Travel, Coal, and Empire: Delineations of Formosa in Nineteenth-Century English Travelers' Coal Texts

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Abstract

Prior to the mid-nineteenth century, Formosa (now Taiwan), was little known to European and American travelers. There was a great abundance of coal, both north and south of the island; as a fuel that could be excavated relatively easily and of value, coal impelled the entry into Formosa of Western explorers, navy investigators, merchants, and naturalist scientists beginning in the mid-nineteenth century. These travelers went on to document the island's virtually unknown landscapes and natural resources, including its coal. This paper focuses on the "coal texts" of six nineteenth-century English travelers who visited Formosa between 1840 and 1895 — Lieut. M. Gordon (1818-1848), Robert Swinhoe (1836-1877), Cuthbert Collingwood (1826-1908), Cyprian Arthur Bridge (1839-1924), Archibald Ross Colquhoun (1848-1914), and James H. Stewart-Lockhart (1858-1937). It explores the historical and cultural underpinnings of coal in the island's eco-geopolitical history and is interested to examine the ways these travel writings represented Formosa's coal mines. It addresses the following questions: How might these coal narratives reveal an environmental consciousness embedded in the history of imperial excavation? What might be the links between nineteenth-century imperial motivations and representations of Formosan coal?

Keywords: coal texts, British imperial travel writing, Formosa, ecological consciousness, proto-environmental sensibility

From the late 1980s, climate change began to emerge as a serious environmental problem, attracting growing attention from scientists, policymakers, and the public around the globe. As a significant global environmental issue, climate change is expected not merely to deteriorate the ecosystem but also to have a serious impact on human life. Among the contributors to climate change, coal plays a major and important role. As early as December 7, 1912, *The Braidwood Dispatch and Mining Journal* had already voiced the close connection between coal and climate change in a very short essay titled "Coal Consumption Affecting Climate":

> The furnaces of the world are now burning about 2,000,000,000 tons of coal a year. When this is burned, uniting with oxygen, it adds about 7,000,000,000 tons of carbon dioxide to the atmosphere yearly. This tends to make the air a more effective blanket for the earth and to raise its temperature. The effect may be considerable in a few centuries.[1]

People's overwhelming reliance on coal in the nineteenth and twentieth century has spawned ecological damage and climate change, both locally and globally. As a matter of fact, the drive for coal during the nineteenth century is linked inextricably to the histories of colonialism and imperialism in Pacific island countries, especially Formosa (now Taiwan), located in East Asia. The Island of Formosa possesses a great abundance of coal in many parts both south and north, particularly in the hills around Keelung. As a valuable item in trade and as a fuel that could be excavated easily and of

increasing value to Westerners, coal impelled the entry of Western explorers, navy investigators, merchants, and naturalist scientists into nineteenth-century Formosa.

Formosa, or Ilha Formosa, meaning the "beautiful island," was named by passing Portuguese sailors in the sixteenth century (Carrington 3).[2] In the seventeenth century, the hope of trade lured the Dutch and Spanish to Formosa. The Island of Formosa was colonized by the Dutch in the seventeenth century; the Spanish built a settlement in northern Formosa for a very brief period but were driven out by the Dutch in 1642 (Carrington 3-4). When the Dutch ruled the island in the seventeenth century, coal "was mined in small quantities around Keelung" (Carrington 54). In 1662, Zheng Cheng-gong, a loyal soldier of China's Ming dynasty, defeated the Dutch and established a base of operations in Formosa, but his troops were defeated by China's Qing dynasty in 1683 (Carrington 4-5). From 1683 to 1895, the Qing empire ruled Formosa and in 1895 Taiwan was ceded to Japan.[3] The renewed foreign interest in Formosan coal developed between 1840 and 1895. Coal, this particular natural production being of great value in trade, impelled the first entry of Western sailors and travelers into mid-nineteenth century Formosa. In 1847, Lieut. M. Gordon (1818-1848), a mariner and an officer of the British Navy, made a visit on the ship "Royalist" to the Keelung coalfields and discovered "the abundance and the good quality of coal" (Yen 48). In 1848, "an advance in the price of London coal" had coincided with discoveries of "the availability and potential of Formosan coal"; English travelers recognized the advantages of obtaining coal locally in Formosa "rather than having it shipped out from mines in England" (Carrington 62, 55). As a matter of fact, in the second half of the nineteenth century the island of Formosa experienced "many years of tension and conflict during which the western power" (England, the United States, and France) and Japan became the prime competitors for control of the island (Gordon iv). The interest of these foreign powers was chiefly stimulated by their mercantile motives, great need for coal, and "expanding sense of empire and an awareness of the strategic balance of power in the far East" (Gordon vi). During the mid- and late nineteenth-century, both the British and Americans in the Far East were eager to arrange for the export of Formosa's valuable fuel — coal (Carrington 63). While American interest was revealed by "the action of Commodore Mathew Perry and Dr. Peter Parker who believe[d] that America should extend her influence" to Taiwan, British interest was mainly in establishing commercial enterprises in Formosa (Gordon vi). All this contributed to Formosa becoming an international prize in the second half of the nineteenth century, and makes Taiwan a compelling case study today.

Meanwhile, Qing rule gradually collapsed during the second half of the nineteenth century; in the Opium Wars of 1839-1842 and 1856-1860, the British army easily defeated the Qing forces.[4] Following Qing China's defeat, Britain, stimulated by a growing and expanding trade,

imposed unequal treaties on the defeated Chinese and forced the Qing to open up many ports for foreign trade, including ports in Formosa (Carrington 21-22). In 1860, the Qing government's ratification of the Treaty of Tientsin allowed the opening of Formosa's ports (Carrington 22). After the opening of Formosa's Ta-kau Port, Tamsuy Port, and Keelung Port for trade in 1860, plenty of Westerners (including first diplomats, imperialist business adventurers, natural history scientists, proselytizing missionaries, and legitimate merchants) visited Formosa. These travelers – such as Cuthbert Collingwood (1826-1908), Robert Swinhoe (1836-1877), and Joseph Beal Steere (1842-1940) – made observations about and documented the virtually unknown landscapes and natural resources, especially coal, of Formosa; a few among them (Collingwood and Steere) also traveled to Formosa's neighboring countries, such as Labuan (a federal territory of Malaysia) and the Philippines. Generally taking the form of travel narratives or natural histories, the writings of these Western travelers were pioneering texts that delineated Formosa's coal mines in the nineteenth century.

This paper focuses on the coal texts written by six nineteenth-century English travelers who visited Formosa between 1840 and 1895 – Lieut. M. Gordon (1818-1848), Robert Swinhoe (1836-1877), Cuthbert Collingwood (1826-1908), Cyprian Arthur Bridge (1839-1924), Archibald Ross Colquhoun (1848-1914), and James H. Stewart-Lockhart (1858-1937) – to explore the historical and cultural underpinnings of issues surrounding coal in nineteenth-century Formosa and to examine how these Westerners represented Formosa's coal mines. Specific questions addressed are: How might the texts on Formosa's coal relate to environmental writings or traveling natural histories? What are the intricate links between nineteenth-century English travelers' imperial motivations and their representations of Formosa's coal? How did Swinhoe, Collingwood, Gordon, Bridge, Colquhoun, and Stewart-Lockhart report their observations of Formosa's coal and how did these writers introduce their readers to the mining of coal in Formosa? How were these writers' works about Formosan coal circulated globally? Are there different ways in which coal is discussed or represented in their texts? Do nineteenth-century English travelers' coal texts describe the broader environment in which Formosan coal was located? Do any of the coal texts articulate environmentalist concerns?

Coal Texts, Imperial Motivations, and Environmental Representations

Before the mid-nineteenth century, Formosa was little known and largely unexplored by foreigners. After Lieut. Gordon's "discovery of rich seams of workable coal on the island of Formosa" in 1847 and after a number of Formosa's ports had been opened for trade by the Western Powers in 1860 (Carrington 56), a great number of English travelers visited Formosa. Through their writings, these

visitors – Gordon, Bridge (an English naval officer who was on a ship calling at Keelung in 1875), Colquhoun (a British traveler), Stewart-Lockhart (a British explorer), Swinhoe (an English naturalist and scientist who served as First Consul in Formosa), Collingwood (a British natural scientist who journeyed to Formosa, Borneo, Singapore, and Labuan), and John Dodd (1838–1907, an English merchant who helped promote Taiwan Tea to America) – provide a plethora of natural history information on Taiwan's coal resources. In 1848, Gordon's essay, "Observations on Coal in the N. E. Part of the Island of Formosa," was presented at a meeting of the Royal Geographical Society in London; in 1949, it was published in the *Journal of the Royal Geographical Society* (Otness 63). Touring Keelung and its neighboring areas in 1875, Bridge detailed Formosan coal in an essay titled "An Excursion in Formosa," which was published in *Fortnightly Review* (Otness 20). Like, Bridge, Colquhoun made a brief visit to Keelung in 1884; he and Stewart-Lockhart authored "A Sketch of Formosa," which appeared in *The China Review* in 1885 (Otness 33, 150). Swinhoe, another visitor to nineteenth-century Formosa, traveled throughout Taiwan, recording his observations of Formosa's coal resources in an essay titled "Notes on the Island of Formosa" published in the *Journal of the Royal Geographical Society of London* in 1864. Like Swinhoe, Collingwood also traveled around the Island of Formosa. He accompanied a British Naval expedition on the vessel Serpent to South East Asia in 1866-1867 (Otness 32-33), and wrote very detailed accounts of Formosa, Labuan, Manila, and Singapore in *Rambles of a Naturalist on the Shores and Waters of the China Sea: Being Observations in Natural History during a Voyage to China, Formosa, Borneo, Singapore, Etc., Made in Her Majesty's Vessels in 1866 and 1867*. He also published a scholarly article about Formosa's coal – "On Some Sources of Coal in the Eastern Hemisphere, Namely Formosa, Labuan, Siberia, and Japan" – in the British journal *The Quarterly Journal of the Geological Society of London*.

Composed as travel narratives, the aforementioned works of Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood can all be described as "coal texts"; in the chain of history and ecology (particularly of the nineteenth century), coal plays a significant role. With the development of steamships in the mid- and late nineteenth century, England was dependent on coal. The people of London and other places of the time were reliant on coal as a source of heat and energy (Netzley 43); coal was "indispensable for domestic purposes" (Jevons 1). In *The Coal Question* (1865), one of the earliest environmental books to address issues about coal and air pollution, William Stanley Jevons declared that the nineteenth century was called the "Iron Age" and "the Age of Coal" because "as the source especially of steam and iron, coal is all powerful" and because "coal alone can command in sufficient abundance either the iron or the steam" (1-2). During the mid- and late nineteenth century, English travelers' interest in the Island of Formosa was stirred by the need to find coaling stations in

the Orient and especially by "the need for coal which was found readily accessible in northern Formosa" (Gordon v).

In the light of this historical context, this paper draws from the definition of environmental texts provided by ecocritic Lawrence Buell in *The Environmental Imagination: Thoreau, Nature Writing, and the Formation of American Culture*. Buell positions coal texts as "environmentally oriented work[s]" in that they demonstrate that "the nonhuman environment is present not merely as a framing device but as a presence that begins to suggest that human history is implicated in natural history" (7). In the coal texts written by nineteenth-century Western travelers, coal and its surroundings – "the nonhuman environment" – play significant parts; the natural histories of coal are minutely represented. Natural history was generally used to refer to the study of all aspects of the environment; it recorded information related to all environmental productions, including coal. Natural history draws on scientific knowledge about nature, and in this sense, its "scientific bent" is a characteristic feature of natural history (Murphy 45). However, natural history is also a kind of belles-lettres, for the genre documents a world captured by human observers in a particular cultural frame (Tallmadge 291-292). As both science and belles lettres, natural history is hence a "narrative practice" of humans (particularly Europeans) observing natural phenomena and representing the environment (DeLoughrey, Gosson, and Handley 5). Since many natural history writers – such as Swinhoe and Collingwood – combine their inquiry into nature with a narrative of their journeys, it is expected that traveling natural history provides an eyewitness account of the environment encountered during one's travels.

In the coal texts (also traveling natural histories) of Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, Collingwood, and many other foreign visitors, "the nonhuman environment" (as Buell calls it) – coal mines in particular – is deeply embedded in imperialist ideas of Formosa; natural resources (especially Formosan coal) have constituted the local environment. During their travels, Western travelers frequently described the natural resources (such as sugar, tea, sulphur, petroleum, and coal) they encountered and provided important early records of Formosa's environmental productions. In their works, these writers consistently reported the abundant natural resources of Formosa. The following passage from Colquhoun's and Stewart-Lockhart's "A Sketch of Formosa" offers an example:

> Like all countries shrouded in mystery, Formosa was credited with fabled treasures of the earth, the field, and the forest. It was to be an EL Dorado for the merchant and miner. (188)

Showing the obviously commercial purpose of Colquhoun's and Stewart-Lockhart's visit to Formosa, this passage, like most other nineteenth-century accounts of Taiwan, reveal continuing connections between economic interests, environmental representations, and imperialist ideas of Formosa. Through their appropriation of nature as an exploitable resource or capitalist commodity, imperial motivations and economic interests entered Colquhoun's and Stewart-Lockhart's environmental discourse.

The report on Formosa's abundance of coal mines can also be found in the ensuing lines from Dodd's "Formosa":

> Coal is the principal export of Kelung […]. The coal seams in the neighbourhood of Kelung and in the northern hills as far as the centre of the island are practically inexhaustible. (569)

Alerting the outside world to the economic potential of the island of Formosa, numerous nineteenth-century accounts of Formosan coal served as promotional writings in which the primary concern was the utilitarian or commercial dimension of nature. Seeking to exploit economic possibilities in Formosa, the English trader Dodd felt the country to be rich in potential export items. Attempting to entice readers with the prospects of Formosa's coal mines, Dodd's coal text placed emphasis on the capitalist and colonial aspects of the representation of nature.

The coal texts by nineteenth-century Western travelers who visited Formosa are deeply embedded in "capitalist-intensive western economic forces," as Richard H. Grove observes in *Green Imperialism: Colonial Expansion, Tropical Island Edens and the Origins of Environmentalism, 1600-1860*; these texts shared a common economic narrative regarding the natural environment they represented (2). As Timothy Sweet explains in his essay "Economy, Ecology and Utopia in Early Colonial Promotional Literature," promotional writings articulated fundamental perceptions of the environment and natural resources, while encoding complex ecological and economic theories (399-401). Promising new possibilities for harnessing the plenitude of nature, Formosa invited foreign travelers to delineate their natural assets – especially coal – and to develop modes of economy based on new networks of resource and information exchange. In their writings, Gordon, Swinhoe, Dodd, Collingwood and most nineteenth-century traveling natural historians expressed the colonial desire to know and to exploit the land. Colonial powers, as Elizabeth DeLoughrey, Jill Didur, and Anthony Carrigan postulate in *Global Ecologies and the Environmental Humanities: Postcolonial Approaches*, "render the landscape into resources to be owned cultivated, or simply extracted" (12). The coal texts of Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood, in a word, attest to

the interdependent relationship between colonial greed and representations of Formosan coal.

The connections among coal texts, environmental representations, and imperialist motivations can also be found in the following passage from the "Address to the Royal Geographical Society of London" delivered by W. J. Hamilton, the president of the Royal Geographical Society of London. Published in *The Journal of the Royal Geographical Society of London* in 1849, this address introduced Gordon's "Observations on Coal in the N. E. Part of the Island of Formosa":

> A communication by Lieut. Gordon, on the discovery of rich seams of workable coal on the island of Formosa, has also been read for you. In the present day, when steam navigation is extended all over the world, the discovery of new mines of coal in different quarters of the globe assures an importance and an interest which the geographers cannot overlook. The future progress of navigation and discovery will become dependent on sufficient supplies of this material, and we therefore hail with satisfaction its discovery in such various and distant lands. (Hamilton xlix)

Lieut. Gordon made a visit to the Keelung coal mines on the ship "Royalist" in 1847; it is "the first occasion on which Westerners entered Formosa in the nineteenth century" and the ultimate objective or motive for the "Royalist" visit was for the future of a particular item of value in trade — coal (Carrington 56). Because of the development of steam navigation in the nineteenth century, coal became a valuable merchant's item for export and Keelung became a place to be exploited by foreigners for its natural resources. Emphasizing foreign naval and mercantile interest, this excerpt alerts readers to the commercial dimensions of Formosa and reveals the historical embeddedness of coal in the British imperial enterprise. Asserting that "future progress of navigation and discovery will become dependent on sufficient supplies of this material [Formosan coal]," Hamilton in this passage made explicit the otherwise implicit connections between coal texts, economic interest, and colonialism (xlix). Revealing the desire to exploit the coal in "distant lands," these lines echo Edward Said's notion of Orientalism. Orientalism, as has been formulated by Said, connotes the "attitude of nineteenth-century and early-twentieth-century European colonialism"; it is a "corporate institution" empowered to deal with the environment "by making statements about it, describing it," knowing it, and finally "ruling over it" (2, 3, 6). Hamilton's "Address to the Royal Geographical Society of London," in short, displays the inseparable relationship between power and landscape (the coalfields in Formosa) and between power and exploitation (the exploitation of Formosan coal).

Describing Formosan Coal: The Colonial Dimension of Environmental Representations in Nineteenth-Century Coal Texts

In the nineteenth century, Formosa was largely uncharted territory. The publication of Lieut. Gordon's "Observations on Coal in the N. E. Part of the Island of Formosa" – the first article about the discovery of Formosan coal in the world – in 1849 and the opening of Formosa to foreign trade in 1860, however, attracted traveling naturalists and merchants to report on Formosa. In this context, Lieut. Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood alerted the outside world to the physical nature and the commercial possibilities of Formosa. Venturing into Formosa for the exploration of coal and other natural products, these Western naturalists delineated Formosa's coal mines and articulated the economic prospects of Formosa's resources, especially coal. A mariner and naval officer, Lieut. Gordon was the first nineteenth-century foreigner who traveled to Formosa. In "Observations on Coal in the N. E. Part of the Island of Formosa," Gordon writes:

> I again observed coal in an E. by N. direction from the above-mentioned pit, one mile distant. This was situated on the west side of a deep ravine running north and south, and probably terminating the range to the eastward. The coal appeared quite as good and as plentiful as at the pits already visited. The seam was 3 feet thick, and the height was about 300 feet above the sea. […] Last year before the existence of coal was known on this island, when running along the coast . . . we passed, about 2 or 3 miles from what appeared to be the entrance of the river, through several miles of blackish water, apparently black with coal dust […]. (23-24)

In this passage, Gordon tells his readers that when he traveled to coal mines in Formosa, he noted that "the coal appeared quite as good and as plentiful as at the pits already visited," suggesting the abundance and plenitude of Formosan coal (23). Written in a form combining travel memoir and natural history, Gordon's coal text also picks out the "blackish water" lined with coal dust. Exemplifying the author's ability to combine the language of empirical observation with personal reflection, the passage reflects Gordon's careful, scientific disposition. His narrative offers a rare early account of British attitudes to coal in Northern Formosa, providing impressive, first-hand information to an audience anticipating further discovery and trade.

Like Gordon, Bridge is a British naval investigator who visited Northern Formosa; in 1875, he was on a ship calling at Keelung, a harbor in the north of Formosa. In "An Excursion in Formosa," before describing the features and the market of Keelung coal, Bridge remarked that when he traveled to the coal mines at Keelung, he witnessed the labor of coal-carriers and the excavation of mine passages:

> The road of the coal-carriers was long and troublesome. Carrying a heavy load for at least four miles, as those who came from some of the mines were doing, up and down steep hills in such an atmosphere and such a temperature, must have been superlatively distressing […] The mines were worked in a most primitive fashion. A hole, not much bigger than would be necessary to admit one person, was dug horizontally into the side of the steep face of a hill. Into this a miner carried a shallow flexible basket, and when he had scraped it full, he dragged it out with a rope, and transferred its contents to the two baskets which the carriers use. (221)

This passage unveils the atrocious conditions under which the coal-carriers and miners laboured, implicitly revealing Bridge's sympathetic attitude toward the coal-carriers. Bridge then provides a detailed description of the coal mines in Keelung:

> The coal was of two descriptions: a lustrous, black, bituminous sort, and a brittle, dull, yellow kind which came out in small lumps, and abounded in sulphur and iron pyrites. The slack and refuse was cast forth from the pit's mouth to lie where it might. By this rude method of raising it a considerable quantity of the mineral is brought into the market. It is believed that as much as ten thousand tons have been raised in a single year. A rude estimate of the capabilities of the present mines, as now worked, fixes the possible out-put at one hundred tons a day, the actual amount being assumed on fairly good data, as one thousand *piculo*, or about half […]. The Government has at length become alive to the important source of wealth which lies hidden in the coal-fields of Northern Formosa. Four English miners arrived just before my visit to the island, to instruct the native colliers, and an engineer, who had already inspected

> the mines, was in England purchasing the requisite machinery for mining on Chinese Government account. The local officials had issued a proclamation desiring the inhabitants to treat the foreigners with civility. (221)

Bridge, in the above passage, outlines the features of Formosa's coal. Characteristically, the language here contains important natural historical information on Keelung coal. It also contains a particular economic narrative of Formosa's environment (Keelung's coal mines in particular). Stating that the coal in Keelung was considered an "important source of wealth," Bridge emphasizes the market value and commercial value of coal. In short, he underscores the utilitarian value of coal and implies the environmental and economic domination of the British.

The idea of Formosan coal as an exploitable resource and capitalist commodity can also be found in a section titled "Trade" in Colquhoun's and Stewart-Lockhart's coal text, "A Sketch of Formosa":

> The chief exports of the island are coal from Keelung […] At one time most extravagant estimates were formed of the value of Keelung as a centre of coal production and distribution. The coal exists, of fair quality, and can be turned out at a rate of 5 to 5 1/2 dollars per ton at Hong Kong against 6 to 7 dollars for Japanese, 8 to 9 dollars for Australian, and 8 1/2 to 11 dollars for English. […] Keelung coal is a small bituminous mineral, good for domestic purposes and for steamers making short passages […] (189-190)

Displaying humanity's resistance to recognizing the intrinsic value of nature, Colquhoun's and Stewart-Lockhart's coal text stresses the importance of the commercial aspects of nature in representations of this era. Once again, an economic motivation swayed Colquhoun's and Stewart-Lockhart's understanding of nature as a desirable commodity or valuable product. In this passage, the coal from Keelung is discussed in utilitarian terms. These quoted lines reveal the intimate linkage between economics, the environment, and imperialist ideas of Keelung as a place to be exploited by Westerners for its natural resources.

The linkage between imperial motivations, environmental representations, and colonialism-induced exploitation of Formosan coal can be discovered in Swinhoe's coal text/traveling natural

history, too. An accomplished naturalist, Swinhoe was a member of the Royal Geographical Society of London (Carrington 56). Most of his writings about Formosa were published in the *Journal of the Royal Geographical Society of London*, the most influential and widely-circulated journal serving the British Empire's imperial enterprise and global information exchange in the nineteenth century (Carrington 56). As a matter of fact, these textual representations about nineteenth-century Formosa were published in European and North American books and journals during the nineteenth-century; in this way, these texts were circulated globally. Swinhoe's writings for the Royal Geographical Society included new discoveries about Formosan coal. When Swinhoe was in Taiwan, he took notes about potential commercial products and conducted botanical and ornithological investigations. As a result of his understanding of Formosa and his enthusiasm for the island, Swinhoe was appointed in December 1860 as the first British consular official in Formosa (Carrington 129). Nevertheless, Swinhoe had travelled to Formosa before 1860. He had participated in two naval voyages to Formosa in 1857 and 1858. The primary purpose of these voyages was to inquire into the possible fate of shipwrecked mariners (Carrington 69). Swinhoe, however, returned with important commercial information as evident on December 14, 1863 at a meeting of the Royal Geographical Society in London when he read a detailed paper on the coal mines of Keelung (Carrington 129). In "Notes on the Island of Formosa," Swinhoe gives an account of his trip to Keelung's Coal Harbour:

> It is a long pull from Kelung Harbour westward, round to what it is called Coal Harbour, where these mines are situated […]. There are eleven or twelve excavations. […]. I went to the end of one […]. The coal thus obtained is very small and bituminous, and burns fast, but with great heat and flame. It is very certain they get the very best there is in that locality […]. As a commodity for steam purposes its value has been often tested […]. Mixed with Welsh or other good coal, it has been found serviceable for large steamers; and for such purposes its cheapness may ensure a good future trade. (13)

Investigating the economic possibilities of the Coal Harbour, Swinhoe entices his readers with the commercial prospects of Keelung's coal industry. This passage exhibits the prominent economic concerns within Swinhoe's mode of environmental representation. Economics entered Swinhoe's ecological understanding as nature came to be classified under the category of "commodity" (Swinhoe 13). These lines reveal the intimate linkage between economic interests, colonial desire, and the

environment. Indeed, as the first British vice-consul in Taiwan, Swinhoe in "Notes on the Island of Formosa" remarked that he visited Formosa mainly "to inaugurate British trade" and that he strove to write out of great concern for British economic interests (7). Swinhoe's coal text, in this way, reveals the workings of the imperial voice and a British expansionist trajectory.

Bridge, Colquhoun and Stewart-Lockhart, and Swinhoe were not the only traveling naturalists who described the coal mines of Keelung, Formosa. Their British contemporary, Collingwood, also journeyed to the area, observed the Keelung coal, and represented foreign exploitation of coal resources in nineteenth-century Taiwan. In an article entitled "On Some Sources of Coal in the Eastern Hemisphere, Namely Formosa, Labuan, Siberia, and Japan," Collingwood gives an account of his trip to Keelung:

> The Formosa coal-district is situated near Keelung, in the north-east corner of the island. The mines are a little more than a mile to the eastward of the town, upon the hills bordering on Quar-se-kau Bay. I approached them in a small boat up a muddy creek. (98)

In yet another text, *Rambles of a Naturalist on the Shores and Waters of the China Sea,* Collingwood reveals colonial economic interests in Keelung's coal resources:

> The coal resources of Ke-lung have only recently been made known […] and it was further said at that time that arrangements might be made for the formation of a stock for the supply of Her Majesty's vessels on very favourable terms. […] In 1858, H.M.S. "Inflexible" received coals at Ke-lung at the rate of four dollars (17*s*. 6*d*.) per ton. H.M.S. "Serpent," during the year 1866, was coaled at the rate of 16 dollars the hundred piculs, which is somewhat less than three dollars (13*s*.) the ton; and for this price we selected our coal from the depots, and it was brought alongside and deposited in the bunkers. When we finally left Ke-lung, there were seven ships in the harbor — Hamburg, Bremen, Prussian, and English, receiving coal either as cargo or for consumption. (94)

This excerpt comprises the impersonal and objective, at least on the face of it, descriptions typical of European and American natural histories of the nineteenth century. Collingwood offers a utilitarian and commercial evaluation of the coal in Keelung; coal thus functioned as a commodity, and its utility

value was stressed. During the nineteenth century, the importance of an abundant supply of coal for the use of streamers – such as "Her Majesty's vessels" and H.M.S. "Inflexible" – furnished the principal motive for the Westerners' incursions to Formosa, making the Island of Formosa a tempting target for foreign naval and mercantile interests (Yen 48-49). This quoted extract, in short, reveals the colonial exploitation of – and imperialism-induced exploitation of – Formosan coal.

Describing Formosan Coal: The Proto-Ecological Dimension of Environmental Representations in Nineteenth-Century Coal Texts

While nineteenth-century English travelers in Formosa were fully cognizant of the commercial and mercantile value of coal, a few among them – Collingwood, Lieut. Gordon, and Bridge – sensed that coal was an element within a broader environment. In their coal texts, Collingwood, Gordon, and Bridge thus frequently called up the broader environment in which coal was located. In his "On Some Sources of Coal in the Eastern Hemisphere, Namely Formosa, Labuan, Siberia, and Japan," for instance, Collingwood delineates Keelung's coal-beds and the large oyster species situated all around them:

> Indeed, the whole country round Kelung is of red sandstone […] The position of this coal-bed proves that it is of comparatively recent formation. It lies apparently over the sandstone. I may also mention that about the middle of this portion of the island, near the town of Sikkow, I observed a thin seam of indifferent coal, cropping out in the river's bank, over which was a bed of stiff clay, abounding in large oyster-shells, seven or eight inches long, of a species (probably the recent *Ostrea Canadensis*) which I have seen brought to Canton in vast numbers for the purposes of lime-making. (99)

Narrating his discovery of the "large oyster-shells" and of "a species (probably the recent *Ostrea Canadensis*)" on a seam of coal "cropping out in the river's bank," Collingwood remarked on how "a thin seam of indifferent coal" created a habitat for a specific species: "the recent *Ostrea Canadensis*" ("On Some Sources of Coal" 99). In so doing, Collingwood connected marine species (oyster) to places (Sikkow and Keelung). In this way, Collingwood's observations invoke an awareness of interconnectedness and hint at a notion of wholeness; this quoted material exhibits Collingwood's

prescient and proto-ecological perception of natural systems and complex interdependencies. Indeed, Collingwood's discourse of natural history here anticipates a move toward a more ecological conception — that is, toward a model of nature that takes into account the complex web of relationships existing among coal and marine species in a given region. Collingwood's description thus anticipates future English and American nature writers' (as well as contemporary eco-theorists') focus on natural interrelatedness.

The notion that coal is a part of the broader natural environment can also be found in Lieut. Gordon's coal texts. The ensuing passages from Gordon's "Observations on Coal in the N. E. Part of the Island of Formosa" serves as a distinct example:

> The coal-seam was embedded between layers of soft blue claystone shale, between the layers of which iron was visible, but did not appear to abound. The sandstone of the neighbourhood was fine and of an ochreish colour. The surrounding soil was composed of a reddish and ochreous fine clay and sand; it was very rich, and, where not cultivated, was covered with high rank grass […]. During my observations I have seen nothing but sand-stone, even in the beds of the rivers, and along the sea shore quantities of coral. The luxuriance of the vegetation and richness of the soil are beyond anything I have hitherto seen, and the regularity of the hills throughout is very striking. There was, however, very little large timber, the greater portion of the hills being clothed with underwood. (23-24)

In this quoted extract, Lieut. Gordon clearly manifests his acute environmental-oriented stance toward the world he describes. It is his closely-observed descriptions of the coal seam and its broader environment – "the sandstone of the neighborhood," the surrounding vegetation and soil – that add to the content and quality, which make his coal text and discourses of traveling natural history distinctive (23, 24). Describing "layers of soft blue claystone shale," "the surrounding soil," "high rank grass," the sand-stone, and "quantities of coral," Gordon's coal text hints at the notion of the web of nature, especially the interconnections between Formosa's coal-seam and the nonhuman nature around the coalfields, such as the underwood, soil, and plants (Gordon 23, 24). In addition, through his observation that the "luxuriance of the vegetation and richness of the soil are beyond anything I have hitherto seen" and that "the regularity of the hills throughout is very striking," Lieut. Gordon expressed

his sense of curiosity, awe and delight (23, 24). In this way, Gordon's coal text cultivates public appreciation for the landscapes and the natural resources of Keelung.

Like Collingwood and Lieut. Gordon, Bridge was one of the few traveling naturalists who probably sensed that coal is an element within the broader environment. In "An Excursion in Formosa," Bridge delineates "a coal-mining neighbourhood" in Keelung:

> We soon came upon symptoms of a coal-mining neighbourhood. Heaps of coal, and great masses of "slack" and refuse formed a background to the village between the houses and the surrounding hills. The carriers, who went and came in an endless procession, were bearing baskets of the black mineral, slung from a pole across their shoulders. The bright verdure, the luxuriant tropical shrubs, the smooth sandy beach were soiled by the foul dust from the black heaps that were piled up beneath the hill. (219)

Composed in the form of a travel journal, Bridge's coal text furnishes valuable catalogues of coal – including "heaps of coal" and masses of "slack" coal and refuse coal – within the larger environment; "the surrounding hills," "an endless procession" of coal carriers, the "bright verdure," "the luxuriant tropical shrubs, the smooth sandy beach" (219). It is a suggestive version of an ecosystem, "a model of interrelatedness in nature," as Donald Worster calls it (378). In *Nature's Economy: A History of Ecological Idea*, Worster contends that an ecosystem "presents both the biological and non-biological aspects of the environment as one entity" (378). Here, Bridge contextualizes Formosan coal within larger landscape and articulates his proto-ecological sensibility, especially his awareness of environmental relationships.

The notion that coal is an element within broader landscapes also appear in other passages in Bridge's coal text, "An Excursion in Formosa." The ensuing lines describing Keelung's coal-pits are highly illustrative of this:

> At the foot of a high hill, far up on the sides of which yawned the black mouths of two coal-pits, out of and into which an ant-like stream of miners and carriers unceasingly swarmed, stood a little hamlet of tea-houses, rice-planters' cottages, and a blacksmith's shop. Above it rose a smooth, grassy eminence, which broadened at the summit to an open down. A fair extent of green sward, placed thus amidst the dense foliage of the

> neighboring hills, heightened considerably the beauty of the landscape. In front of the village ran a little stream, across which was thrown a frail bridge of a single plank, a giddy passage for the laden carriers from the mines. A few huge water buffaloes were feeding in the valley, and the green sward was dotted with swine and goats browsing on the shrubs. A wide plantation of bamboo waved in feathery masses on an opposite height, and hedges of the screw-pine fenced the village gardens behind the houses. Up the face of the green hillock, behind the village, ran our road to the town of Kelung, which the rising temperature warned us it was time to gain. (Bridge 221)

In lucid and eloquent prose, Bridge devotes much of his energy to suggesting that Keelung coal mines and coal-pits are elements within the broader environment or natural landscape. This quoted extract connotes a proto-ecological understanding of the larger world outside Keelung's coal pits, bringing together the broader human environment (the "two coal-pits, out of and into which miners" and coal carriers swarmed, "tea-houses, rice-planters' cottages, and a blacksmith's shop") and the nonhuman environment (including Formosan landscapes such as "the neighboring hills," "a little stream," and "the green sward," a "wide plantation of bamboo," "the green hillock," "the screw-pine," and their nonhuman inhabitants, such as water buffaloes, swine, and goats) (Bridge 221). In this way, Bridge's coal text anticipates a move toward a more ecological conception of nature — that is, a model of nature that takes into account the intricate web of relationships between the human and nonhuman worlds. Moreover, in evoking "a fair extent of green sward" and "the beauty of the landscape," Bridge vividly conveys the beauty and charm of the natural world he observed during his trip (221), expresses his admiration for the green world, and thus reveals his proto-ecological sensibility. The term "proto-ecological sensibility" is defined by Michael P. Branch as meaning "incipient ecological sensibilities," such as the emphasis upon an appreciation of nature and the "sensitivity to interconnectedness" (or interrelatedness) of nature and to interrelationship in a natural community (288, 291, 297). Bridge's coal text continues to be environmentally resonant because of his close observation and careful description of nature, his admiration for nonhuman nature in nineteenth-century Formosa, and especially his perception of the interrelatedness between natural productions (such as coal) and their broader environment.

In addition to representing the broader environment in which coal is located, a number of nineteenth-century English travelers (Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood)

also expressed an environmentalist concern about the hazards of coal mining. In a section titled "Keelung" in Colquhoun's and Stewart-Lockhart's "A Sketch of Formosa," the idea of the coal region as a harmful and lethal environment is expressed:

> The climate of Keelung is worse than that of Tamsui. The N.E. monsoon is generally attended with rain. The mortality in the coal-pit region is great, the Chinese coolies dying off as fast as they begin to work. The difficulty of getting coolies to live in this unhealthy region is one of the chief obstacles to the successful working of the coal-mines. The great heat in summer and the constant bad weather in winter, with the rapid changes, make the climate more trying. (198)

It is well known that air pollution from coal is a cause of hundreds and thousands of premature deaths worldwide. In this excerpt, representing the miserable condition of the Chinese coolies who worked in the coal-pit regions and noting that the "mortality in the coal-pit region is great," Colquhoun and Stewart-Lockhart presciently maintained that the coal mine is a deadly and "unhealthy region" and that coal can also bring ill to humanity (198).

The concept of the coal region as a dangerous and deadly environment can also be found in the essay "Formosa" by an anonymous nineteenth-century traveler:

> The coal mines situated in a bay known to Europeans as "Coal Harbour" are of some interest. They are worked after the usual Chinese manner, horizontally, producing a small bituminous mineral. It is unsuitable for steamers, burning too rapidly and caking in the furnace […]. The whole neighbourhood is impregnated with the stench and is said to be fatal to insect life. ("Formosa" 324)

The author is not oblivious to the stinking air and smells of Keelung's coal mines and even suggests that such a stench is harmful, perilous, and lethal to living creatures, such as insects (324). His observation that the stench "is said to be fatal to insect life" points to the idea of an ecological web; coal is entwined with air, insects, and the human race (324).

In addition to the coal texts of Colquhoun, Stewart-Lockhart, and the anonymous nineteenth-century author of "Formosa," the traveling natural histories of Swinhoe and Collingwood also display a slight but perceptible environmentalist concern. In his "Notes on the Island of Formosa," Swinhoe comments on the air pollution caused by burning coal:

> It [Formosan coal] is found to burn too rapidly, giving out an unpleasant – somewhat sulphurous – stench, and leaving large quantities of light ashes. For small high-pressure steamers it is of little use, besides being dangerous. From its inflammable nature the boats can carry little more than enough for one day's consumption, and the smoke is so thick and heavy that it often ignites the flues. (13)

In *Rambles of a Naturalist on the Shores and Waters of the China Sea,* Collingwood also comments on the dirty and foul air caused by consuming the "Ke-lung coal":

> In general terms, it [Formosan coal] consumes rapidly and makes much smoke […]. The Ke-lung coal is of very light weight; it burns very rapidly, and it gives out a very great heat—so much so, that it readily sets the funnel on fire. It is extremely dirty, and the combustion is so imperfect, that a vast number of blacks of a soft and soiling character are produced, and fall all over the ship. The flues also rapidly get very foul, requiring frequent attention and cleansing. (95)

As evinced by the quoted passages, Swinhoe draws attention to the "unpleasant – somewhat sulphurous – stench" and the "thick and heavy" smoke caused by coal consumption. Observing that the Keelung coal "makes much smoke" and "gives out a very great heat," Collingwood is already concerned about air pollution (*Rambles of a Naturalist* 95). Of all fossil fuels, coal is the dirtiest when burned; it produces the largest amount of carbon dioxide, causing a visible reduction in the quality of air (Medunic, Mondol, Radenovic, Nazir 13). Since the time of Swinhoe and Collingwood and the publication of Jevon's *The Coal Question*, environmentalists have begun to address the issue of air pollution. Nevertheless, modern environmental literature discusses the impact of air pollution not merely on human health but also on ecosystems and global warming. Erik Eckholm's *Down to Earth: Environment and Human Needs* (1982) and Isaac Asimov and Frederic Pohl's *Our Angry Earth: A Ticking Ecological Bomb* (1991) are two instances of such works. While *Down to Earth* examines air pollution in terms of other environmental problems (such as global atmospherics, health and the human environment, biological diversity, economic development, and so forth), *Our Angry Earth* is an example of apocalyptic literature and warns that air pollution is threatening to destroy humankind. Long before the publications of *Down to Earth* and *Our Angry Earth*, Swinhoe and Collingwood had

prophetically drawn attention to energy problems in the nineteenth century. The notion of coal as a harbinger of environmental degradation and air pollution, in other words, can already be discovered in the coal texts of Swinhoe and Collingwood. It is true that Swinhoe and Collingwood did not sense that emissions from coal are the biggest contributors to climate change. Nevertheless, their awareness of the foul air and unpleasant stench caused by burning and consuming coal gave them a special relevance to our air-pollution problems today and make their coal texts helpful guides as we grapple toward a more harmonious relationship with the earth.

Conclusion

In *The Future of Environmental Criticism: Environmental Crisis and Literary Imagination*, Lawrence Buell points out that ecocriticism has to open up new textual archives by recuperating material previously overlooked in literary and cultural studies (130-133). Nineteenth-century coal texts are an integral part of those overlooked textual archives. The travel writings of Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood have not received the critical attention they deserve. They are still largely unheard of even today, remaining unknown and neglected in the fields of ecocritical as well as Asian studies. Focusing on the afore-mentioned authors, this paper has examined some unexplored spaces of nineteenth-century ecocriticism in order to retrieve obscured voices that articulate incipient ecological sensibilities, including an appreciation of nature and a sensitivity to interrelationships between humans and non-humans in the natural environment.

As reliable reporters on Formosa and its coal at the threshold of East Asia, Lieut. Gordon, Bridge, Colquhoun and Stewart-Lockhart, Swinhoe, and Collingwood also offer compelling accounts of Formosa's coalfields and their environs and alerted readers to the commercial possibilities there. They made explicit their vision of the imbrication between coal texts and colonial economic interests in fuel resource, especially coal. Embodying the imperial and capitalistic desire to delineate, "know", and exploit the land, their coal narratives attest to "the colonial/imperial underpinnings of environmental practice" – as Graham Huggan and Helen Tiffin have put it (3) – in nineteenth-century Formosa Island and echo Said's notion of Orientalism. As formulated by Said, Orientalism is "a system of knowledge about the Orient" and "a Western style" for describing, "dominating, restructuring, and having authority over the Orient" (3, 6). Indeed, the accounts of Gordon, Bridge, Colquhoun, Stewart-Lockhart, Swinhoe, and Collingwood not only contain written representations that construct knowledge about Formosa and its coal resources but also attest to the relationship between textual representations of East Asia and imperial desire in the nineteenth century.

Notes

[1] "Coal Consumption Affecting Climate", *The Braidwood Dispatch and Mining Journal*, Wednesday 17 July (1912): 4, http://nla.gov.au/nla.news-article100645214.

[2] Having arrived in Far Eastern waters in the sixteenth century, the Portuguese named Taiwan "Ilha Formosa." However, there is no evidence of Portuguese settlement in Formosa.

[3] Qing China rule over Formosa ended when Taiwan was ceded to Japan by the Treaty of Shimonoseki in 1895. From 1895, Japan began its colonization of Formosa. Taiwan was a part of the Japanese empire under Japanese colonial rule from 1895 to 1945.

[4] One main contributing factor in Qing China's decline was European imperialism. In the late nineteenth century, leading countries in Europe – primarily Britain and France – exerted their control over large portions of Asia and Africa, putting pressure even on the traditional superpower of East Asia, Imperial China. The most devastating blow came in the Opium Wars of 1839-1842 and 1856-1860, after which Britain imposed unequal treaties on the defeated Chinese.

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