one of Western industrial corporations. This change in the Pacific happened rapidly as the culmination of technological advancements in steamships crossed the barrier of Pacific distance in the 1880's. The steamship changed the seascape as month-long voyages were reduced to a week. It changed the landscape of harbors with huge wharfs and mountains of coal nearby. It changed the mariner culture as shipboard jobs became specialized and massive numbers of passengers became mobilized. The focus on what literally fueled this change is one small method of quantifying these developments.

The focus on coaling stations in the Pacific serves the purpose of clarifying some of the nationalistic themes found in historical literature. Coaling stations are at the crossroads of competing nation-states, indigenous agency, and technology. Books such as *Dreadnought*, *Steam at Sea*, *Steamship Conquest of World*, and *Oceania under Steam* take a nation-centric point of view. Advancements in steam technology have been recorded as distinctly American or German or English. This is not without reason or merit; the Englishman Charles A. Parsons invented the steam-turbine engine in 1894 that found its way into the H.M.S. *Dreadnought* and her sister-ships, which became a symbol

of national pride and furthered British imperialism. Measuring the horsepower of steamship was equal to measuring a nation's pride. Advancements in steam technology led to more nautical miles per ton of coal; however, this does little to explain the age of steam because it obscures a fundamental theme in the Pacific, its *lack* of coal. The high-tech advancements of steam engines have much less historical value to the narrative of the Pacific than the advancements in coal production in Australia, China, the Americas, and Europe, in combination with the distribution to hundreds of coaling stations throughout the Pacific Islands.

Of all the technological advancements that came out of the 1800s, communication had the greatest impact on the Pacific maritime industry. In the United States there were forty miles of telegraph wire stretched in 1846, and over twelve thousand miles in 1850.²² The first transatlantic cable was laid in 1858 with the cooperation of several telegraph companies and the governments of the United States and Great Britain. Queen Victoria and President James Buchanan were able to say "hello" before the cable failed and another was laid in 1866. By the 1880s telegraph wires had encompassed the globe. A tourist group visiting Panang sent an amusing Christmas telegram to London that arrived three hours "before" it was sent.²³ Many coaling stations in the Pacific had become telegraph terminals, places where very long links of wire were connected and telegraph stations built. Information on currency exchange values, harvest values, and price fluctuations transmitted across the Pacific in a matter of minutes changed the dynamic of maritime commerce. Coaling stations equipped with a telegraph could transmit one of the

²² Tom Standage, *The Victorian Internet: The Remarkable Story of the Telegraph and the Nineteenth Century's On-line Pioneers* (New York: Walker and Company, 1998), 58.

²³ Joyce E. Chaplin, *Round About the Earth: Circumnavigation from Magellan to Orbit* (New York: Simon and Schuster, 2012), 224.

most vital bits of information concerning maritime travel: weather. Weather reports could reroute vessels around heavy winds and high seas. This information greatly reduced the number of ships lost at sea. By the late 1890s, ships began to carry the radio telegraph. This was the first time vessels in distress could call for help and gain assistance from other vessels in the area beyond the line of sight. Crossing the Pacific had not only become faster but safer as well.

The steam engine underwent two major developments in the 1880s. The first was the triple-expansion boiler and second was the steam turbine engine. These advancements were cumulative, built upon a number of technical achievements from many inventors in the United States and Europe. Metallurgy had advanced steel strength to the point in which triple-expansion became capable of containing pressures as high as 300 pounds per square inch. It was British marine engineer Alexander Kirk who first fitted a triple-expansion system to the *Protonis* in 1873, a one-hundred-foot, steel-hulled vessel built for the purpose of testing different engine configurations. Kirk's design achieved 1,800 horsepower and consumed just 1.25 pounds of coal per hp/hour. This design was smaller, lighter, and required less engine room space than the conventional compound steam engines in commercial use at that time. Triple-expansion cut coal consumption by nearly two-thirds allowing vessels to carry less coal and, thus, more cargo. In 1881 the London-based shipping company G. Thompson and Co. fitted their vessel *Aberdeen* with Kirk's design. The *Aberdeen* ran a trade route to Melbourne, and her maiden voyage proved the incredible efficiency of the design. The *Aberdeen* became the prototype of all the thousands of tramp steamers that plied the sea lanes for the next fifty years.²⁴

²⁴ Rowland, *Steam at Sea*, 153.

Triple-expansion continued to improve, and in 1887 the Italian Navy, still in its infancy, developed a four-engine vessel capable of producing 22,800 horsepower with a top speed of twenty-seven knots. Speed itself became an obstacle for steamships as British destroyers could overrun their own torpedoes. Cavitation, the process in which the force of the propeller blade exceeds the resistance of water, causing air to form, was a phenomena not understood until the turn of the century. The loss of thrust caused by cavitation created a speed ceiling of twenty-eight knots that was difficult to break through. The British ship builder Caird and Company developed cavitation tunnels, similar to contemporary wind tunnels, to test certain propeller designs and configurations. The solution to cavitation was simple: more propellers. Caird and Company designed vessels such as the *City of Paris* with four shafts and three propellers per shaft. The *City of Paris* was the first vessel to cross the Atlantic in less than six days.²⁵ She was 620 feet long, 65 feet wide, and displaced 19,000 tons.²⁶

The name Charles Algon Parsons was impressed upon world when in 1897 his 100-foot vessel the *Turbinia* slipped her anchor at Queen Victoria's Diamond Jubilee and began to race up and down the seaway, which was lined on both sides with HMS ships. When two torpedo boats were dispatched to stop her, the *Turbinia* passed them at such a speed, one of the torpedo boats was nearly swamped by the wake. Unbeknownst to the thousands of onlookers, the *Turbinia* had just proved itself to be the fastest ship ever built.²⁷ With three prototype steam-turbine engines, the *Turbinia* travelled at 34.5 knots.

²⁵ Rowland, *Steam at Sea*, 154.

²⁶ Talbot, *Steamship Conquest*, 42.

²⁷ Rowland, *Steam at Sea*, 170.

The concept of the steam-turbine engine dates back to 100 AD, as the Greek mathematician and inventor Hero had created the aeolipile, a device in which steam was exhausted from nozzles on a cylinder, causing it to spin. Parson's turbine design took advantage of high and low pressures created inside a stator, with force exerted on blades attached to a rotor causing it to spin. Parson's designed proved to be as efficient as triple-expansion engines but with power-to-weight ratios nearly double. By the turn of the century, steam-turbine-powered vessels of 800 feet in length were cruising the sea lanes at speeds in excess of twenty knots regularly.²⁸

The triple-expansion steam engine became the workhorse of the sea. Thousands of tramp steamers were built in the 1880s and even more in the 1890s. These vessels became the standard in cargo shipping, capable of carrying thousands of tons of cargo. As the tonnage shipped throughout the Pacific grew exponentially, so did the number of coaling stations. As the number of coaling stations grew, the amount of tramp steamers that carried the traditional two masts for sail fell. Shipyards building steel-hulled tramp steamers became a common sight along the Pacific coasts of Japan, Australia, Chile, the United States, and Canada. Tramp steamers carried agricultural goods such as wheat from the United States to China, copra from Pacific islands to Southeast Asia, and guano from the Aleutians to San Francisco. The increased ability to carry more tons placed pressures on production. These pressures were translated into cultural difficulties, as many of the agricultural lands in the Pacific were owned by Western businessmen and farmed by indigenous labor. As the limitations of the labor force became apparent, many businessmen found their solution in gathering large groups of laborers from China and

²⁸ Talbot, *Steamship Conquest*, 43.

Southeast Asia and shipping them to Hawaiian, Micronesian, or Samoan farms.

Expanding Pacific plantations and mines included copper and sugar plantations in Peru, silver mines in Chile, and rice plantations throughout Southeast Asia.²⁹ This business of moving large labor populations to colonial plantations and mines came to be known as “recruitment,” a very kind descriptor considering the business of recruiting was more often kidnapping. Tens of thousands of Melanesians travelled to other Pacific islands for labor. Islanders who considered themselves wronged attacked boats and killed traders. Traders often responded with punitive raids.³⁰ Many younger islanders went with traders willingly, as it increased their status in their tribe. Islanders were not only laborers, but agents and managers, go-betweens in trade relations. Young men from Vanuatu could be found as crew on smaller steamships in the South Pacific and in some cases, the steamship would be entirely complimented by islanders supervised by two or three white officers.³¹

Pacific trade between China and Western companies went through a period of stagnation beginning in the late 1870s, while trade with Japan increased nearly tenfold. Japan shipped roughly one million tons of goods in 1884, but by 1900 that number increased to eleven million, placing the Japanese on the stage of the Pacific as a major maritime contender.³² Over half of all Japanese trade was directed outside the Pacific to Europe. From 1875 onwards, the Japanese established regular steamship lines to

²⁹ Adam McKeown, “Movement,” in *Pacific Histories: Ocean, Land, People*, ed. David Armitage and Alison Bashford (London and New York: Palgrave Macmillan, 2013), 154.

³⁰ Thomas, “Age of Empire,” 91.

³¹ Thomas, “Age of Empire,” 90.

³² McKeown, “Movement,” 158.

Shanghai and Bombay. By 1896, Japanese steamships found destinations on every Pacific coast, competing intensely against American and Canadian shippers.³³

The very large steam-turbine-powered ships were reserved for carrying the most lucrative resource: people. Passenger steamers capable of carrying thousands of people began regular trans-Pacific routes, some of the more popular routes being Sydney to San Francisco, Canton to Seattle, and New York around Cape Horn to Honolulu. Chinese migration throughout the Pacific ebbed and flowed throughout the latter half of the nineteenth century. Nearly 900,000 had migrated to Australia and the Americas during the gold rush of the 1850s, but by 1885, many of those destinations had implemented anti-Chinese immigration laws. Even still, over thirty million Chinese migrated to Manchuria after the 1880s. Japanese migration was not as stifled by immigration law as the Chinese, and over half a million travelled to the United States and Hawaii in the 1890s while another half-million travelled to the Japanese colonies of Korea, Taiwan, and Manchuria.³⁴

Moving people via steamship was one of many commodities entrepreneurs operating in the Pacific found profit in. The steamship carried Western manufactured goods to the region. This was a major shift in trading. The commodities of the early-nineteenth century had run their course by the 1880s. Whale oil had been replaced by petroleum. Chinese porcelain and silk had been replaced by mass-produced, less expensive products. Pacific sandalwood had been harvested to depletion. Wheat from the United States was rapidly encroaching on the rice trade in Southeast Asia. By the 1880s the ebb of Asian goods flowing east had reached low tide and the flood of Western goods

³³ McKeown, "Movement," 157.

³⁴ McKeown, "Movement," 153.

to Asia was well underway. Everything from tin cans to coal-fired power generators were shipped across the Pacific, and in every port or harbor, there was a Western businessman negotiating its sale.³⁵

Of all these commodities, coal is arguably the most vital because without it, a steamship can't leave the dock. At the heart of all Pacific trade lays the coal mine. Multinational corporations began dispersing coal supplies to remote Pacific locales over great distances in the late nineteenth century. In 1884, Welsh and Scottish coal could be found in Pacific harbors that, by steamship, had to travel over 17,000 nautical miles from its point of origin to its point of sale, more than half-way around the world. The reports from the Office of Naval Intelligence list "Kind of coal on hand", in which the kind of coal is defined by its place of origin, such as 'Cardiff' or 'Seattle'. This was very important to ship captains because many ships were built to run on coal with a specific thermo-unit value meaning that ships designed to run on Cardiff coal could not run properly on Formosa coal. The reports describe the kind of coal in some of the smaller, less frequented coaling stations such as Unga Island Alaska as "Native, of poor quality".³⁶ After reading these reports it becomes clear that the quality of coal was tiered based upon its place of origin with Cardiff as the highest quality and 'native' coal found in China and Alaska as some of the lowest.

Procuring land with Pacific shores that might yield coal supplies became a vital component of the maritime trade. Procuring this land was one challenge; extracting coal from the basalt-rich Pacific Rim was quite another. Of all the Western commodities

³⁵ Colin Matthew, *The Nineteenth Century: Short Oxford History of the British Isles*. (Oxford: Oxford University Press, 2000), 144.

³⁶ 1900 report p.54

entering the rapidly evolving Pacific trade system, the jackhammer and the water-pump may be on an even keel with the steamship.

The pneumatic drill was first developed in Pennsylvania.³⁷ The air compressor followed its development, as coal-fired steam engines could not vent their fumes in a mine. Both German and British innovators developed their own design, and by the 1880s jackhammer manufacturing could not supply the global demand from the mining industry, which seemingly had no end. Gold, copper, nitrate, and coal mining companies could purchase these tools and see an exponential growth in ore yield with far fewer laborers. These companies could now reach deposits impossible to penetrate with previous means.

The Englishman Thomas Newcomen had taken previous designs of pumps and invented one for the sole purpose of coal mining. As mine shafts reached depths below the water table of the region, they began to seep and flood. Water had been removed by man and horse power previous to Newcomen's pump, created in 1712. By the 1760s, hundreds of Newcomen's steam-powered pumps were in use in England and Scotland. James Watt and Matthew Boulton improved the Newcomen design, which pumped four times the amount of water with a much greater length of piping. By the 1850s English coal mining companies had become expert in pumping and diverting ground water out and away from mineshafts, allowing for greater extraction rates of coal.³⁸

Maintenance and use of compressors and jackhammers required trained technicians. These tools allowed for such rapid extraction of ore in deeper, more complex

³⁷ Henry S. Drinker, *Tunneling, Explosive Compounds, and Rock Drills* ... (New York: John Wiley & Sons, 1878), 153–57.

³⁸ Barbara Freese, *Coal: A Human History* (New York: Penguin Books, 2004), 58–69.

mines that greater understanding of geology was required. Western businesses combined geologists, technicians, and tools as a package deal for sale, and developed a new market. Many coal fields with easy access to ports and harbors were either purchased outright or annexed entirely by a Western nation, but for the Pacific Islands and regions vital to trade routes controlled by indigenous chiefdoms or democratic governments that would not sell land to outside investors, such as Formosa, this package deal became a marketable service alternative.

Purchasing land for mining in the Pacific region, deftly trafficking Western goods at high volume, having the capital and strength to negotiate annexation of Pacific Island archipelagoes, selling the services of comprehensive mining companies, and having a fleet of steamships to mobilize it all—this collection of assets and abilities describes British private enterprise as the dominant group in the Pacific. British companies had an integrated, well-established system of producing, distributing, and selling coal in other parts of the world before the age of steam in the Pacific. Their ambitious shipbuilding companies commissioned more ships than any other nation. The expansion of British steamship companies into the Pacific seemed inevitable in the mid-nineteenth century.

The steamship brought an end to mariner's world. The massive increase in production of Pacific commodities was due in part from the need to fill the large holds at both arrival and departure destinations. The competition between Pacific shipping companies created a rapid acceleration of voyage timetables, reducing month-long transit to a week, and week-long port calls to a single day. Entrepreneurs who had established trading ports in one or two Pacific locales used the steamship to seek out dozens of places to expand their commercial empires. Competition among these companies sought the

assistance of their perspective governments to further their aims, governments that were also competing for political dominance as well. Those companies that were able to establish coaling stations at key locations came to dominate particular trade routes and generate considerable revenue from the sale of coal. The next chapter examines Pacific coaling stations in a series of case studies as a method of quantifying the change brought by the new steamship economy and to place that information into the broader economic, political, and cultural realms.

Chapter III: Case Studies

“How great is the power of to influence shipping possessed by a nation holding a coaling port. It is not necessary that it should withhold coal from vessels against which it wished to discriminate, for by means of a slight preference in price and port dues, [a] nation might give its own vessels a very considerable advantage in keen competition.”³⁹ This quote from the *Journal of Commerce* in Liverpool illustrates how investors and businessmen in the United Kingdom viewed global maritime commerce, with coaling stations as a most vital and influential component to the system of import and export. The British government had transitioned from imperial protection to universal free trade by the late-nineteenth century, so the influence “possessed by a nation” was firmly in the grasp of private British shipping companies and many other British companies from different industries that had become vertically integrated into them. The United Kingdom had become the commercial nexus of shipping by the late nineteenth century with broad economic and political investments that radiated around the globe. An inquiry into the regional and local impacts and outcomes of coaling stations, rather than a linear and hierarchal enquiry into imperialism, provides a more human element to the narrative. The case studies of coaling stations in this chapter help to define the interactions of those truly involved in Pacific. A focus on the entrepreneurs and their interactions with indigenous agency shifts the center of study away from governments and towards commerce and culture.

³⁹ From the *Journal of Commerce*, Liverpool. Reprinted in “An English View of Outlook for American Expansion in Foreign Commerce.” *Coal and Coal Trade Journal* 49, no. 2, July 17, 1918, ed. Fredrick A. Saward. University of Illinois Library 338.05 co.

For example, the Smith Bell Company in Manila was founded by the Scotsman James Adam Smith and an American partner, Lawrence R. Bell, in 1846. This company held the main coaling station there throughout the nineteenth century. The company remains today after conducting business under the Dutch, Spanish, American, and Pilipino flags. By 1849, Smith Bell was appointed agents of Imperial Insurance Company, Ltd., marking the involvement and entry of Smith Bell into the insurance industry. Years later, it would be appointed as agents for Lloyd's of London in 1877, as well as agents for seven other insurance companies. Smith Bell was also designated as Philippine agents for Sunlife of Canada until Sunlife set up its own office in Manila in 1928. The year 1866 saw the expansion of Smith Bell as it opened its Cebu branch, the first of many branches to be established throughout the archipelago. In 1880, the Philippines experienced one of its worst rice shortages because of milling inadequacies. Responding to this acute situation, Smith Bell also operated its own fleet of lighters and inter-island steamers, and the company was able to distribute rice to the southern provinces. Aside from the rice shortage, the company also had to cope with the sugar shortage crisis. Smith Bell established the Luzon Sugar Company, the first sugar refinery in the islands located a few miles north of Manila.⁴⁰ The Smith Bell example provides a better understanding of the broader transnational connections in the Pacific. This company operated in spite of imperialism rather than because of it.

In 1884, the U.S. Navy Department produced the first in a series of reports spanning decades that listed the “comparative merits of anthracite and bituminous coal for ordinary naval uses; to ascertain the price of said coals and the readiness in which

⁴⁰ Smith Bell and Company, *Under Four Flags: The Story of Smith, Bell and Company in the Philippines* (New York: Smith Bell Publications, 1972), introduction.

they may be procured in the ports of the world.”⁴¹ These reports were produced every four to six years. The majority of the information was gathered from commercial ship captains, coaling station owners, and collieries, which were large corporations with a number of coal production and distribution sites in certain regions. These reports were published by the Government Printing Office every four years until the 1950s. The value of these reports lies in their listings of coaling stations of the Pacific. This list is the starting point of this research. The data from these reports are quantified in this study to illustrate a broad change over time, and the case studies provide explanation of the impacts and outcomes of this change in a cultural transnational context. These reports list many of the privately held and publically traded companies that own the coaling stations. This study begins with a commercial focus on these companies’ interactions followed by local and regional connectivities in a maritime theme and then to broader themes of global trade networks and imperialism.

The true definition of a “coaling station” varies. In its simplest form, a coaling station is anywhere a steamship can procure coal. The means by which this is done varies a great deal. In Cape Sabine, Alaska, in 1900, procuring coal meant that the ship’s crew mined it themselves from veins one-quarter mile from the dock and carried it in wheelbarrows and baskets to the ship.⁴² Farther down the coast in Nanaimo, British Columbia, a steamship could tie to a large wharf and be filled with coal rapidly with

⁴¹ William E. Chandler, Secretary of the Navy, “Anthracite and Bituminous Coal for Naval Use.” (Washington, DC: Government Printing Office, 1884). This title later changed to “Coaling, Docking and Repairing facilities of the Ports of the World 1st edition” after the second edition was published in 1888. Hereafter 1884 report.

⁴² Secretary of Navy John D. Long, *Coaling, Docking and Repairing Facilities of the Ports of the World*. Fourth Edition, Office of Naval Intelligence (Washington, DC: Government Printing Office, 1900), 56. Hereafter 1900 report.

chutes fed by steam-powered elevators.⁴³ In most Pacific island coaling stations, the procedure was done by lightering, anchoring the steamship in a harbor and having port workers bring barges of coal to it.

These reports include nearly every coaling station around the globe and are broken into chapters with headings of “Northern Atlantic Stations” and “Southern Atlantic Stations.” In the chapter covering “Pacific Stations,” they are listed from Alaska to the southern tip of South America and as far west as Singapore. The Chinese and Russian coastlines are included while Indochina is listed under the “Asiatic Stations” heading. There are a number of coaling stations in the Malaccan Strait but the border between “Asiatic” and “Pacific” appears to be defined in these reports by a north-south line drawn between Singapore on the Malaysian peninsula and Padang, Sumatra, in Indonesia.

It is important to note that the coaling stations listed in these reports are specifically for the availability of coal to U.S. Navy vessels. For example, coaling stations in the Marshall Islands and New Guinea, owned and operated by German companies, do not appear in the 1884 report, which may indicate coaling stations were excluding vessels based on nation of origin. In the Samoan Islands, the 1884 report listed the coaling station in Apia, owned by the German copra company Godeffroy and Sons, as having “none” available to U.S. vessels while the coaling station in Pago Pago, seventy-eight miles from Apia and owned by the San Francisco investment group CPLCC, is reported to have one thousand tons available.⁴⁴

⁴³ 1900 report, 57.

⁴⁴ 1884 report

These reports list the point of origin for the coal. Of the seventy-eight coaling stations in 1884, thirty-one are supplied with Australian or New Zealand coal. Australia underwent an incredible coal mining boom beginning in the mid-1870s, and its distribution throughout the Pacific region was unprecedented, as large amounts of Australian coal can be found in San Francisco, 7,400 miles away.

Coal from the United Kingdom can be found in fifteen of the seventy-eight coaling stations in 1884. The combination of the United Kingdom and its colonial possessions created a global coal distribution system that its maritime economic domination was built upon. French, German, and U.S. companies had coaling stations in Pacific, but the system Australian and English companies had created was unrivaled.

Nearly all of these coaling stations are owned and operated by private companies. There are a few government-run coaling stations, most of which can be found at naval shipyards in the United States, Mexico, and Australia. The majority of privately held companies that operated coaling stations in the Pacific were part of larger collieries. These collieries generally held railroad, lumber, and steamship companies as well. The influence and dominance of the British Empire was all too evident in 1900, when of the 167 Pacific coaling stations, only nineteen of them did not import coal from the United Kingdom, Australia, or Canada.⁴⁵

⁴⁵ 1900 report.

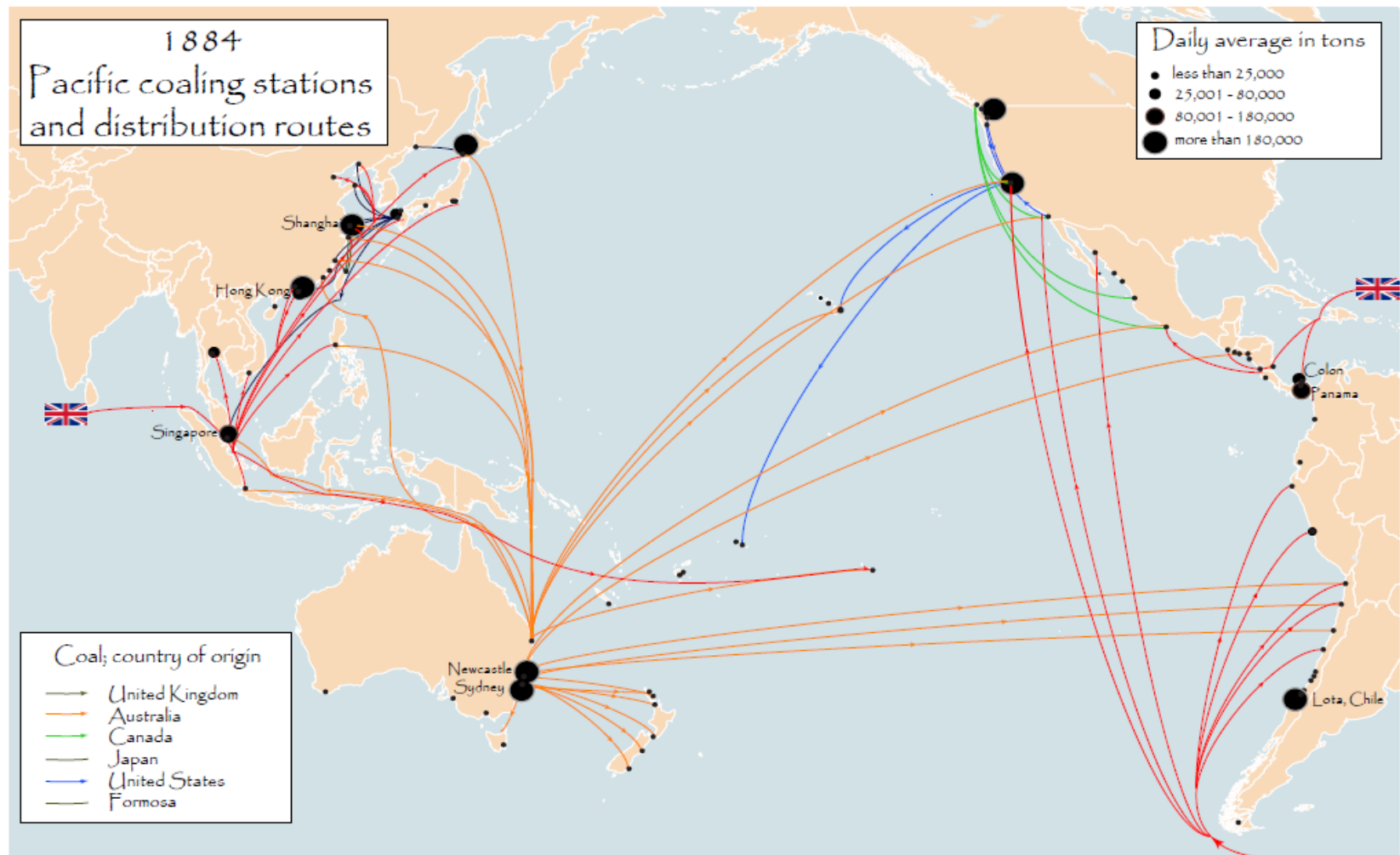


Figure 1 Pacific coaling distribution

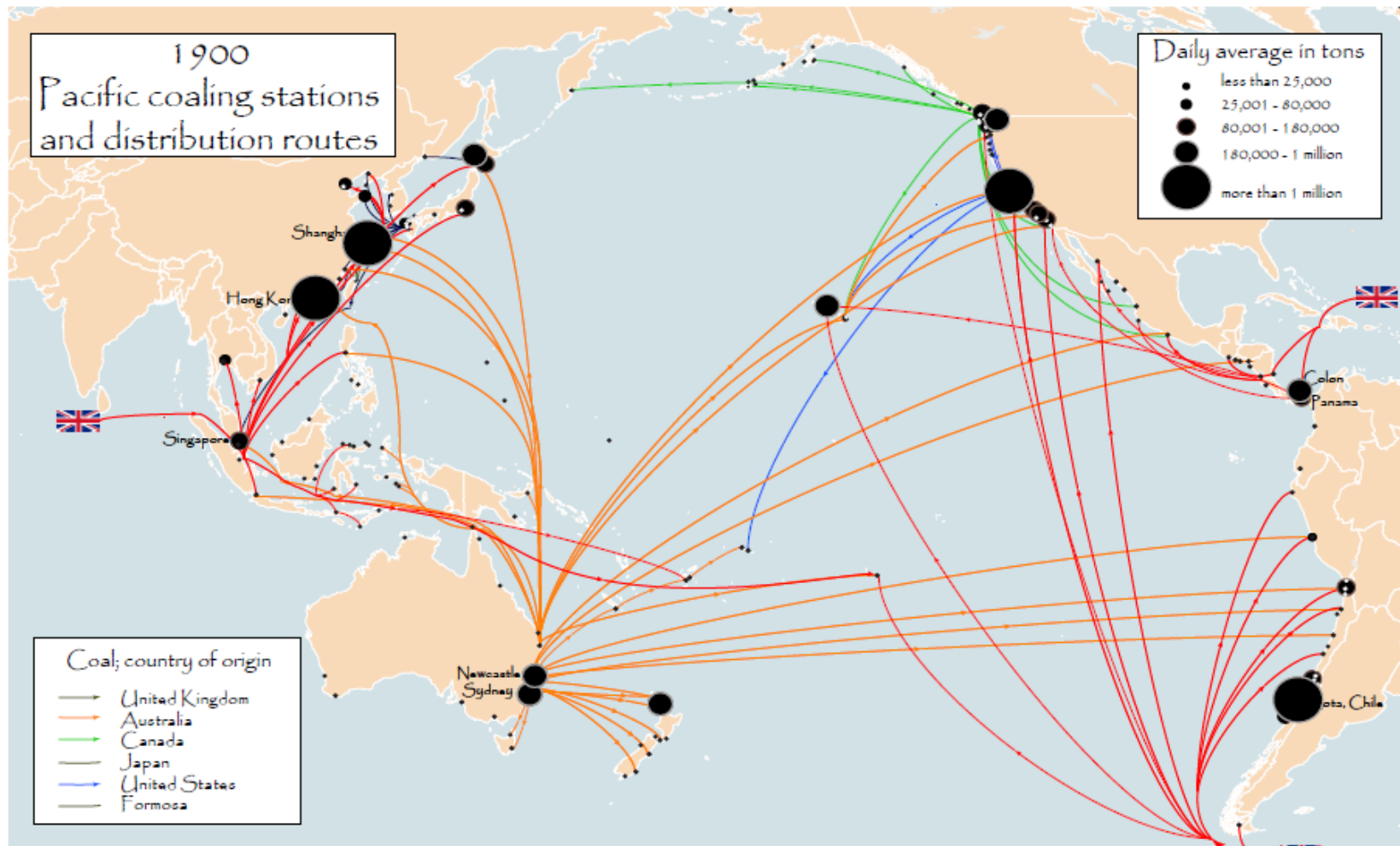


Figure 2 Figure 1 Pacific coaling distribution

Alaska

Alaska provides an example of the inabilities and lack of organization and investment that plagued the U.S. development of commerce in the Pacific in the late nineteenth century. It also exemplifies the dependence on coal from foreign suppliers, something that both the U.S. government and private shipping companies appeared to be comfortable with during this time. Alaskan coaling stations are defined by the lack of investment from both government and private enterprise, a trend visible in other Pacific regions.

There are no coaling stations listed for Alaska in the 1884 report. Twelve stations are listed in 1900, four of which are supplied completely by coal from Nanaimo, British Columbia. Cape Sabine, Cape Lisburne, and Port Clarence are located in extreme northern latitudes and the ready supplies of coal are listed as “mined as required,” meaning that there is an open mine nearby that the ship’s crew can access and mine the amount of coal needed for the vessel themselves, using hand tools and wheelbarrows that were brought with them.⁴⁶

According to Roy D. Merritt, an Alaskan coal geologist, “Mining of Alaska coal did not begin on a significant scale until 1917, after construction of the Alaska Railroad had begun.”⁴⁷ There are numerous reasons for this, not the least of which being Alaskan weather. The majority of Alaskan maritime trade was very seasonal. The long, dark winters that lasted nearly nine months were mostly in below-freezing temperatures.

⁴⁶ 1900 report, 56.

⁴⁷ Roy D. Merritt, “Chronicle of Alaska Coal-Mining History” (Fairbanks: Alaska Division of Geological and Geophysical Surveys, August 1986), 1. Public-data File 86–66.
http://pubs.dggs.alaskagov.us/webpubs/dggs/pdf/text/pdf1986_066.pdf.

Steam-powered water pumps, air compressors, and jackhammers are mining tools that were not yet adapted to freezing conditions in 1900. The geology of Alaska had been explored first by the Russian private enterprise for coal extraction purposes as early as 1855, followed by numerous federally funded geological studies from the United States from 1880 through to World War I. What was known was that Alaska had a vast wealth of not only coal but other mineral riches, most of which were so inaccessible that the amount of investment to reach them was beyond market value.⁴⁸

In a speech given to the U.S. Senate in 1895, Watson C. Squire of the Geological Bureau provided a detailed report of the mineral wealth the Bureau had discovered in the Alaskan territory, explaining the difficulty in accessing this mineral wealth, and concluding with a request for more federal funding to explore the feasibility of mineral extraction.⁴⁹ Alfred H. Brooks reported to the Association of American Geographers in 1911 that Alaskan coal supplies were enormous; that, due to the geographic position of the Aleutian Islands, profits from Alaskan coal production could be enormous as well; and, for those who could front the equally enormous capital investment needed, a viable and lucrative industry awaited. Brooks went as far to say that “Every effort should be made to assure to mankind the maximum use of all the energy stored as coal.”⁵⁰ Brooks concludes his report by stating that government control should be exercised.

⁴⁸ Roy D. Merritt, “Chronicle of Alaska Coal-Mining History” (Fairbanks: Alaska Division of Geological and Geophysical Surveys, August 1986), 1. Public-data File 86–66.

⁴⁹ “Gold and Coal Resources of Alaska, speech of Hon. Watson C. Squire of Washington, in the Senate of the United States, February 28, 1895.” <http://catalog.hathitrust.org/Record/100255955>.

⁵⁰ Alfred H. Brooks, “Geography in the Development of the Alaska Coal Deposits,” *Annals of the Association of American Geographers* 1 (1911): 85.
<http://www.jstor.org.libpublic3.library.isu.edu/stable/2560845>.

The U.S. Navy gave over a dozen reports beginning in 1884 and into the 1920s to the budgetary committees requesting federal funds for coaling station development in Alaska. In 1913, the Navy reported to the Senate that, “In times of peace, the Naval service in the Pacific needs 400,000 tons of per annum of high grade steam-coal. In time of war, an enormously increased amount would be required. No suitable coal is at present, available in the Pacific, and all the coal used in the Pacific is brought around the Horn, a large portion in foreign bottoms, and delivered at points in the Puget Sound and south at a cost of over 8.50\$ per ton. In time of war, this supply would be completely cut off.”⁵¹ This illustrates not only the U.S. Navy’s military concerns in pre-WWI strategic planning but more importantly that Alaska possessed a wealth of coal that needed massive initial investment to develop, and so the vast Alaskan coal riches went virtually untouched in the nineteenth century. The few Alaskan coaling stations that witnessed some frequency of steamship visits were supplied by Canadian collieries.

Canada

This case study attempts to draw the somewhat separated histories of Canada and First Nations peoples into the fold of Pacific history. In this view, the experience of industrial development and westward expansion in Canada comes from two directions, one from lands in the east, the other from ships in the west. First Nation peoples have a long history with Western mariners, most notably in the trade of sea otter furs and other marine mammal products that began in the late eighteenth century. Many merchants from

⁵¹J.A. Holmes, Director of the Bureau of Mines, “The Naval Coaling Situation in the Pacific; with the compliments of the Alaskan Northern Railway Company, Seward Alaska, 1913.” (Washington, DC: Law Reporter Printing Company, 1913).

Boston, New York, London, and Quebec gained a foothold in the Pacific maritime industry by trading with First Nation peoples for furs and whale oil, trade relations that began as mutually beneficial, but degraded over the following century. The Indian Act of 1876 placed native lands in “trust,” where indigenous ownership was surrendered and the government used the land as it chose. The Queen Charlotte Mining Company was one of many coaling stations built on such land.

The 1884 report lists Nanaimo and Victoria as coaling stations. Nanaimo is on the southeast side of Vancouver Island and Victoria is the provincial capital and the largest city on the island. The 1900 report lists seven stations along the coast of British Columbia, most of which are clustered near Vancouver and the intersection of the Inside Passage and the Strait of Juan de Fuca. The amount of readily available coal at these stations in 1884 is roughly 10,000 tons. The 1900 report states that the amount of coal available is “unlimited,” which is hard to quantify, but if Seattle and Tacoma coal supplies are any comparison, Nanaimo and Victoria would have amounts near 750,000 tons.⁵² Exports from coaling stations in British Columbia can be found in Alaska, Hawaii, and multiple locations along the coasts of the United States and Mexico.

According to John Douglas Belshaw, a history professor at the University of Victoria, “British capital played a key role in the development of West Coast coal resources from the 1850s to the end of the century. It is only a slight liberty to describe these as British-owned and operated mines worked by British colliers in British territory. Remarkably, no other North American mining district in the second half of the 19th

⁵² *Coaling, Docking and Repairing Facilities of the Ports of the World*. First Edition, Office of Naval Intelligence. (Washington, DC: Government Printing Office, 1884), 38; 1900 report, 56.

century was so completely dominated by British elements.”⁵³ Over three thousand coal miners from England, Scotland, and Wales took up residence at these coaling stations and the mining operations near them. These miners came across the Atlantic and the continent on their own dime, unlike many miners moving to New Zealand and Australia from the United Kingdom with some public assistance from London. British colliers operating on Vancouver Island compensated these miners with relatively high wages.⁵⁴

Reading a prospectus of the Queen Charlotte Coal Mining Company sheds some light on the corporate structure of Canadian colliers. Queen Charlotte Coal Mining Company was registered with the government of British Columbia. The prospectus itself was printed by the British Colonial Office located in Victoria. This company was a subsidiary of the Nanaimo Collieries. The prospectus contains drafts from two iron-works companies stating their intent on purchasing coal, a railway company that intended to build the necessary line from the mine to the wharf, and a timber company slated to harvest 20,000 acres, which were reserved by the British Columbian government, and take the timber to the coaling station for markets in Japan and China. Wharf construction, roadways, and housing are detailed as are the transfer of foremen and other skilled personnel from other coaling stations. The prospectus concludes by stating, “The demand for coal is almost unlimited. For ocean going steamers it is a necessity. The naval squadron of England, the United States, France and Russia will necessarily take large quantities. Trade in coal to China and Japan necessarily be done to a considerable

⁵³ John Douglas Belshaw, “The British Collier in British Columbia: Another Archetype Reconsidered,” *Labour / Le Travail* 34 (Fall 1994): 12. <http://www.jstor.org/stable/25143844>.

⁵⁴ Belshaw, “The British Collier in British Columbia,” 16. Nova Scotian coal mines paid between \$1 and \$2.25 per day; Nanaimo area miners, the same document instructed, were earning from \$3 to \$4 per day.

amount, especially if taken in conjunction with the lumber trade.”⁵⁵ This prospectus illustrates the multiple assets needed to work in conjunction to build the infrastructure needed to support a coaling station. Queen Charlotte Mining Company was publically traded on the stock market. This prospectus also illustrates the vertical integration of this company and the large amount of British capital invested into it. The same corporate structure can be found all around the Pacific rim.

⁵⁵ Queen Charlotte Coal Mining Company, “Prospectus and Report with Articles of Associations of the Queen Charlotte Coal Mining Company ‘Limited’” (Victoria, BC: British Colonist Office, 1865). <http://babel.hathitrust.org/cgi/pt?id=aeu.ark:/13960/t1vd7cz0q;view=1up;seq=7>.

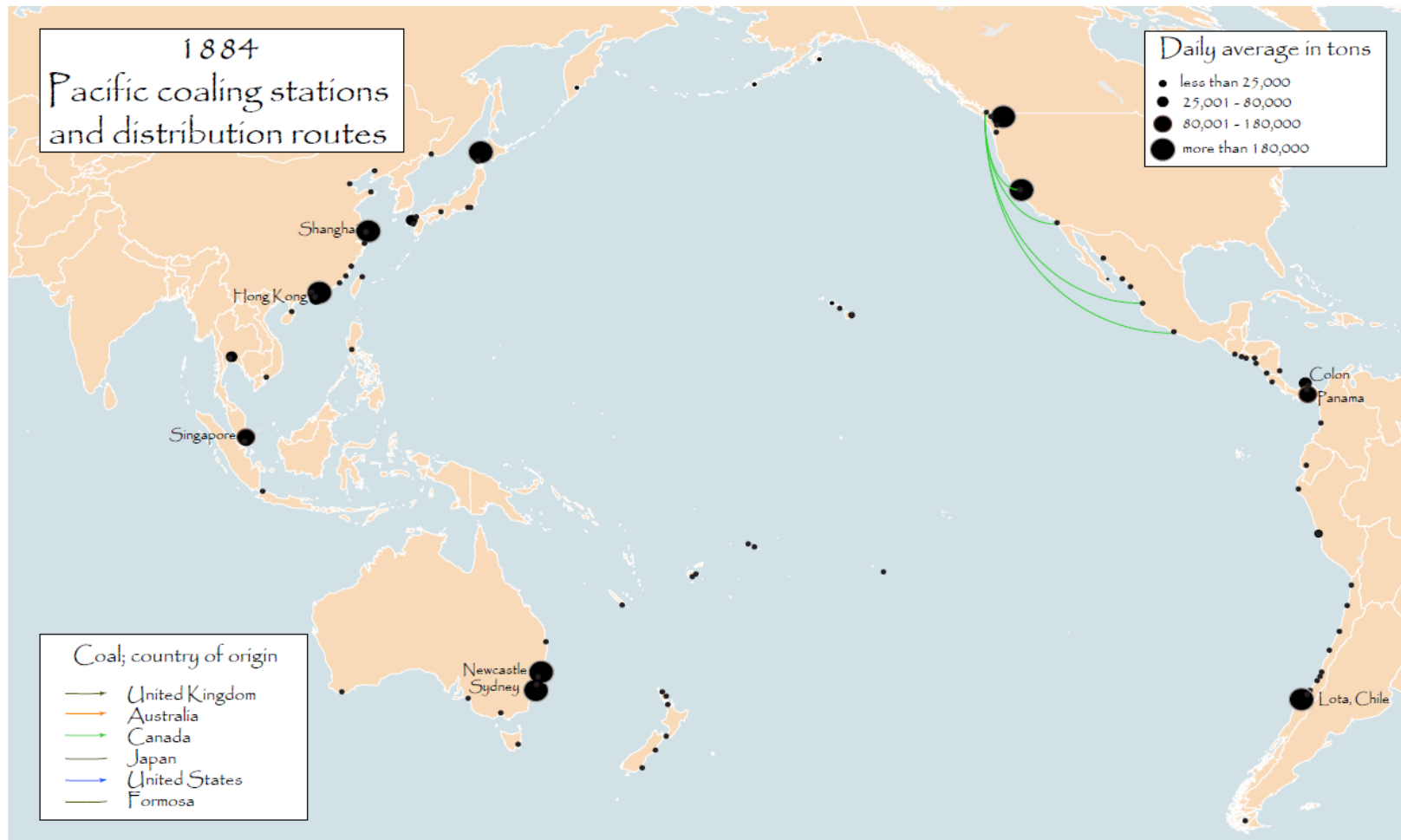


Figure 3 Canadian collieries distribution

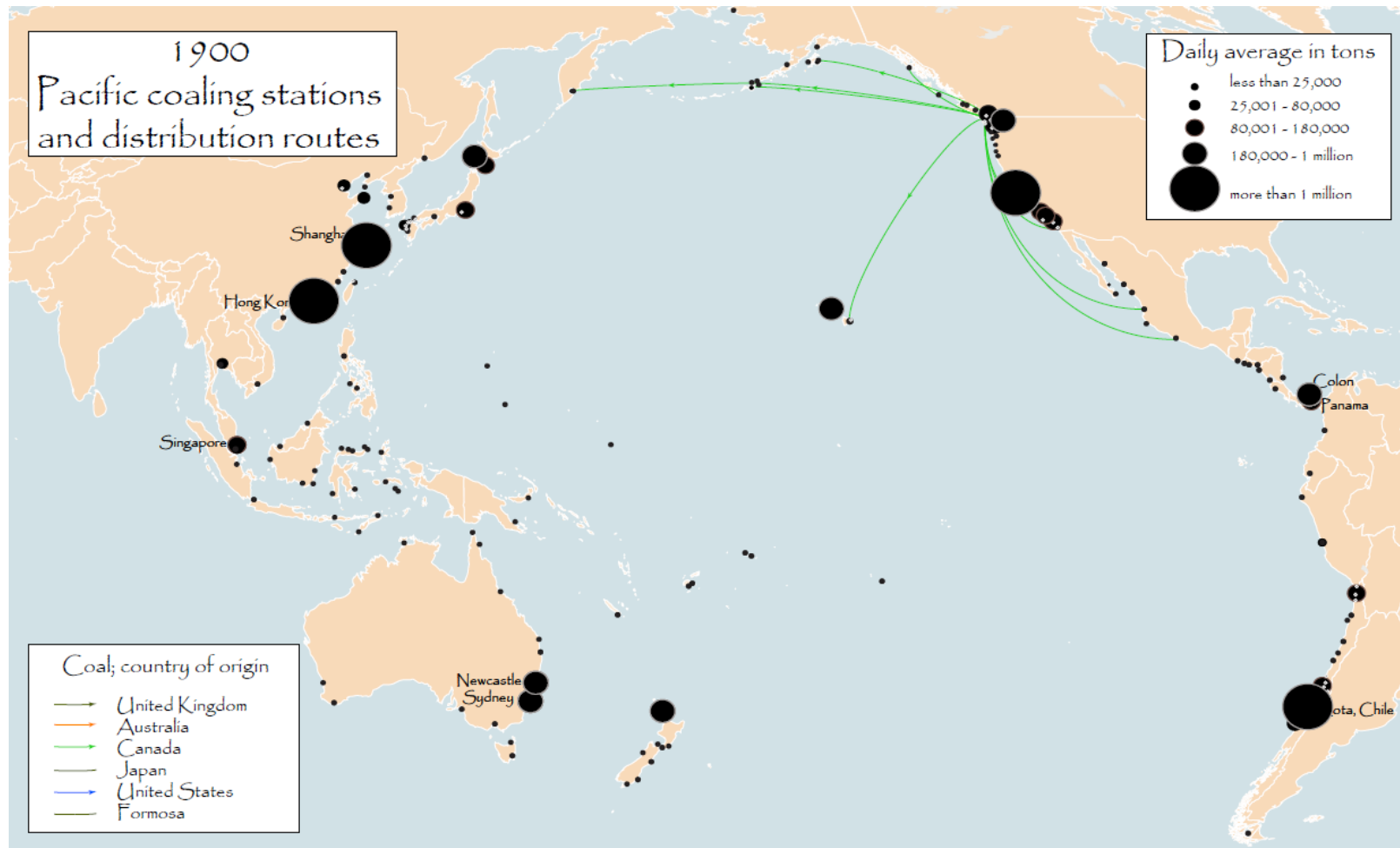


Figure 4 Canadian collieries distribution

Chile

Chile provides a prime example of how privately owned companies worked together to consolidate and vertically integrate nearly all of the import/export business in a region. The sixteen coaling stations in Chile also provide some insight into the competition and conflict between British and American shippers.

According to data collected from the 1900 report, Chile's coaling stations had 688,900 tons of coal available to steamships on any given day, making it the third largest supplier in the Pacific region. What is peculiar is that Chile had no distribution to speak of. Unlike Australian and English coal, which can be found all around the Pacific, Chilean coal stayed in Chile. Further examination reveals that this South American nation imported as much Australian and English coal as it produced that year, an estimated 1.5 million tons in total.⁵⁶

Mobilization for war explains some of this build up, as Chile fought with Peru and Bolivia in the War of the Pacific ending in 1883, and a civil war in 1891. Chile's experience of industrialization was centered on its vast resources of nitrates. Nitrates were in everything from gunpowder to fertilizer. Nitrate mining required massive amounts of earth to be moved, and nitrates required enormous amounts of coal to supply heat to the fire grates that separate this commodity from the soil. English businessmen became involved in Chilean nitrate mining in the 1840s and were instrumental in developing this industry. British entrepreneurs controlled over 60 percent of the nitrate

⁵⁶ Charles William Centner, "Great Britain and Chilean Mining 1830–1914," *Economic History Review* 12, no. 1/2 (1942): 76–82. <http://www.jstor.org/stable/2590393>.

mines and British investors in London purchased government bonds on the London Stock Exchange that supported the democratic government in Chile. Over £766 million were invested into all of South America in 1908, ten times the amount invested into all of continental Europe the same year.⁵⁷ Copper and silver smelting operations required large amount of coal and capital investment as well. British private companies created a system in which ores were extracted from Chile and shipped to the United Kingdom. The ships returned to Chile loaded with coal as mere ballast, where it was sold at a loss.⁵⁸ This made it difficult for others in the coaling industry in to gain any foothold in Chile.

One of the few foreign companies to penetrate the British-dominated coaling industry was W. R. Grace and Company. The Irish-born William Russel Grace first established a business in the guano trade in Callao, Peru, in 1854, and a merchant steamship company in 1860.⁵⁹ Chile was a popular stop in the long, pre-Panama Canal era of steamship voyages from the east to west coasts of the United States. W .R. Grace and Company owned three of the sixteen coaling stations in Chile and two in Peru. The company was involved in a wide array of businesses from rubber to nitrate production as well as railroads and steamships. Their steamships incorporated under the name “The Merchant Line” in 1890 and served the merchant route from Chile to the east coast of the United States. Their coaling stations were frequented by American merchant vessels on their way to and from the west coast. The majority of the bondholders of the company were British.⁶⁰

⁵⁷ Centner, “Great Britain and Chilean Mining,” 4.

⁵⁸ Louis Ortega, “The First Four Decades of the Chilean Coal Mining Industry 1840–1879,” *Journal of Latin American Studies* 4, no. 1 (May 1982): 12.

⁵⁹ <https://grace.com/en-us/history>.

⁶⁰ Lawrence A. Clayton, *Grace: W.R. Grace and Company, The Formative Years 1850–1930* (Ottawa, IL: Jameson Books, 1985), 189.

English coal mining companies had as much influence in Chile as did the nitrate entrepreneurs. Welsh coal had a very high yield of thermal units per ton, and the fire grate used in the nitrate industry had been designed for this coal. Welsh coal had become renowned for its quality and was a premium product sought by many shipping companies that had triple-expansion and steam-turbine-powered ships. English coal mining companies operating in Chile discovered that mixing Welsh coal with Chilean coal at a 1-to-3 ratio would yield similar thermal units per ton, but at a much lower cost, especially to Pacific fleets. Mining and shipping had become vital components to the Chilean economy, bringing industrialization and affluence. These developments had been cultivated by English technology and capital.

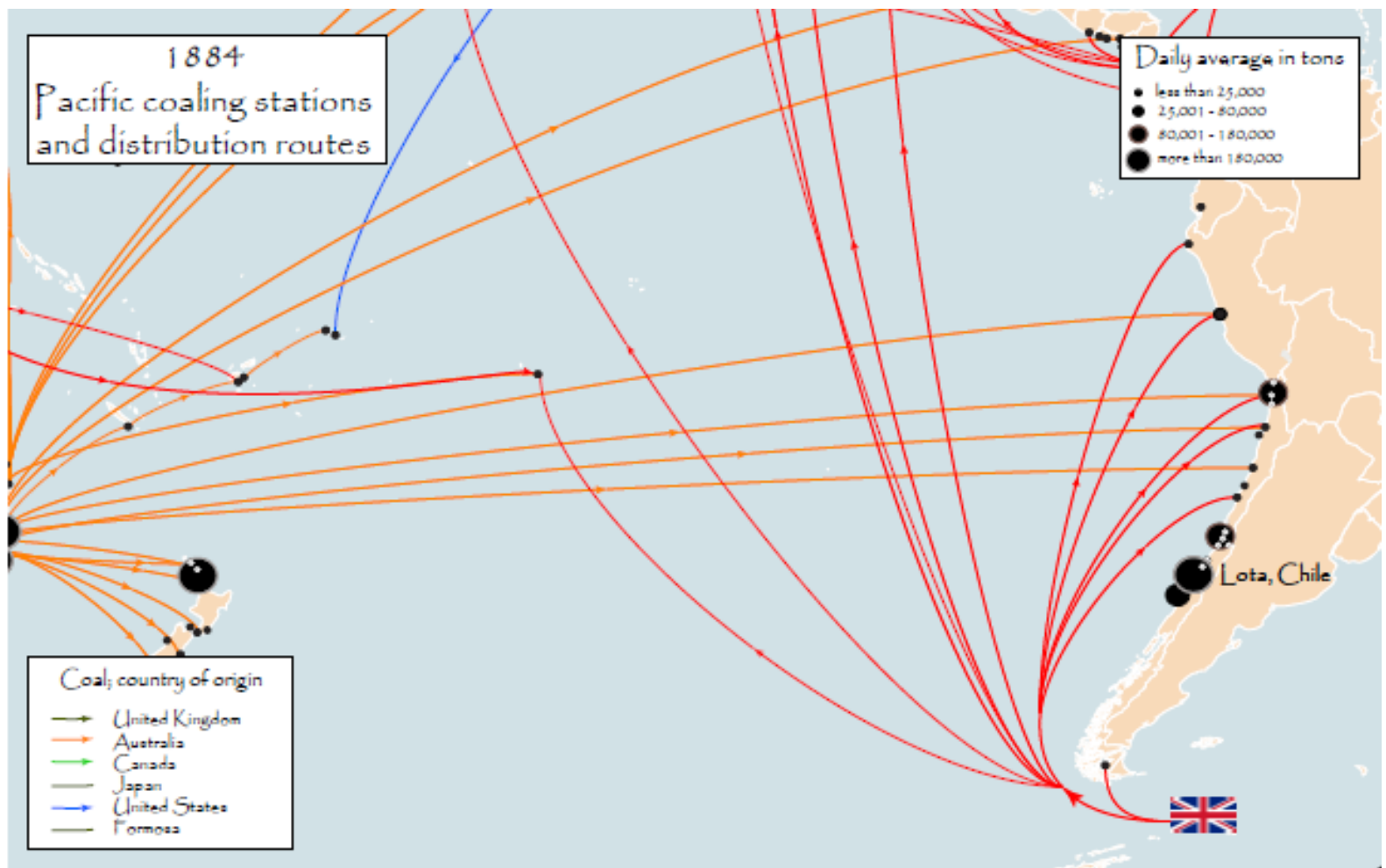


Figure 5 coaling stations in Chile were dominated by British shippers

Australasia

The case studies of Australia and New Zealand illustrate the transformation from a mariner's world to one of Western capitalism and the impacts of the steamship on trade and maritime relations. Schooners and square-riggers had developed well-established trade routes throughout a number of South Pacific islands but by the late nineteenth century, the largest trading companies with the largest steamers monopolized the maritime space, shutting out all the smaller merchants.⁶¹ The economic pressure of the steamship was threefold. First, the increased size of the cargo holds required much more production of a particular commodity. Second, these large tramps required much more development of a harbor's dock and wharf space. Third, the initial investment to purchase large tramps and develop deep-water wharfs and docks required these tramps to fill their holds to capacity every time they left port at either their port of arrival or their destination port. It was too costly to voyage under ballast; every trip had to be profitable. The competition among shipping companies in New Zealand and Australia was fierce. Francis Steel illustrates in her book *Oceania Under Steam* that shipping companies in Melbourne and Sidney raced to become the major trans-Pacific terminal. Sidney became the major port terminal because the shipping companies there were able to acquire the necessary investment and develop the harbor faster than the shippers in Melbourne could. Steel also discusses the change in the amount of time a steamship stayed at the dock, loading and unloading cargo. Prior to the large tramp, schooners stayed weeks in port transferring

⁶¹ Steel, *Oceania Under Steam*, 27.

goods from ship to shore with lighters and barges. The tight schedule steamships had to keep meant that the transfer of goods from ship to shore needed to happen in one day, hence the need for the development of more specialized docks and wharfs, capable of the swift movement of cargo from ship to shore.

The transnational relationship of shipping companies and coaling station owners is apparent in Australasia. The Spreckels Commercial Company was an American conglomerate that not only owned coaling stations in Honolulu and San Diego, but their shipping line, The American Oceanic Steamship Company had a partnership with the Union Steamship Company owned by New Zealand investors. This short-lived partnership took advantage of government mail-ship subsidies from both the United States and New Zealand governments as the two companies delivered mail to a number of Pacific locales.⁶²

It may have been that in all of the production and distribution of coal throughout the Pacific coaling stations, Australasia was at the heart of it all in 1884, but had lost its place on the mantle by 1900. Australian coal could be found in 38 of the 78 coaling stations in 1884 but only 51 of the 167 coaling stations in 1900. Australia supplied coal to half the stations in 1884 and less than one-third in 1900. The eighty-nine coaling stations that were built in this sixteen-year period are mostly in the East Asian region. Japan's coal production growth during this time is enormous and supplied many of the new stations. Coal discoveries in Borneo also supplied many of the Indonesian stations developed in this short period as well. The addition of coal suppliers was as significant as the addition of stations. Australian coal suppliers and distributors did not experience the

⁶² Spreckels in Honolulu and San Diego, 1900 report, 63, 73. Oceanic Co. contract with USSCo., Steel, *Oceania Under Steam*, 32.

more than double growth that the rest of the maritime coaling industry was experiencing in the Pacific.⁶³

Numerous historical sources indicate that New Zealanders had the inclination to become the dominant protector of the entire Pacific. Those who advocated New Zealand's destiny in the Pacific (such as George Grey, Julius Vogel, Robert Stout, and Richard Seddon) were just as concerned to avert foreign strategic bases as to protect trade prospects. Colonial strategy required the exclusion of foreign powers from islands where bases could pose a threat to merchant shipping and harbors.⁶⁴ Australasia had developed Pacific trading networks throughout the whole of the Pacific and, in congress with other British Pacific colonies, Canada, and annexed islands, had become a major component of British Pacific trade domination.

Germany entered Pacific colonialization beginning in 1871, and by 1882 it had annexed, purchased, or otherwise taken control of Bismarck Island; parts of Papua; the Caroline, Marshall, and Solomon Islands; Tonga; Nauru; and the main island in the Samoan archipelago. This string of German possessions plunged across Northern Australia and encircled the northern and eastern half of Australasia. New Zealanders and Australians viewed this as a grave threat to their maritime trade operations, which quickly became politicized in Australian and New Zealand newspapers. The German economic encroachment was perceived as a security threat to Australasia. Australasian governors pushed the colonial office in London to take action and stop the German encroachment. British parliament was opposed to these requests because of cantankerous diplomatic

⁶³ Comparison of 1884 and 1900 report.

⁶⁴ Peter Overlack, "'Bless the Queen and Curse the Colonial Office': Australasian Reaction to German Consolidation in the Pacific 1871–99," *Journal of Pacific History* 33, no. 2 (September 1998): 133–52.

negotiations with Germany concerning other parts of the world. Security concerns remained at the fore. In 1883, New Zealand governor Sir William Jervois made clear to Lord Derby, the colonial secretary in 1882, the local belief that foreign possession of the Pacific islands could well see them become bases for wartime operations against British colonies.⁶⁵

The lack of growth and expansion in the Australasian coaling industry in the Pacific during this sixteen year period was something that caused Australasian shippers and entrepreneurs some anxiety. They blamed the encroachment of other companies into what they had perceived as their territory. Most of these companies were owned and operated by German or Japanese firms though some were British. Nevertheless, Australasian shippers pushed their territorial governors to label this encroachment as a security threat which created some conflict amongst the imperial governments.

One of the most distinctive advantages the British had over the rest of world in coal mining and distribution was a near century head start it had over other developing nations like the United States. By 1700, the United Kingdom was mining almost five times the amount of coal as the rest of the world combined.⁶⁶ The United Kingdom's long history with coal mining would culminate into domestic coal mining boom in the 1870s that developed coal mining into a syndicated system involving miners, engineers, schools for mining and metallurgy, as well as bankers and financiers. As this coal boom subsided, the men involved in this industry sought employment overseas.

British-run coaling stations along the Pacific Rim involved much more than mining nearby coal fields and distribution to other ports. Often these coaling stations

⁶⁵ Overlack, "Bless the Queen," 137.

⁶⁶ Barbara Freeze, *Coal: A Human Story* (London: Penguin, 2003), 56.

lacked basic supplies such as fresh water or the infrastructure of roads and housing, and so it was frequently necessary to undertake diverse investments in railway workshops, smelters, chemical plants, offices, schools, stores, and recreational facilities. Thus, besides requiring the services of experienced mining engineers, overseas mining companies also needed to employ many civil, mechanical, and electrical engineers.⁶⁷ This required a high degree of planning and organization to oversee production and distribution at a Pacific location. It also required a high degree of organization in London as accountants, lawyers, and financiers handled the investments. This group in London, with its long history in overseas mining, had grown strong by the 1880s and public confidence in these large multinational corporations was reflected on the London stock exchange. According to Charles Harvey and Jon Press's research into the industry, 8,408 companies were registered in Britain for mining and mine exploration abroad between 1880 and 1913.⁶⁸ Their research does not focus on coal alone, but the broader realm of overseas mining in general. British-owned companies, for example, accounted for 60 percent of the world's output of gold in 1898, by 1914 twenty of the world's largest copper mines, and a quarter of the tin output of the Straits Settlement and Malay States (Malaysia, the Straits of Malacca, and the surrounding region), and 60 percent of the Chilean nitrate industry was owned and controlled by British-based firms.⁶⁹

Although the vast majority of coaling stations were developed by private enterprise, the British government played a minor role in some coaling station

⁶⁷ Charles Harvey and Jon Press, "Overseas Investment and the Professional Advance of British Metal Mining Engineers, 1851–1914," *Economic History Review*, New Series, 42, no. 1 (February 1989): 67. <http://www.jstor.org/stable/2597046>.

⁶⁸ Harvey and Press, "Overseas Investment," 65.

⁶⁹ Harvey and Press, "Overseas Investment," 65.

developments. Hong Kong became a British territory as a result of the first Opium War in 1842, and a 99-year lease was negotiated in 1898. British maritime commerce in Shanghai grew larger than that of Hong Kong by the turn of century. Malaysia, Singapore, Borneo, and many other Pacific locales were all incorporated into the empire's economic networks.⁷⁰ The United Kingdom had become import dependent with even the most basic of necessities being shipped to the British Isles. Malayan rubber, tin, sugar, cocoa, vegetable oil, American timber, and Australian wool are just a few of the commodities shipped from the Pacific to the United Kingdom in the late nineteenth century.⁷¹ The British government was a supporter of free trade in order to maximize access to these commodities. A symbiotic relationship developed, as her suppliers became dependent on British technology and capital.

Import dependence led the British government to abandon imperial protection in favor of universal free trade. Political controls over Australia and Canada begin to loosen in years between 1846 and 1851, and by the 1880s both former colonies had established governments as confederations.⁷² British economic ties to Australia and Canada remained, as many of the private enterprises in these nations were either British owned, operated, or financed.⁷³ The Colonial Office was the sector of commercial governance for Australia and Canada.

⁷⁰ Colin Matthew, *The Nineteenth Century: Short Oxford History of the British Isles*. (Oxford: Oxford University Press, 2000), 138.

⁷¹ Matthew, *The Nineteenth Century*, 138.

⁷² Matthew, *The Nineteenth Century*, 144.

⁷³ Freeze. *Coal*, 56.

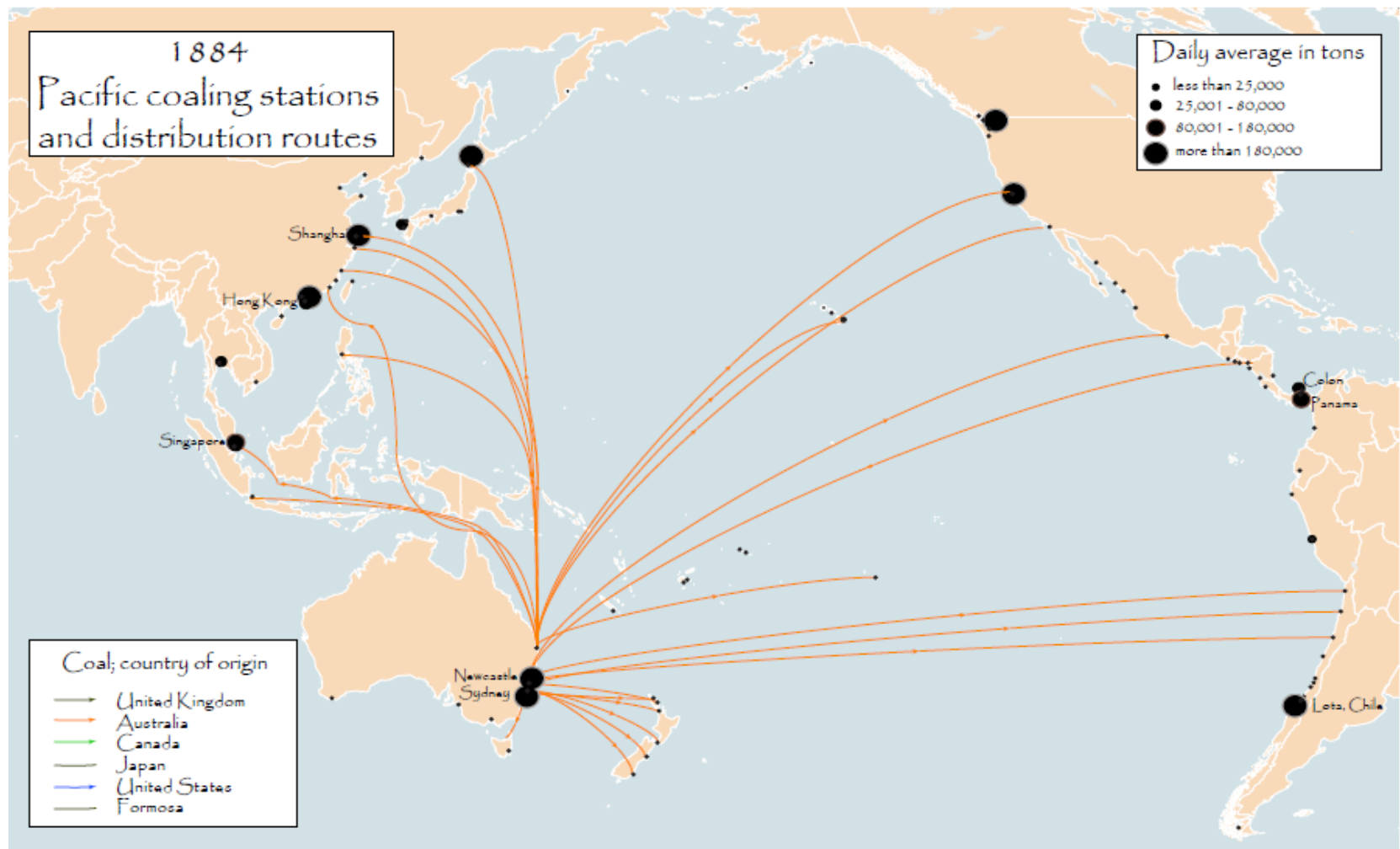


Figure 6 Australian collieries dominated distribution in the Pacific in 1884

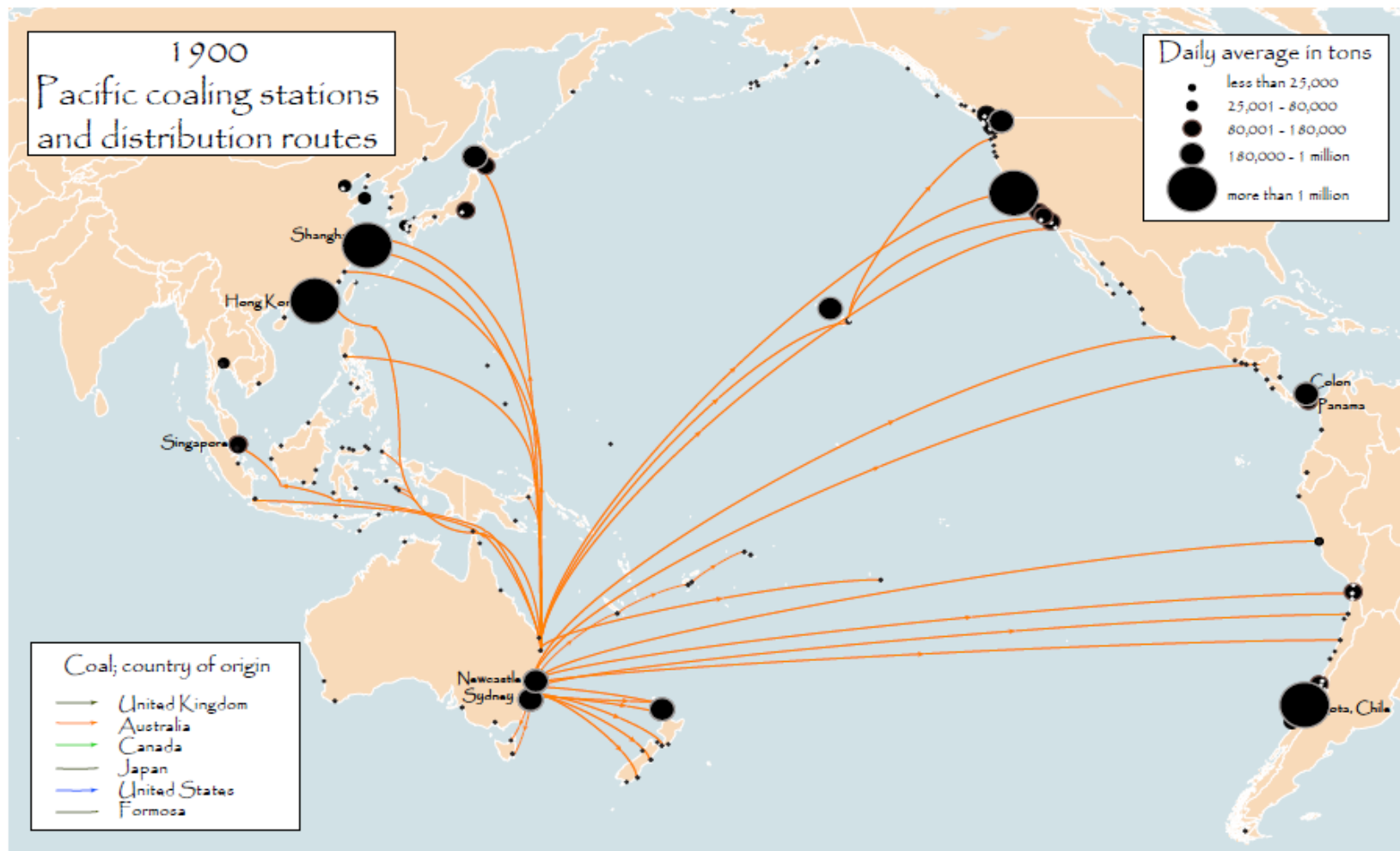


Figure 7 Australian distribution saw little growth by 1900

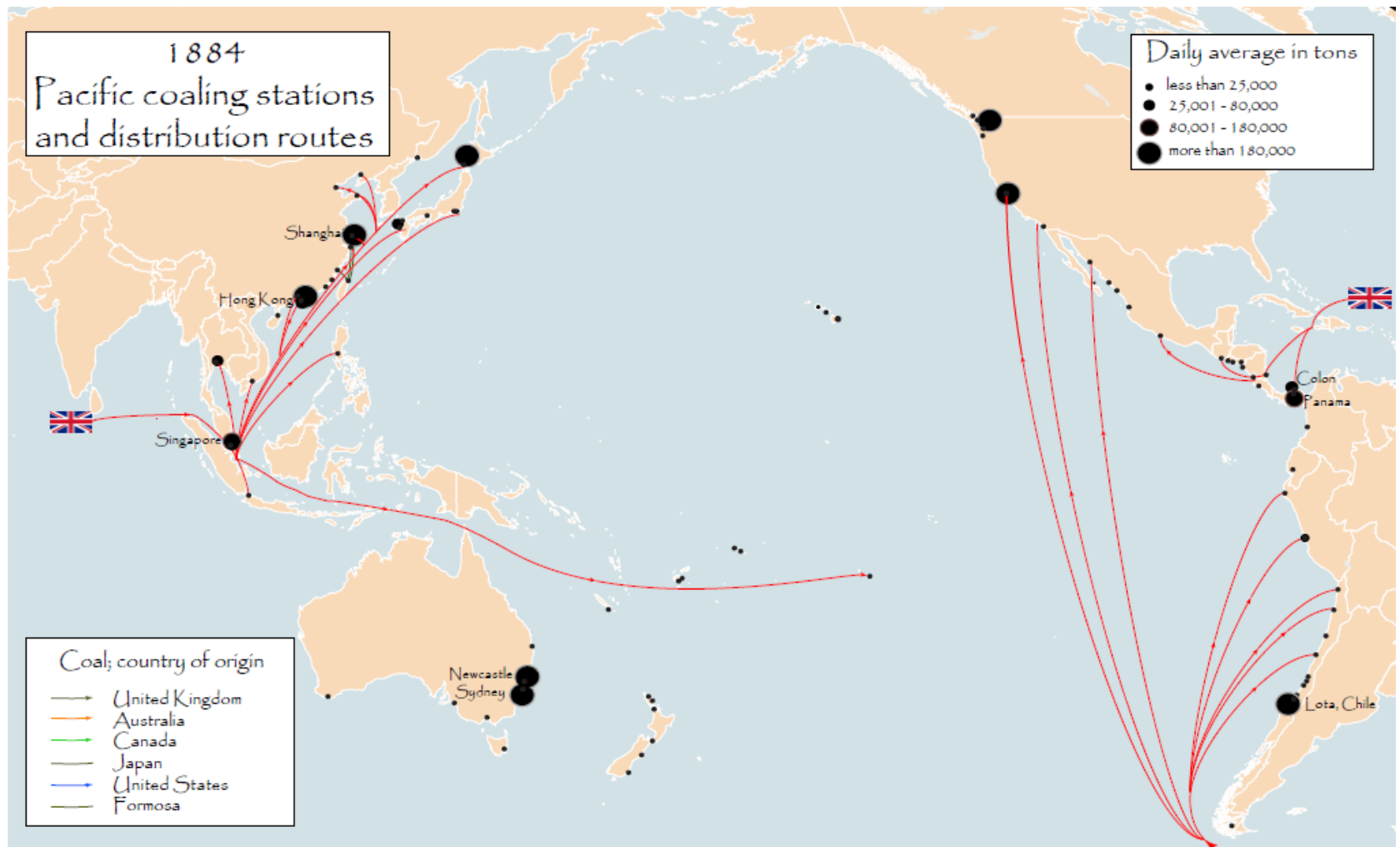


Figure 8 British coal can be found throughout the Pacific region

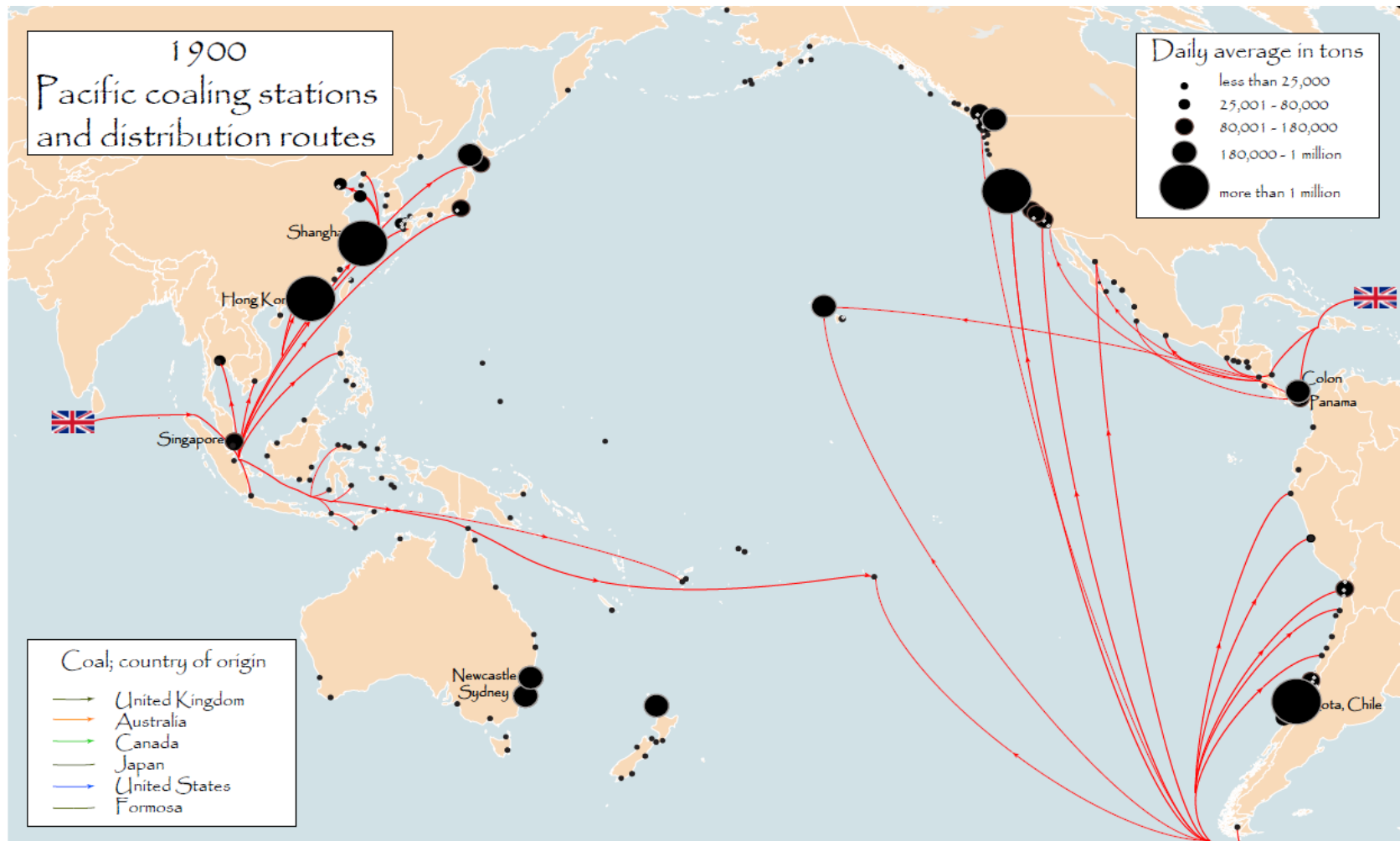


Figure 9 British dominated the coaling industry in 1900

Formosa

Coal deposits were known to those who had inhabited Formosa (Taiwan) for a considerable time. Prior to the industrial age, it was not viewed as an extractable, natural resource. The coal caverns found on Kelung Hill had a different value. It was “the abode of genii, and the source for arterial current for the whole of Formosa.”⁷⁴ Feng shui beliefs made this coal rich vicinity a place of spiritual importance not to be desecrated. In the early nineteenth century, a tablet had been erected by local authorities warning visitors to the area of the dangers desecrating the area would bring. Many indigenous people risked upsetting the genii for a basket of coal they could bring to market. This tablet disappeared somehow, and was replaced twice more; the third erected in 1847 was made of stone.

In 1849, the officers of the U.S.S. *Dolphin* toured Formosa and Kelung Hill. Their observations led to the conclusion that coal could be obtained here with very little difficulty. American occupation of certain areas in Formosa was a thought that went beyond the officers of the *Dolphin*. Historians have long been aware of the main outlines of a proposal by certain Americans in China that the United States seize the island of Formosa in 1857. Manuscript records of the U.S. Department of State and the documents published by Congress have been the basis for most of the work on this topic.⁷⁵ The Treaty of Tientsin signed in 1858 opened Formosa to foreign trade. Businessmen, adventurers, consular authorities, and missionaries swarmed onto the island.⁷⁶ The British

⁷⁴ James A. Davidson, *The Island of Formosa, Past and Present* (London and New York: Macmillan and Company 1903): 469.

⁷⁵ Harold D. Langley, “Gideon Nye and the Formosa Annexation Scheme,” *Pacific Historical Review* 34, no. 4 (November 1965): 397–420.

⁷⁶ Yu-Shan Han, “Formosa Under Three Rules,” *Pacific Historical Review* 19, no. 4 (November 1950): 404.

consul to the Chinese government would petition them to co-operate in mines in Kelung, an offer that was declined. French engineer M. Dupont would also fail to convince the Foochow and Tamsui commissioners for mining rights at Kelung in 1864.⁷⁷ During the period from 1849 to 1864, it became clear to local governments that the practice of illegal mining was unstoppable. The combination of the illegal mining from locals and irresistible offers from numerous foreign companies motivated Formosan authorities to reexamine Kelung. A commission was formed to investigate coal mining in this spiritual region. It was decided that the proposed coal mines were far enough away from “genial properties owing to their locations.”⁷⁸ The commission also decided that measures should be taken to prevent foreigners from obtaining an interest in the industry. Full-scale mining operations began in 1860. The Treaty of Tientsin had been signed two years earlier, which allowed foreign businessmen, missionaries, and consular authorities to conduct business on the island.⁷⁹ It may have been that the profitability of coal production outweighed the spiritual significance of the area.

Authorities from Peking invited English mining experts to bring in modern machinery in 1874, as long as it was understood that mining in Formosa was to remain a native operation. Englishmen were to be advisors and observers. Within a year, Kelung coal mines were producing 200 tons per day. The coal was carried by rail-car three miles to Pa-Tou, later known as “Coal Harbor.” Coal mining and production was hindered slightly by disease, but otherwise went well in the initial period. Distribution was another matter. The Chinese government did not allow any steamship to enter Coal Harbor, for

⁷⁷ Davidson, “The Island of Formosa,” 479.

⁷⁸ Davidson, “The Island of Formosa,” 480.

⁷⁹ Han, “Formosa Under Three Rules,” 404.

any reason. Coal was shipped to stations in Shanghai and Foochow by Chinese junks (sail barges), which could only run in seasonal winds to nearby locales. This may have been a method of maintaining local control of the product. English mining companies and investors were heavily involved in production, but had no authority in distribution. The Chinese were building up their naval fleet during this time and needed to secure coal reserved for military operations. This frustrated Western shipping companies who wanted to include Formosa into their regular routes and, thus, into their sphere of influence. Monopolizing coal distribution from Formosa may have been a method of maintaining Chinese interests, and safeguarding the coaling industry from foreign control. Regardless of limitations placed on distribution, Formosa's coal output had grown to 46,000 tons in 1881.

The 1884 report from Office of Naval Intelligence lists "Formosa" coal being distributed to Foochow, Amoy, Keelung, Shanghai, and Ningpo, which demonstrates a comprehensive regional distribution system fully controlled by the Chinese government and fully independent of foreign distributors.⁸⁰

In 1880 the Russians, in order to strengthen their negotiations concerning Ili, a strategic center in Chinese Turkestan, put on an imposing naval demonstration in Chinese waters, and when Russian warships made their appearance in Formosan waters five new fortresses were hastily thrown up, with seven-inch and six-inch Krupp guns installed for action.⁸¹ These preparations were made for use against Russian belligerence, but were also used against the French in 1884. The Sino-French war concerning the northern

⁸⁰ 1884 report, 48-50; footnote on 50 states that "Formosan coal in the hands of Chinese"

⁸¹ Yu-Shan Han, "Formosa Under Three Rules," 403.

portion of Indochina spilled northward to Formosa, and the French Navy decided to put more pressure on China with a military expedition onto the island.

Liu Ming Ch'uan, governor-general of Formosa, led the battle against the French invasion. Upon the arrival of the French Fleet, led by Lieutenant-Colonel Bertaux-Levillain, Ch'uan ordered the coal mines be flooded and the stockpiles, some 15,000 tons of coal, be burned. Ch'uan was successful in repelling the French invasion. The Chinese were convinced now that Formosa had great strategic value for the empire and that it should be made an independent province and be governed by high-ranking officials.⁸² After the war, coal mining resumed but at half the rate of previous production. By 1891, the Formosan coal mines were reported to have been exhausted. Five private companies continued to mine and supply the Formosan government, but the state-run program had ended. Formosan coal production had dropped to 24,000 tons by 1894, with exports lower than 7,000 tons.⁸³

Ch'uan's success in the battle against the French had illustrated the strategic importance of Formosa not only to the Chinese, but to the onlookers of the United States, Britain, and especially to Japan. When Chinese and Japanese representatives were engaged in making preliminary peace terms at Shimonoseki on March 20, 1895, Prince Ito delayed the meeting to give the Japanese navy time to attack the Pescadores and Formosa to the end that Formosa might be included as a prize of war. The Treaty of Shimonoseki was signed on April 17, but Japan did not find the taking over of Formosa as easy as the signing of her demands. The Chinese and natives on the island decided to set up their own republic and to fight against the treaty's fulfillment. It took Japan seven

⁸² Yu-Shan Han, "Formosa Under Three Rules," 403.

⁸³ Davidson, "The Island of Formosa," 484.

months and heavy losses to gain control.⁸⁴ During the years 1895 and 1896 in which a transfer of administration from Chinese to Japanese took place, coal exports dropped to 5,767 tons. Japanese capitalists opened fourteen new mines in 1896, most which consisted of mining through manual instead of mechanized means. The Chinese and those indigenous to Formosa were used as cheap labor by Japanese coal mine owners. By 1899, coal exports from Formosa reached 18,112 tons, which were still shipped by Chinese junks to Shanghai and Foochow.⁸⁵

Formosa in the late nineteenth century is a prime example of complex trade systems, the imperial conflict of both Western and indigenous agency, the economic stresses brought by technology, and conflicts that arose from the stresses of all those vying for commercial dominance. Although steamships rarely entered Formosan harbors during this time, the coal for which they starved became a prize of skillful negotiations by British miners and the ends to the military means brought by the Russians, French, and Japanese.

⁸⁴ Yu-Shan Han, "Formosa Under Three Rules," 406.

⁸⁵ Davidson, "The Island of Formosa," 490.



Figure 10 Chinese administrators maintained control over Formosan distribution

Borneo

Borneo in the late nineteenth century makes for a good case study of treaties among nations and the adherence or lack thereof to said treaties by private enterprise operating there. Borneo also serves a good example of why American attempts at maritime expansion failed while the British succeeded. In terms of imperial attempts to establish trading posts and colonies on the island, Borneo had “passed through the withering hands of the Portuguese and the Dutch.”⁸⁶ Borneo is located in the center of the Indonesian archipelago, halfway between Singapore and Papua New Guinea. It was an ideal location for trade, as Hong Kong, Japan, and Australia were all within a five-day steam. Borneo had been part of the Dutch East Indies for a century prior, but by the 1840s the Dutch contingent on Borneo had not established any major facilities, and a small group inhabited a port town on the southwest side. Borneo had a reputation of being a pirate haunt, which was partially true at times. Western commercial ships had steered clear of Borneo for this reason for most of the early nineteenth century. After a brief visit in 1812 to Labuan, the capital city in which the sultan ruled the majority of Borneo, Sir James Hunt aboard the British commercial ship *Bridgewater* remarked that it was disappointing “that so large a portion of the habitable globe as all Borneo is abandoned to barbarism and desolation.”⁸⁷

⁸⁶ Sir Alcock Rutherford, *Handbook of British North Borneo, Compiled from Reports Received from Governor Treacher and Other Officers in the British North Borneo Company's Service* (London: William Clowes and Sons Limited, 1886), 10.

⁸⁷ Rutherford, *Handbook of British North Borneo*, 12.

Borneo's landscape was mountainous and densely forested with many rivers. Sir Alcock Rutherford's 1886 *Handbook of British North Borneo* describes the population as "sparse, with vast tracts of the East coast and interior simply uninhabited." The west coast was populated by small districts of Soloos, Illanuns, Bugis, and more than a dozen other tribes or chiefdoms, some of which held private property and paid dues to the sultan of Brunei. Counter to J. Hunt's 1812 observation, Rutherford describes these tribes as "courteous, intelligent and companionable."⁸⁸ Although Rutherford's handbook was clearly designed to entice London investors and convince British citizens Borneo was fine place to emigrate to, this makes his observations no less true. The Borneo islanders had developed exports in fisheries, copra, beeswax, and camphor, a tree sap particular to Borneo that Indonesians and Chinese used for embalming. Camphor garnered an incredible £30 per pound in Hong Kong.⁸⁹ Borneo's vast potential in resources were too good to be passed by British private enterprise.

The Anglo-Dutch Treaty of 1824 had separated Malaya and the Dutch East Indies into spheres of influence not to be encroached upon by either the United Kingdom or Netherlands governments. The treaty specifically states that "any shared occupation of islands in the South Pacific shall be avoided."⁹⁰ It may be that the British consul in Hong Kong was trying to skirt the issue or circumvent the treaty when in 1847, the British government and the sultan of Brunei created a cession to form the British North Borneo Company. The company agreed to an initial payment of £20,000 for a fifteen-year lease on a 25,000-acre tract of land covering six hundred miles of coastline on the northwest

⁸⁸ Rutherford, *Handbook of British North Borneo*, 34.

⁸⁹ Rutherford, *Handbook of British North Borneo*, 79.

⁹⁰ Anthony Webster, *Gentlemen Capitalists: British Imperialism in Southeast Asia* (New York: Tauris Academic Studies, 1998).

side of the island, and annual dues thereafter.⁹¹ This was not a government establishment, but a private corporate one, which angered the Dutch none the less.

Three years later, Captain Joseph Balesier of the U.S. Navy negotiated a treaty with the sultan of Brunei. This treaty consisted of a ten-year lease for 15,000 acres across the north and east of Borneo.⁹² Nothing was made of this treaty for the next sixteen years until the U.S. government appointed Claude Lee Moses as the American Consul to Borneo. Moses traveled to Borneo, made promise of payments to the sultan, and then quickly travelled to Hong Kong with signed concession forms in his hand. On September 9, 1865, Moses sold these concessions to Joseph W. Torrey and Thomas B. Harris, two American merchants, for an unknown sum. Moses disappeared, and it was later reported that he had to borrow the funds for his travels.⁹³ Torrey and Harris partnered with two other Chinese merchants, traveled to the Kimanis River, sixty miles north of Labuan, where the British company was operating. Once word reached the Spaniards in Manila that Americans were establishing a trading company on the Kimanis, they quickly responded with a threatening communique provided by a Spanish warship to Torrey and Harris.

Unbeknownst to much of the world, the sultan on the small island of Sulu, northeast of Borneo, had been increasing its territory by force in years prior to 1865 and had captured an area of northeast Borneo along with some southern Philippine Islands. The Spanish had defeated the sultan of Sulu after a year-long guerrilla campaign in 1864 and laid claim to all territories of the sultan upon his defeat, which included the Kimanis

⁹¹ Rutherford, *Handbook of British North Borneo*, 16.

⁹² K. G. Tregonning, "American Activity in North Borneo, 1865–1881," *Pacific Historical Review* 23, no. 4 (November 1954): 356.

⁹³ Tregonning, "American Activity in North Borneo," 360.

River. The Spanish communique was accompanied by a flurry of angered messages from the British Consul to the absent American Consul, as the British North Borneo Company viewed the American establishment as a violation of British-American trade agreements.

The governments of the United Kingdom, Spain, and the Netherlands entered into negotiations and by 1877 had agreed that the British company could stay, and to set of tariffs and trade agreements of what commodities could be sold where. The American government was absent from the negotiating table in part because Moses had never been replaced and because Torrey, Harris, and their two Chinese partners had run out of capital months after arriving at the Kimanis River. Many of the Chinese labor they had hired to fell trees in the river valley were in a state of starvation as they waited for transport back to Asia.⁹⁴

The British North Borneo Company had, by 1884, created the infrastructure necessary to penetrate the Borneo interior and begin coal mining operations. By 1900, the company was distributing coal throughout much of Indonesia.

These case studies provide some insight into the methods in which private enterprise controlled the production, distribution and sale of coal supplies. Control over the fuel supply meant control over shipping and these case studies illustrate control on in local and regional contexts. The data used to create the maps illustrate dominant forces of private enterprise on a broader, Pacific scale. Quantifying this data shows British shipping coaling companies as a dominant coalition. These case studies also illuminate the transnational connections of indigenous peoples and their struggles to adapt to the new steamship economy.

⁹⁴ Tregonning, "American Activity in North Borneo," 364–70.

U.S. Pacific Coast

There are three mainland U.S. coaling stations listed in the 1884 report: Portland, San Francisco, and San Diego. By 1900 the number of coaling stations grew to seventeen. Coal production along the western seaboard grew exponentially between 1884 and 1900, as did the whole of the nation. The United States became a net exporter in 1870 and by 1900 had outpaced the United Kingdom in coal production.⁹⁵ Washington, Oregon, and California shifted rapidly from wood fuel sources in the early 1870s to primarily coal in the mid-1880s. Many coaling stations were close to the mines, such as Coos Bay and Newport Bay in Oregon, where the mines were “in sight” of the docks.⁹⁶

Seattle and the Puget Sound developed five coaling stations from Bellingham south to Olympia, as well as collieries throughout King County between 1885 and 1900. The maritime industry consumed 1.2 million tons of coal from the Puget Sound in 1894, a dramatic increase in only a decade. Additionally, steamships entering San Francisco consumed 1.3 million tons the same year, totaling 2.5 million tons from those two ports alone.⁹⁷ The total domestic coal produced in Washington, Oregon, and California in 1894 was 1.1 million tons, according to the USGS.⁹⁸ More than half of the coal consumed at Pacific coast coaling stations came from foreign lands, primarily the United Kingdom. The United States was the largest exporter in the world and, at the time, the largest consumer.

⁹⁵ Freeze, *Coal*, 137.

⁹⁶ 1900 report.

⁹⁷ 1900 report: Seattle, 59; San Francisco, 61.

⁹⁸ George Otis Smith, “The Coal Fields of the Pacific Coast,” *22nd Annual Report, USGS 1900–1901* (Washington, DC: GPO, 1902), 473.

In spite of this exponential growth in available coal at Pacific coast coaling stations, coal produced in the United States can only be found in Hawaii and Samoa in 1900. There is no evidence to show that U.S. exports found any destination in foreign ports, at least not for steamship purposes. One of the main reasons for this is the trade relationship between the United Kingdom and the United States, which was described in the 1918 *Coal and Coal Trade Journal* article as a “shipping fraternity.”⁹⁹ It may be that U.S. investors were looking towards the future of petroleum and investing in a new fuel source, instead of competing with British shippers in the already dominated coaling industry.

Hawaii, Guam, and the Philippines

Hawaii is center to much of the historical analysis concerning Pacific maritime trade, indigenous agency, U.S. foreign policy, cultural diversity, and more. Hawaii had become a center of free trade among imperial powers. The United Kingdom and France had vested interests in trade on the Hawaiian Islands, but far less than those of the United States. Alfred Thayer Mahan had written an influential and widely published article that sounded the alarm of the rise of Japan and Germany in 1890, with special concern towards the weakness and near inability to simultaneously defend U.S. trade in the Pacific and the Atlantic. Hawaii’s strategic location to the U.S. military is often pointed to by historians as causation for Hawaii’s annexation, especially when considered in conjunction with plans of war in Spanish colonies. The rapid acquisition of the Philippines, Guam, and the Hawaiian islands within two years seems to support strategy

⁹⁹ Harvey and Press, “Overseas Investment,” 67.

as viable argument, but obscures what I consider to be central to all the reasoning and decision making towards annexation. Hawaii is central to many aspects of Pacific exchanges but, above all, what Hawaii meant to United States can be viewed in one very simple term: revenue. In 1884, Hawaiian imports garnered \$4.6 million and exports equaled \$8 million. In 1900, import revenue grew to \$10 million and exports netted \$14.4 million.¹⁰⁰ In 1884, Honolulu had 3500 tons of coal readily available to Pacific shippers. By 1900, Honolulu had over 40,000 tons available on any given day from four different companies, illustrating the growth in Hawaiian shipping volume over this sixteen year period.¹⁰¹ Hawaii anchored the United States in the Pacific trade system, and its commercial value had no equal in the eyes of American entrepreneurs.

William Warren Kimball, a young Navy lieutenant, had drawn up a plan in 1896 to simultaneously attack all the Spanish colonies in the event of war breaking out with the United States. The thrust of his plan concerned Caribbean strategy, but Kimball had included the Philippines as measure to humiliate Spain.¹⁰² Navy Secretary Long and Teddy Roosevelt set this war plan in motion in February of 1898 “in the absence of any other.”¹⁰³ President McKinley approved the plan with no concept of diplomacy or plan for occupation in the Philippines after the war.

After Commodore Dewey’s swift victory in Manila, many American businessmen exhibited great interest and enthusiasm towards the Philippines, eager to exploit its varied crops and to use Manila as a secure base of trade in a region that had seen increased

¹⁰⁰ Sumner La Croix, “Economic History of Hawai’i,” Economic History Association, <http://eh.net/encyclopedia/economic-history-of-hawaii/>.

¹⁰¹ 1884 report, 44 and 1900 report, 72-73.

¹⁰² J. A. S. Grenville, “Diplomacy and War Plans in the United States, 1890–1917,” *Transactions of the Royal Historical Society* 11 (December 1961): 3.

¹⁰³ Grenville, “Diplomacy and War Plans,” 4.

conflict. Such enthusiasm turned to hesitation as the U.S. military had become engaged in Pilipino resistance towards occupation. The resistance movement and U.S. military action in Manila was well publicized in newspapers around the world, and American citizens began to question the purpose and goal of the government. The McKinley administration had no real commercial policy for the Philippines, making any entrepreneur or investor wary of pursuing interests there. The swift acquisition of Guam suffered from the same commercial hesitation, although plans for a naval base came quickly, as did plans for naval base in American Samoa, following the Tripartite Agreement in 1899.¹⁰⁴

Although the acquisitions of Guam, the Philippines, and American Samoa were watershed moments for the U.S. government, these acquisitions did very little to further any U.S. commercial gains. All of these Pacific islands would produce conflict between the indigenous peoples and the U.S. military as the government struggled to maintain control and push forth the construction of military outposts. Hawaii would remain the economic hub of trade between East Asia and the United States, and no economic gains would be felt from these acquisitions until well after the turn of the century.

¹⁰⁴ *San Francisco Call*, vol. 85, no. 169, May 18, 1899. California Digital Newspaper Collection, <http://cdnc.ucr.edu/cgi-bin/cdnc?a=d&d=SFC18990518.2.107>.

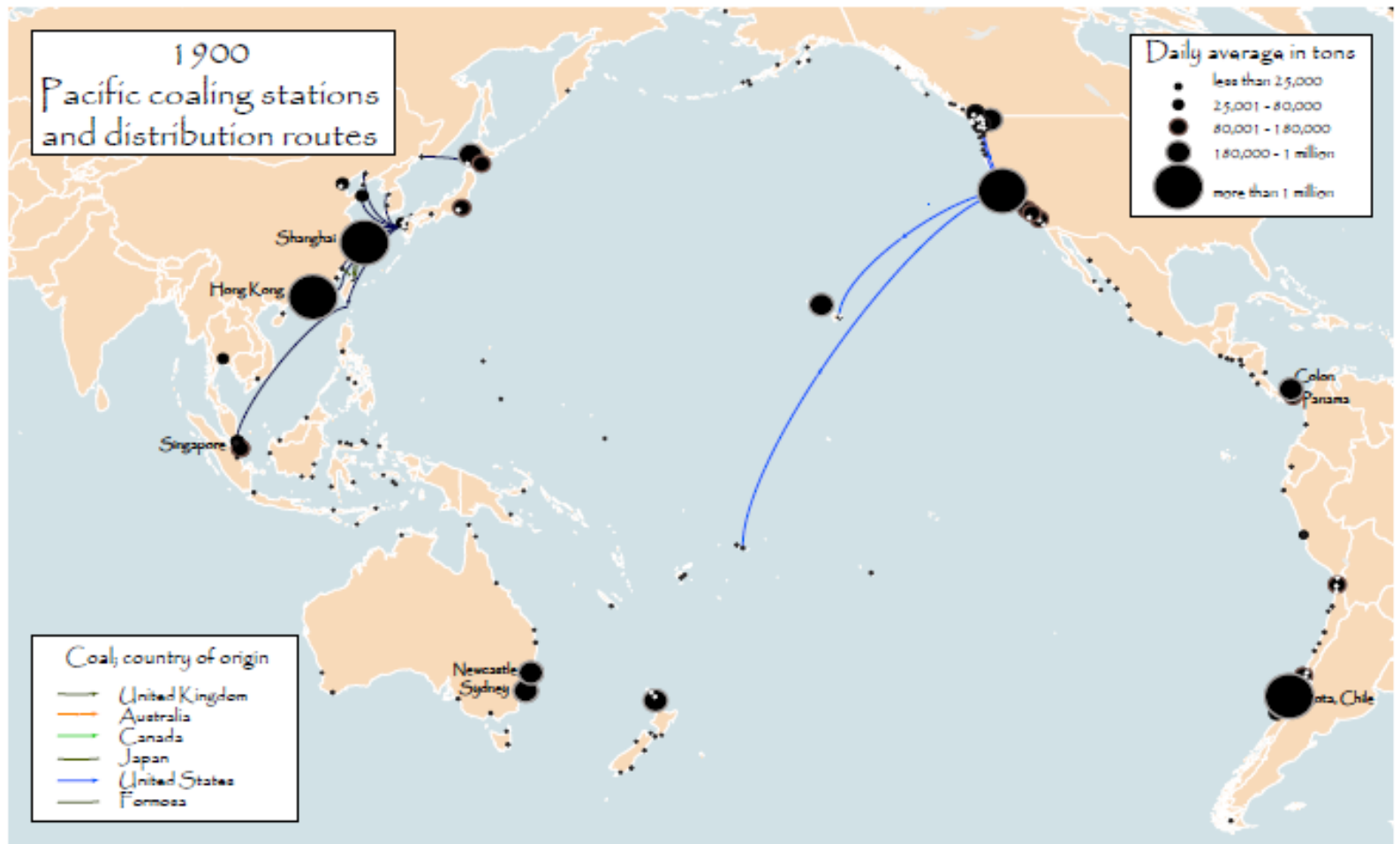


Figure 11 US coaling industry experienced no growth from 1884-1900

Summary

The exploration of these coaling stations reveals some common themes, the most obvious being that the vast majority were owned, operated, financed or supplied by British companies (see appendix). Alaskan coaling stations were supplied by Canadian collieries that financed by British capital. Most of the American coaling stations were at least partially supplied with coal from the United Kingdom, Australia or Canada. Most of these suppliers were financed with British capital and supported through British mining equipment and technology. Chile and Formosa are examples of how British firms not only developed the coaling industry in these regions, but a majority of infrastructure surrounding mining and shipping, including roads, shops, railroads and steam repairing facilities. Of all the 167 coaling stations in the Pacific, only eighteen of them operate without some form of British involvement.

Chapter IV: Methodology

The last two decades of the nineteenth century was a time of incredible change in the Pacific. The widespread of use of steamships was a major cause of this change. The steamship changed the dynamic of the mariner's world and introduced a completely new trade system. The changes brought by the steamship were fueled by coal that, during the age of steam, was the primary commodity. The quantifiable data within the 330 pages collected from the reports of the Office of Naval Intelligence illustrate a major component of this transformation. My primary goal with digitizing this data into a visual form was to explain this change over time quickly and easily. A secondary goal was to provide this data in a visual form that could be easily accessed and understood by other scholars studying this topic. I view the digital portion of my thesis as a component with diverse uses for future historical works.

There are a number of software programs that are used to map raw data. My choice to use Adobe Illustrator and Flash on this project had more to with benefitting my future career opportunities than it did this particular work. Skills in Illustrator, Flash, and the rest of the Adobe suite are versatile and have a broader use among many career paths. The purpose of this project was to take an underutilized data set and put this data into a digital visual representation so the information contained in this data set could be easily shared and understood.

The four reports from the U.S. Navy's Office of Intelligence that were used in this study consisted of a few pages of text and 330 pages of what essentially are nineteenth-century spreadsheets, with locations of coaling stations as each row and coaling

information in six columns describing where the coal came from, how much was readily available on an average day, and so on. These 330 pages are specific to the Pacific region, taken from the larger body of these reports that covers all the coaling stations of the world. Most of this project focused on the changes over time, from 1884 to 1900. The reports themselves changed considerably over this time as well, as new information was added to each report. The greatest challenge in accurately understanding the information was in accurately understanding place names. This was particularly challenging in the regions surrounding Hong Kong and Shanghai. Each of these major trading ports in China had six to ten coaling stations located in smaller towns very near the metropolis center, similar to U.S. suburbs. It is not common knowledge that Fremont and Queen Anne are parts of greater Seattle any more so than Sai Wan is part of greater Hong Kong; this is local knowledge that was poorly translated in the reports. Some of these locations were badly misspelled in the reports and a few of them were misspelled to the point of not being able to locate them exactly. Although the data used in this project focused on the 1884 and 1900 reports, the 1888 and 1894 reports were vital to the accuracy of place names. Changes in spelling and location of place names could be seen as trends throughout the four reports allowing for greater accuracy in mapping.

One of the greatest challenges to mapping data is choosing the right map. The Pacific ocean and the surrounding lands cover more than one-third of the globe. Illustrating the vast distances that were covered by the maritime industry operating in the Pacific during this time period was important to the visual representation of this project. My initial choice was to use an interactive orthographic globe provided by the open source website d3js.org, which allowed the user to move a 3D globe model with a mouse,

but the inability of this model to zoom to specific locations coupled the need for more advanced html coding caused me to choose more traditional two-dimensional maps. Of all the cylindrical and pseudo-cylindrical projections, which includes the well-known Mercator, the Robinson pseudo-cylindrical projection proved the least amount of distortion to the Pacific rim as it composed of distance values versus equidistant and equal-area values placed on other projections. The base map used in this project came from the open source Wikipedia and their WikiProject maps page. This map was created as a svg file, making its import into any Adobe program easy.

The base map is a global map, and thus there was some difficulty in sizing and fitting it to illustrate only the Pacific and its shores. The greatest challenge was getting the left side of the map containing the East Asia data onto the map without showing the rounded corners of right side, as the map was not square but oval. Some manipulation of the upper and lower right corners had to be done in order to fill the “blank” spots on the square presentation field. Choosing colors for the any map can be more challenging than you may think. Each part of the map consists of fill and stroke, where fill is color of the body of the item and stroke is color and size of the lines that make its border or outline. I chose pastel colors for the land and water and very thin white line for the stroke that makes up the national borders of each country as well as the shoreline. This choice served to de-emphasize the national borders, as they have little to with the showing the rest of the data. The colors chosen to represent the coaling stations and lines of distribution are bold and dark to make the layers of data stand out from the pastel colors of the base map.

Wikipedia was also invaluable to locating places in which the place name has changed one or more times of the past 130 years. Placing a black dot to represent each

coaling station on the base map took considerable time and effort. My twelve years of experience on the Pacific Ocean helped to find many of the locations that hold the same place name as they did 130 years ago, but a Wikipedia search on “Formosa” quickly led to Taiwan, and many other similar Wikipedia searches led to the accurate placement of other coaling stations.

Google Maps was very useful in placement accuracy. Searching for coaling station locations on Google Maps once the place name had been identified allowed me to zoom in tightly and identify coastal features such as harbor shapes or atolls. I would then zoom in on the base-map provided by WikiMaps and find the same coastal features. Although the 1900 maps have more than twice the number of locations as the 1884 maps, the 1900 place names, for the most part, remain today. Identifying locations in which the place name changed was much more of a challenge in the 1884 reports than it was in the 1900 reports. A number of conclusions can be drawn from this: I theorize that once telegraph communications systems had been established, most of the world referred to a place by its title at the time. A change in a place name after the global telegraph connection would have meant the whole world would have to change how they identified a location, which may have created much confusion. This may represent the growing western dominance and the end of the mariner’s world.

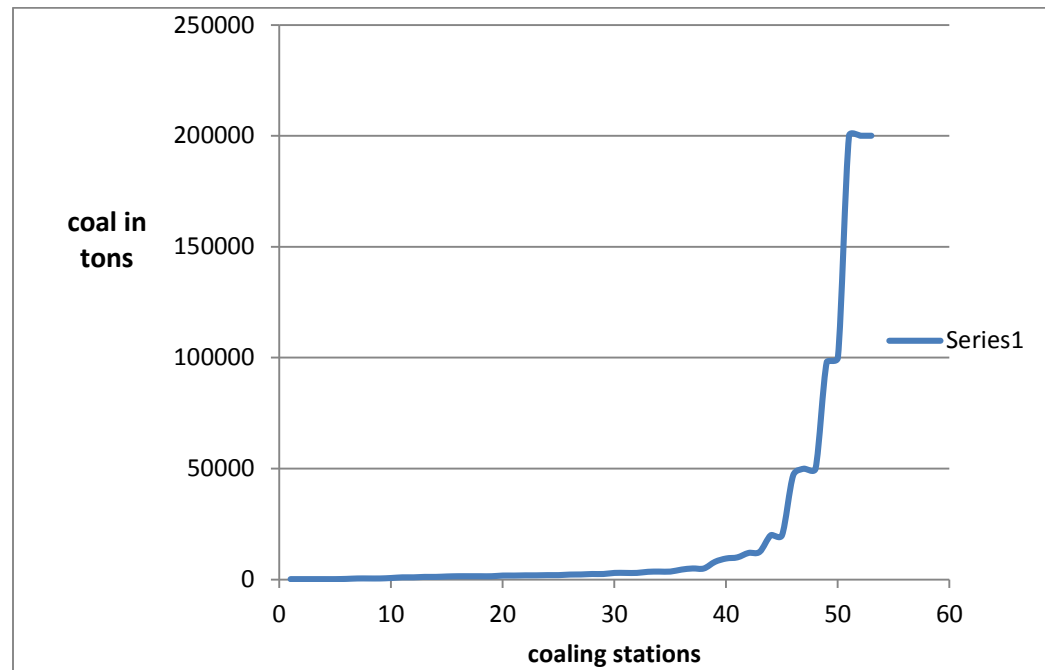
These maps illustrate a system of production, distribution, and consumption of coal throughout the Pacific Rim and the changes of this system from 1884 to 1900. Many of these stations were provided coal from mines that were very near the station, but the majority of these stations also imported coal from elsewhere. Illustrating the distribution of coal across the ocean is vital to understanding the broader global system. I chose to

illustrate the lines of distribution as shipping routes on the map. What I actually produced was a representation of shipping routes, not actual ones. In truth, there are very few shipping routes that can be drawn on an ocean map like roads on a land map. Most routes have two common paths, one for summer and another for winter. Most ships deviate from shipping routes to avoid weather. A ship captain from Vladivostok who ran a route to Seattle told me, “I won’t go north of Midway in the winter.” This adds three days to the Pacific crossing but it is much safer to both crew and cargo. The lines of distribution are a possible route of coaling ships, not a probable one.

A tough choice I had to make was how to group the distribution lines in a way that illustrates that the distribution of coal was a private enterprise. I reluctantly grouped them by coal-producing nations with the hopes that the written portion would clarify this. The difficulty in global maps is that they are generally divided by national borders. I could have labeled the 1,200 coal producers, thousands of coal-ship companies that handled distribution, and the hundreds of stations buying the coal—but this would have been a mess, not a map, and any message this would have portrayed would have been lost in overlapping labels. What the lines do illustrate is the point of origin of the coal itself. This does become important to the broader understanding of this system, as the quality of the coal was generally assumed during the late nineteenth century because of where it was mined.

Each dot representing a coaling station is a proportional symbol, meaning that the value placed on it is approximate. The value placed on the size of the dot illustrates the amount of coal the station had “on hand” according to the reports. These values were interpolated by placing all the coaling stations into an Excel spreadsheet column and the

amounts of coal (in tons) placed into another column. From this spreadsheet, I made a bar graph to find the natural breaks in the data.



1884 coaling stations daily average in tons

The natural breaks are visually obvious in this graph. Based on this graph I decided to make the breaks at 25,000, 80,000, and 180,000, with the latter being a “more than” category. After surveying the data from the 1900 report, this “more than” category needed adjustment, as there were stations such as San Francisco and Shanghai that had millions of tons on hand. The proportional symbol (black dot) that should have indicated the true proportion in relation to the other categories had to be scaled down in size, as the stations with millions of tons would covered too much of the map. In short, the largest symbols are not truly proportional to the others, but the visual point I was trying to make is clear.

I needed to quantify the influence of the British companies operating in the Pacific for my conclusions. It seems redundant to make an Excel spreadsheet from other spreadsheets, but I was the most straightforward way to get the information. This spreadsheet took a number of primary and secondary sources to complete. The 1900 report lists many of the collieries and companies operated at a specific coaling station, making it easy to identify ownership. Some required much more research. Additional sources are listed on the spreadsheet.

The greatest contribution to this work is the ability to easily share the digitized data set with others who may be researching a similar topic. These underutilized reports from the Office of Naval Intelligence have had little exposure in the historical record due to its format. Now this information can be easily disseminated and understood. Historians and students can digest the information taken from 330 pages of these reports in just twelve maps.

Chapter V: Conclusions

The case studies provide insight into some of the methods that British businesses used to stay ahead of their competition. In Canada, vertical integration was the key to success. Vancouver Island had become the favored port stop for large steamers, as Nanaimo had the best wharf with the fastest method of loading coal and at a reasonable price. Nanaimo Collieries used their railroad company to deliver coal to other coaling stations along the Canadian coast. They used their timber company to fell Douglas fir trees in the region and their shipping company to deliver both coal and timber to numerous locations about the Pacific.

In Australia, distribution of coal throughout the Pacific seemed to be owned by Australasian companies. Coal was a chief export and shipping was a business in which each territory took great pride. New Zealanders came to see themselves as the new caretakers of the southern Pacific. Competition between shipping companies in Australasia was fierce, and companies that were new to the region, such as German companies, were viewed as an unwelcome threat. Australian coal was king in 1884, but growth remained stagnant and other coaling companies filled the gap.

In Chile, price control kept British mining companies a comfortable distance from any competition. French and American companies had great difficulty in entering the Chilean market because British companies had flooded the market with cheap coal. These companies sacrificed profits in coal to gain profits in copper, silver, and nitrate mining—a reasonable sacrifice, as coal is the gateway to these other markets. Coal is necessary not only to shipping but in the mining processes themselves.

Formosa is an example of British entrepreneurs selling their equipment and knowledge of coal mining as a market alternative to buying the mining claims outright. The local governments in Formosa kept full control of distribution as way to prevent the hired British mining companies from taking control of the coaling industry. Formosa is a prime example of the strategic value of the coaling station, as Russian, French and Japanese forces all began their military incursions at Coal Harbor where the coal was.

For the United States, their time had not yet begun in the Pacific, at least not economically. Hawaii had become a commercial center, and American investment grew to the point in which those investors living in Hawaii began to push for U.S. annexation in the 1880s. By 1900, the Hawaiian monarchy had been overthrown and the islands had become a U.S. territory. The amount of U.S. investment in Hawaii is unique in the rest of the Pacific, where a lack of U.S. investment is the common theme. In Borneo, American entrepreneurs failed where British entrepreneurs succeeded because their initial capital investment was ten times that of their American competitors. A lack of investment and lack of interest from private companies could be seen in Samoa, Guam, and the Philippines. Investment and business gravitated towards more domestic, and more secure, ventures. For British investors this was not a risky business, this was their business. Investing in coaling stations, trading ports, and overseas imports and exports was a major capital corridor, something London-based investors were very familiar and comfortable with.

What began as a study into coaling stations as a component of the Pacific trade system became an exercise in quantifying the influence of British private enterprise. This essentially is a study of some of the first multinational energy corporations. Of all the 167

coaling stations in the Pacific, 81 percent of them are at least partially supplied by a British company. British companies are the sole supplier to 71 percent of the stations, and own 34 percent of the stations outright. If you control the fuel, you control the trade. This is a concept that British companies seemed to pursue collectively and had become exceedingly efficient at executing. This domination of the fuel supply directly correlates to the domination of the steamship economy. Abraham Berglund's article in the *American Economic Review* on steamship commerce published in 1920 quantifies and compares American companies to those of the British. Berglund tabulates the global British maritime commerce in 1914 at 18,892,000 tons, while the United States stood at 2,027,000 tons the same year.¹⁰⁵ British steamships carried nine and one-half tons for every ton carried by American ships in 1914.

This domination also influenced political ties as well. British coal and mining companies in Chile and Japan were supported by investors in London via Chilean and Japanese government bonds that were purchased on the London Stock Exchange, which enabled British collieries or investor groups to maintain exclusivity in those regions.

British-owned companies had created a cartels and monopolies in the Pacific. Other companies may have sought to interrupt such monopolies, such as the American-owned and government-subsidized Pacific Mail Steamship Company operating in Panama.¹⁰⁶ Here, steamships were refueled by lightering. The steamship anchored in the harbor and coal was brought to it by lighters, small flat-bottomed barges that would lay alongside the vessel that would lift the coal from the barge into its holds. In Panama, all the lighters were owned and operated by the Pacific Mail Steamship Company. An

¹⁰⁵ Berglund, "The War and the World's Mercantile Marine," 30.

¹⁰⁶ 1900 report, 66.

estimated two-thirds of the coal supply being consumed in Panama came from England and Australia, but it could not reach its customers without contracting the American-owned lighters. Similarly, coal distribution in Formosa was controlled solely by the Chinese or Japanese administrative bodies, most likely to prevent the British private companies producing coal from having total control of the Formosan coaling industry.

The British domination of the fuel supply also played a part in determining the outcome of some military conflicts in the Pacific just after the turn of the century, such as the Russo-Japanese War of 1904. Lamar J. R. Cecil's article, "Coal for the Fleet That Had to Die," summarized the difficulties that the Russian Navy's Baltic fleet had in fueling its vessels. The majority of coaling stations in the East Asia were either owned, operated, or supplied by British companies, none of which were willing to endanger the treaty the United Kingdom had with Japan by selling coal to the Russian Navy. The Russian Navy attempted to contract the German-owned shipping company Hamburg-American Line to carry coal supplies from Germany to non-British-operated coaling stations in the Dutch East Indies, a contract that failed due to German/Russian political negotiations. The Russian Navy's Baltic fleet was able to take on coal in the French-owned Saigon coaling station, but after the 2,800-mile journey to the battle zone in the Tsushima Straits between Korea and Japan, the fleet had little coal left in its holds. It took the Japanese Navy less than two days to destroy the Russian fleet.¹⁰⁷

In the 1880s, Samoa was loosely governed by native monarchies that battled at times with a rival groups vying for power. Samoa had trading posts and merchants from France, Britain, and the United States, but none more influential than the German firm

¹⁰⁷ Lamar J. R. Cecil, "Coal for the Fleet That Had to Die," *American Historical Review* 69, no. 4 (July 1964): 990-1005.

Godeffroy and Sons. The famous author Robert Louis Stevenson gave a firsthand account of what would later be referred to as “The Samoan Crisis.” Stevenson’s account, *A Footnote in History: Eight Years of Trouble in Samoa*, describes the German firm as having plantations of 10,000 acres, each with seven or eight hundred men imported for labor from other Pacific locales, to work with Samoans. Stevenson stated that “the whip was very busy at these plantations.”¹⁰⁸ As the two native factions skirmished with one another, the German firm tried to administer its own rule of law to protect the plantations and keep their labor groups from escaping into the bush to fight. Failing in this, the firm opted for the German Navy to take control. Five German warships entered the harbor through military force, overthrew the Samoan monarchy in Apia, on the island of Upolu (the Samoan archipelago is five islands). The entrance of the German military into Samoan affairs was viewed as unjust by British and American merchants. The British merchant ship *Richmond* came to Apia after the overthrow loaded with weapons and ammunitions for the overthrown monarchy. The German Navy seized the cargo as it was unloaded and declared martial law throughout all of the Samoan archipelago. American and British merchants were arrested, in some cases aboard their own ships, The *Samoan Times* and other newspapers were shut down. Samoan factions that had fought against each other now cried for support and protection from the British and American merchants, who responded to the German Navy’s occupation in kind. Negotiations ensued between the three governments as each anchored warships in the harbor in

¹⁰⁸ Robert Louis Stevenson. *A Footnote in History: Eight Years of Trouble in Samoa*. Transcribed from the 1912 Swanston edition by David Price. Project Gutenberg. <http://www.gutenberg.org/files/536/536-h/536-h.htm>.

preparation for war. On March 15, 1889, a hurricane blew through and destroyed all of the warships, ending any possible military action for any party.¹⁰⁹

The Berlin conference in June of 1889 divided the Samoan archipelago among the three parties, established that Samoans would hold a sovereignty and a government of their choosing, and that government would be paid for by merchants on the islands as well as taxes collected from Samoans. Stevenson, who had witnessed the Samoan crisis, recalled that a native orator said, “Who asked the Great Powers to make laws for us? To bring strangers here to rule us? We want no white officials to bind us into the bondage of taxation.”¹¹⁰

Tensions between German and American governments concerning Samoa would continue for decades. The *San Francisco Call* announced on May 18, 1899, that the U.S. government was building a coaling station in Pago Pago for naval use.¹¹¹ This may have been what drove the renegotiations that culminated into the Tripartite Agreement that same year, in which Samoa was divided between the two governments and Samoans lost any sovereignty or independence that had remained.

A number of parallels can be drawn from the Samoan experience. Similar processes had unfolded in similar ways in the eastern Americas, with British French and American governments vying and fighting for territorial control, drawing treaties with Native Americans who ultimately lost all sovereignty after negotiating and fighting against whites and themselves. The situation in Samoa can certainly be compared to the

¹⁰⁹ Stevenson, *Footnote in History*.

¹¹⁰ Stevenson, *Valima Papers and Footnote to History*. New York, 1925. Joseph Waldo Ellison, “The Partition of Samoa: A Study in Imperialism and Diplomacy,” *Pacific Historical Review* 8, no. 3 (1939): 259–88.

¹¹¹ *San Francisco Call*, vol. 85, no. 169, May 18, 1899. California Digital Newspaper Collection. <http://cdnc.ucr.edu/cgi-bin/cdnc?a=d&d=SFC18990518.2.107>.

Hawaiian monarchy, who had done well to adapt to the flood of white merchants and maintain sovereignty until the pressures of the steamship economy became too great. The monarchy fell to a rebellion led by mostly American sugar plantation owners in 1887, where the Bayonet Constitution and the Committee of Safety governed instead until annexation in 1898, finally becoming a U.S. territory in 1900. It is a familiar story of imperialism, found in many places and over a long period of time. Samoa, Hawaii, and many other Pacific locales illustrate the rapid change in the late nineteenth century from entrepreneurs seeking revenue, to competition that led to conflict among Western nations and the subjugation of indigenous peoples.

The steamship economy did not begin 1884 nor did it end in 1900, but this sixteen-year period marks the heart of the transformation caused by the entry of the steamship into the mariner's world. Coal became the main commodity in which all the transport of all other commodities relied upon. A focus on the exponential growth of coaling stations and the immeasurable amount of coal produced, distributed, and consumed during this sixteen-year period is one unit of measurement of the depth and breadth of this change. The study of coaling stations illustrates the broader impacts and outcomes of the new steamship economy and does so in way that includes indigenous connections. Capitalism is the driving force of this change, and its transnational ties across the Pacific are what spurred the transformation from a mariner's world to the new steamship economy.

This work is an attempt to establish a narrative on the origins and development of an integrated and globalized economic system, one in which the Pacific is not viewed as segregated regions with individual spheres of influence, but as whole, tied together by

transnational capitalist ventures that came before any Western government influence. It was these entrepreneurs who first shifted large populations of labor about the Pacific, who established coaling stations that changed the landscape of harbors and the daily routine of Pacific islanders. It was these individuals who purchased steamships that accelerated import and export and created the need for more tons of cargo to be shipped rapidly in both directions.

As mentioned before, the age of coal-powered commerce did not end at the turn of the century, but it was bookmarked by the emergence of petroleum-powered steamships. One of the reasons that American investment and interest in competing in the British-dominated coaling industry is that, instead of fighting for space in the crowded coaling station arena, it may have been that investors on Wall Street looked forward to the next technological tide. American investment in shipping had remained strong in the domestic realm and weak in the Pacific. The development of oil fields coupled with the petroleum-fired boilers in steamships, both beginning in earnest in the 1890s, may have been what American investors looked towards as a way of counterbalancing the global domination of shipping held by British shipping companies.

The narrative of the impact of steamships has been illustrated outside the context of nation-states and colonies. Placing the Pacific in a maritime space as defined by a mariner's world transformed by the new steamship economy brings the Pacific islands and the Pacific Rim into a single interpretive framework. It becomes difficult to cast off the lateral and horizontal approaches to the study of imperialism. Placing the steamship and coal that drives it at the center, the narrative then illustrates the circulation and connections brought by maritime commerce. It brings indigenous relations into the fold,

those often caught between the excessive demands of traders and shippers and the power of colonialism. The concept of the mariner's world and the new steamship economy allows us to view the ocean as a real space in which people interacted. The ocean-centered viewpoint provides a better understanding of the ways in which these larger histories were lived and experienced. In the mariner's world, the ships voyaging the Pacific numbered in the hundreds, each as its own sovereign place with its own unique set of cultural exchanges between the crew and those the ship encountered on its journeys. According to Berglund's estimates, the number of steamships plying the Pacific in the first decade of the twentieth century was over 30,000.¹¹² These exchanges were no longer the personal, individual definable moments they were before the steamship but were watered down by the sheer volume, one stop in an endless list of port calls and timetables, part of a trade system that had covered the globe and devoured the culture of the mariner's world along with millions of tons of cargo and coal.

¹¹² Berglund, "The War and the World's Mercantile Marine," 239, table 4.

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Appendix

The spreadsheet below quantifies British influence in Pacific coaling stations with columns categorizing the coaling stations that were British owned, operated, financed, solely supplied and partially supplied.

Pacific operations of British coaling companies

-partial supplier	129/160	(81%)
-sole supplier	113/160	(71%)
-financed	68/160	(43%)
-owned, operated	54/160	(34%)

coaling station	owned	operated	financed	sole supplier	partial supplier
AK Cape Sabine					
AK Cape Lisburne					
AK Port Clarence					
AK Herendeen Bay					
AK Unalsaska				x	
AK Iliuliuk				x	
AK Dutch Harbor				x	
AK Coal Harbor					
AK Kachemak Bay					
AK Kodiak				x	
AK Sitka					
CA Skidgate Inlet			x	x	
CA Fort Rupert			x	x	
CA Comox			x	x	
CA Nanaimo			x	x	
CA Vancouver			x	x	
CA Union Wharf			x	x	
CA Victoria, Esquimalt	x	x	x	x	
CA Union Wharf			x	x	

US New Whatcom					
US Fairhaven					
US Port Townsend					X
US Port Angeles					
US Seattle					X
US Tacoma					X
US Olympia					
US Astoria				X	
US Portland					X
US Coos Bay					
US San Francisco					X
US Mare Island				X	
US Santa Cruz					
US Monterey				X	
US Santa Barbara					
US Los Angeles				X	
US San Pedro				X	
US San Diego					X
MX La Paz					
MX Guaymas					
MX Altata					
MX Mazatlan				X	
MX Acapulco					X
NIC Corinto					X
COL Panama					X
ECU Guayaquil					X
PER Callao	X	X	X	X	
CHL Arica	X	X	X	X	
CHL Pisagua	X	X	X	X	
CHL Iquique	X	X	X	X	
CHL Tocopilla	X	X	X	X	
CHL Antofagasta	X	X	X	X	
CHL Caldera	X	X	X	X	
CHL Carrizal	X	X	X	X	
CHL Coquimbo	X	X	X	X	
CHL Valparaiso	X	X	X	X	
CHL Talcahuano	X	X	X	X	
CHL Coronel	X	X	X	X	
CHL Lota	X	X	X	X	
CHL Lebu	X	X	X	X	
CHL Corral, Valdivia	X	X	X	X	
CHL Port Yanez			X	X	
CHL Sandy Point			X	X	

US Honolulu	?	?	?	x	x
US Kahului				x	
US Hilo					
Tahiti				x	
US Am. Samoa					
GMY Apia Samoa				x	
Tonga				x	
Fiji				x	
FRA New Caldonia					
GMY New Britian (Bismark Is.(				x	
DNK New Guinea					
DNK Ternate Indonesia				x	
DNK Amboyna Indnesia				x	
DNK Banda Indonesia				x	
DNK Buton Indonesia				x	
DNK Gorontalo Indonesia				x	
DNK Kema Indonesia				x	
DNK Menado Indonesia				x	
DNK Kwandang Indonesia				x	
DNK Tontoli Indonesia				x	
DNK Macassar Indonesia				x	
Bima, Sunda Islands	x	x	x	x	
Kupang, Sunda Islands	x	x	x	x	
Dilli, Sunda Islands	x	x	x	x	
AUS Darwin (UK)	x	x	x	x	
AUS Port Kennedy (UK)	x	x	x	x	
AUS Cooktown (UK)	x	x	x	x	
AUS Townsville (UK)	x	x	x	x	
AUS Maryboro (UK)	x	x	x	x	
AUS Brisbane (UK)	x	x	x	x	
AUS Newcastle (UK)	x	x	x	x	
AUS Sydney (UK)	x	x	x	x	
AUS Port Adelaide (UK)	x	x	x	x	
AUS Albany (UK)	x	x	x	x	
AUS Freemantle (UK)	x	x	x	x	
Hobart Tasmania (UK)	x	x	x	x	
Lanceston Tasmania (UK)	x	x	x	x	
NZ Russell (UK)	x	x	x	x	
NZ Whangerei (UK)	x	x	x	x	
NZ Auckland (UK)	x	x	x	x	
NZ Napier (UK)	x	x	x	x	
NZ Wellington (UK)	x	x	x	x	
NZ Nelson (UK)	x	x	x	x	

NZ Lyttlelton (UK)	x	x	x	x	
NZ Dunedin (UK)	x	x	x	x	
NZ Bluff Harbor (UK)	x	x	x	x	
NZ Greymouth (UK)	x	x	x	x	
Petropauiovski Kamchatka					x
Vladivostock					
JPN Otaru			x	x	
JPN Hakodate			x	x	
JPN Yokahama			x	x	
JPN Yokosuka			x	x	
JPN Kobe			x	x	
JPN Nagasaki			x	x	
JPN Kuchinotsu			x	x	
JPN Misumi			x	x	
JPN Sassebo			x	x	
JPN Karatsu			x	x	
JPN Hakata			x	x	
JPN Simonoseki			x	x	
JPN Moji			x	x	
JPN Chemulpo Korea				x	
JPN Kheum Korea				x	
CHN Port Authur					
CHN Niuchwang					
CHN Taku					
CHN Tientsin					
CHN Chefoo			x	x	
CHN Chinkiang (Yangsee River)					
CHN Wuhu					
CHN Hankow					
CHN Ichang					
CHN Shanghai		x	x	x	
CHN Ningpo					x
CHN Foochow					x
CHN Amoy					x
CHN Swatow					
CHN Hong Kong	x	x	x	x	
Keelung Formosa		x			
Tamsui Formosa		x			
CHN Canton					x
Saigon Cochin China				x	
Bankok Siam				x	
Manila Philippines				x	
Iloilo Panay Philippines				x	

Caroline Islands				
Marshall Islands				x
Labuan Borneo	x	x	x	x
Kuching Sarawak	x	x	x	x
Pontianak Borneo	x	x	x	x
Banjermassin Borneo	x	x	x	x
Pulo Laut Borneo	x	x	x	x
Koti Borneo	x	x	x	x
Surabaya Java	x	x	x	x
Batavia Java	x	x	x	x
Palembang	x	x	x	x