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ORIGINAL RESEARCH

Chen Ziying and Woods Hole: Bringing the Marine Biological Laboratory to Amoy, China, 1930–1936

Christine Y. L. Luk[1]

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Abstract

This article examines Chen Ziying, an American-trained Chinese biologist and his prewar efforts to bring his Woods Hole experience from the United States to China between 1930 and 1936. I argue that the Marine Biological Laboratory (MBL) appears as a prominent American scientific institution in the twentieth century among visiting Chinese students and scholars who were drawn to the American approach of building world-class seaside laboratories to facilitate marine biological study while cultivating a collaborative culture via songs of biology. Chen was one of the leading US-trained Chinese scientists who aspired to the international trend of developing coastal biology in the early twentieth century and was determined to modernize China's discipline-building of biology with the construction of marine research facilities similar to the MBL. I show that Chen's efforts of bringing the MBL practice to China took place at a time when science in China was overshadowed by the impulse of nationalism. Despite the nationalistic rhetoric, Chen was able to establish a Chinese connection with Woods Hole by introducing the MBL cultural practices of songs with biological significance. Lyrics from popular biological songs such as "It's a Long Way from Amphioxus" and "Songs of Amoy" reflect not just Darwinian themes but also a transnational connection between American and Chinese biologists in Republican-era China—a period in modern Chinese history that is often characterized by soaring sentiments of nationalism. This paper sets out to reconsider the interplay of scientific nationalism and scientific internationalism in shaping marine science in modern China, as well as to reflect on the meanings of value-laden terms such as "nationalism" and "foreignness" and their conceptual impacts on writing the historiography of biology in twentieth-century China.

Keywords Amoy University · China · Marine Biological Laboratory · Woods Hole · Marine biology · Nationalism

✉ Christine Y. L. Luk
chrisluk@tsinghua.edu.cn

[1] Department of the History of Science, Tsinghua University, Room 511, Meng Min Wei Humanities Building, Beijing 10084, China

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In 1924, Chen Ziying (陳子英, aka T. Y. Chen) was near the end of his doctoral study at Columbia University and he applied for a premedical fellowship from the Rockefeller Foundation. The fellowship would enable him to finish his work at Columbia while spending a summer at the Marine Biological Laboratory (MBL) together with his doctoral advisor T. H. Morgan. With recommendations from Morgan and A. E. Severinghaus, the executive board of the Rockefeller Foundation decided that "Chen is doing brilliant work and that it would be a good investment to assist him to complete his work for a doctorate which he expects to receive at the end of the next year." Mr. Severinghaus, they noted, believes that "with this exper[tise] Mr. C. bids fair to become a leader in the development of biology in China."[1]

After receiving a one-year fellowship, 1924–1925, Chen arrived at Woods Hole on June 29. The arrival in early summer was planned so that he could spend the bulk of the summer at MBL before the opening of classes at Columbia. At the MBL, he enrolled in a summer course on "General Physiology" and worked with T. H. Morgan until September.[2] According to a recent MBL history exhibit: "Morgan's Chinese students … carried their Woods Hole training and the connections that they made while at the MBL back with them as they returned to China, and used these experiences to shape early 20th century genetics there" (Jiang and MacCord 2015). But this begs the question: how did Morgan's Chinese students bring their MBL training home with them to shape China's development of biological science, including, but not limited to, genetics?

Partly driven by this question, this article sets out to explore the Woods Hole experience of Chen Ziying, one of Morgan's Chinese students who later returned to China and founded the first marine biological laboratory in Amoy, on China's southeast coast. Focusing on his role for bringing the cultural practice of the summer marine biological surveys between 1930 and 1936 to Amoy, this article highlights the transnational connection between Chinese and American marine biological communities by emphasizing Chen's attempts to introduce certain MBL practices to China in the 1940s. Unlike the indigenous construction of biological research of native species,[3] this article focuses on people and places and shows the significance of foreign (particularly American) influence in shaping the embryonic development of marine biology in Republican-era China, a period of flux in modern Chinese history during which intellectual affairs were often inseparable from foreign influences.

I begin with a brief review of the scholarship about the history of biological stations, examining the uniqueness of the MBL against other seaside stations across the world. After summarizing the key features of the MBL, I turn to Chen Ziying's background and experiences at the MBL and Amoy. My focus is on Chen's efforts

[1] Box 16, FA #426, RG#10.2, "13. China Medical Board (CMB) Medical Fellowships, Premedical & Misc.," Rockefeller Archive Center, Sleepy Hollow, New York; heareafter: RAC.

[2] Physiology was one of the four main courses offered at the MBL since 1892. Together with botany, zoology, and embryology, these four courses were offered until the 1960s, after which the MBL began to expand the curriculum and increase the number of summer courses. For the history of the educational program at the MBL (MacCord and Maienschein 2018).

[3] For an excellent analysis of the biological research of Chinese native flora and fauna as embodiment of China's past and nationhood, see Jiang (2016a).

to adapt elements of the MBL approach to construct an American-styled marine biological laboratory in Republican-era Amoy. Such a transnational approach to marine biology is interpreted against the historical backdrop of rising nationalistic sentiment restricting foreign biological expeditions in the 1920s and 1930s. While there is undoubtedly a complex relationship between biology and nationalism in Republican-era China, the transnational connection with American institutions, research practice, and financial assistance remains a persistent theme that characterized the Chinese scientific enterprise throughout the twentieth century.

Historical Studies of Seaside Stations

Seaside stations typically began in nineteenth-century Europe, at a time when intense interest in marine organisms brought researchers and holidaymakers to the seashore. Nineteenth-century naturalists joined long expedition trips, collected specimens in faraway places, and studied these species either onboard the ship or back home in their own surroundings. Although prominent naturalists such as Thomas Henry Huxley and Charles Darwin could study marine organisms this way, the absence of seaside stations soon became glaring in view of the growing interests in marine studies. As Jane Maienschein noted, "Itinerant researchers—including notably Anton Dohrn and Ernst Haeckel, who rented rooms for research—soon began to long for even more permanent facilities where they could set up labs, leave their equipment, and return the next year to continue their research in reliable surroundings" (Maienschein 2020, p. 9). Marine studies could proceed without seaside facilities in the early nineteenth century, but changing needs in the subsequent decades created a market force to fulfill this professional demand. Study of marine organisms was not necessarily predicated upon such seaside facilities, but they are called "facilities" because they *facilitated* the study of natural history by the water for a growing number of researchers, students, and other visitors.

It was this context that prompted the American biologist Charles Otis Whitman to call for studies of the "history of the seaside schools," which refers to beachside research establishments for studying natural history (Whitman 1883). This network of institutions inspired each other, nurtured the early cohort of marine researchers, and facilitated the study of living marine organisms. Studies of "the history of seaside schools" drew on the history, organization, equipment, and work of numerous marine research stations, mostly in Europe. By the 1900s, an increasing number of biological stations in Europe, both freshwater and marine, attracted the attention of the US government's Bureau of Education, which commissioned a study of the existing European biological stations in order to assess the need for creating similar stations in the United States, which culminated in Charles Kofoid's *The Biological Stations of Europe.* Published in 1910, Kofoid's report provides a good compilation of both marine and freshwater biological stations in Europe at the turn of the twentieth century.

Bringing the European experience of setting up seaside stations to the US, Kofoid summarized the fundamental purpose of all of these surveyed stations, which was to "bring the student and the investigator into closer connection with nature, with

living things in their native environment. They facilitate observation and multiply opportunities for inspiring contact with, and study of, the living world" (Kofoid 1898, p. 391). The biological station was primarily conceived as a seaside venue for investigation and instruction, which led Kofoid to conclude that "the biological stations owe their existence primarily to educational and research motives" (Kofoid 1910, p. 329).[4] Several European summer stations were impromptu outposts created for both instruction and exploration, such as the stations at Trieste (founded 1875) and Fiume (founded 1905). But not all stations shared this dual vision. The Swedish marine biological station at Kristineberg (founded 1877) was portrayed as a "naturalists' summer colony" that offered a summer resort to Swedish naturalists without too much educational engagement.

Philip Pauly has argued that the American trend to establish seaside schools arose partly from a need to address the educational needs for biological teaching in the late nineteenth and early twentieth centuries (1984). This explained why some of the early American seaside schools on the Eastern Seaboard were really called "schools," such as the Anderson School on the island of Penikese (founded 1873) and Annisquam School on Cape Ann (founded 1880). Meanwhile, other American marine stations, especially those instituted on the Western Seashore, such as the Hopkins Marine Station in California (founded 1893) and the Marine Station of the University of Washington (also called the "Friday Harbor," founded 1903), did not carry the name "school." Yet as Keith Benson has noted, "these stations differed from those on the East Coast in being to serve the faculty and students of colleges and universities, rather than school teachers or avocational naturalists" (Benson 2001, p. 15). West Coast stations thus differed from their East Coast counterparts, and it is with this context in mind that we can further delineate the historical founding and the long-standing success of the MBL at Woods Hole.

Among all of the American seaside establishments, the MBL at Woods Hole is considered to be the first permanent laboratory in the United States. The shift from the Penikese and Annisquam "schools" of the 1880s to the MBL as a "laboratory" in 1888 reflects the delicate balance of teaching and research. Benson noted that C. O. Whitman, the first director of the MBL, had written an essay about biological "observatories" that enabled biologists to discover the mysteries of evolution just like astronomical observatories gave astronomers the place to observe the mysteries of the heavens (Whitman 1893). The "observatory" approach would have set the Woods Hole station apart from the rest of the seaside schools and because "Whitman dropped 'observatory' and pushed MBL toward research" (Benson 2001, p. 16), which is why we are now left with the legacy of the MBL, not the MBO.

Summarizing the "Americanism" of the MBL, Maienschein has laid out a few essential features of the MBL model. First, the MBL offered a visionary prototype for an independent institution that brought together what was called "*instruction* and

[4] It should be noted that not all European stations surveyed in Kofoid's report were built to accommodate instruction with investigation equally. As an anonymous reviewer suggested, Stazione Zoologica di Napoli in Naples, Stazione Zoologica de Roscoff in France, and the Plymouth Station in England, founded in the 1880s and 1890s, had limited places for students and only offered a few courses.

investigation" (2020, p. 6). While Woods Hole was home to the US Fish Commission (USFC), the MBL was developed as a complementary but independent institution, just across the street from the USFC. Institutional independence remained a core feature of the MBL. As Maienschein suggested, "between 1888 and 2013, the MBL remained ferociously independent" (2020, p. 16). This heightened sense of independence underlined the much-touted collaborative culture within the MBL, which contrasted with the more individualistic culture at Stazione Zoologica di Naploli (SZN) founded by Anton-Dohrn (Groeben 1985, 2020).

With institutional independence also came the financial reliance on private donation, subscription, and tuition fees, as well as annual dues from the corporation of scientists, who paid membership fees that enabled them to return to the lab each year. After more than 120 years of such "ferocious independence," the financial situation of the MBL could no longer sustain its long-held independence. In July 2013, the MBL formally affiliated with the University of Chicago, which had a historical tie with the MBL for the first forty years of its existence.[5]

Despite cycles of financial instability, the MBL was able to maintain a dual emphasis on research and teaching, largely due to the visions and persistence of its founding directors. Contrary to the SZN, which focused on independent research among individual researchers, the MBL valued teaching and research as equally important and compatible. Not only were teaching and research perceived as complementary to each other, they were successfully integrated. The MBL was founded to provide a space to study and investigate broad questions that covered a wide-range of biological subjects from zoology to physiology and embryology (MacCord 2020). At America's first permanent seaside laboratory, questions concerning marine organisms and their developmental processes united students, teachers, and researchers under the aegis of a community of scientists and overseen by a board of trustees. This mix of teaching and research, students and professors, made the MBL "uniquely American and surprisingly successful" (Maienschein 1985, p. 31).

Other marine stations were also once independent and dedicated to the dual goals of research and education. But the MBL nonetheless stands out, largely because of its relative permanence (lasting for over a century) and the eminence of its visitors. The MBL has hosted MacArthur Fellows, National Academic of Sciences members, National Institute of Health Merit researchers, and Nobel laureates. It also nurtured a cohort of prominent biologists, including Shinya Inoué (1921–2019), a distinguished Japanese American scientist at the MBL and a recipient of the 1992 E. B. Wilson Award and the 2003 International Prize for Biology. In his memoir, Inoué explained why he held the MBL in high esteem: "For those of us hungry for more science, the MBL at Woods Hole was the true target of our dream." He praised the MBL's trans-institutional approach, which he held above the Misaki Marine Biological Station in his home country:

[5] Diana Kenney, "University of Chicago and Marine Biological Laboratory Agree to Form Affiliation," June 12, 2013, https://www.mbl.edu/uc-affiliation/.

> In contrast to Misaki, the MBL in Woods Hole was developed by a consortium of universities, colleges, and research institutes, and thrived by the interactions of investigators of all ages and background from around the world. Leaving their daily academic chores at their home institutions, immersing themselves in research, and sharing knowledge with each other for the whole summer, this community of scientists developed the foundations of basic biology year after year. Today, many of the MBL teaching programs still thrive, spawning innovators and leaders in many fields of basic biology. (Inoué 2016, pp. 53, 201)

Coming from a high-achieving scientist of Asian descent, Inoué's testimony lends further support to the prestige of the MBL and its international reputation. The MBL facilitated transnational scientific communication among people and places between Europe, America, and Japan, and, as we shall see, China.

American Biology and Modern China

Most of the scholarly literature about the American influence on modern Chinese biology and biomedicine by and large focuses on the Rockefeller Foundation and its role in running an elite biomedical program in China at the Peking Union Medical College (PUMC) (see Bullock 1980; Buck 1980). Although the Rockefeller Foundation also took part in areas of biological research outside of public health, especially agriculture, its global philanthropic initiatives were most influential in the realms of biomedicine and public health (Schneider 2002).

Among the books that mention the transmission of Western science to modern China via the Rockefeller Foundation, Buck discussed the attempts to transplant American science to China, first by missionary physicians visiting China in the nineteenth century and later by private philanthropists in the early twentieth century. He concluded that these efforts to export American values to China largely "failed" because of the divergent socio-political contexts and expectations with regard to science and social change. Buck dismissed the cosmopolitan values of cooperation, egalitarianism, and independence as embodied by eminent American scientific institutions such as the MBL as "anachronistic" (1980, p. 16).

Perhaps the American model of pure science and elite medical education was indeed irrelevant to China's immediate needs in the early twentieth century; rural reconstruction and poverty alleviation were of greater importance, and science was romanticized by Chinese students desperate to copy the American scientific model to China. But a blanket dismissal of American science as nothing more than Western ethnocentrism overlooks the broader impacts of these so-called "failed" endeavors. A good example in point is the life and work of Nathaniel Gist Gee (1876–1937), an American naturalist-missionary who spent more than thirty years in China and was known for introducing modern biological research and education to China (Haas 1996). William Haas's biography of Gee chronicles a life spent crossing the chasm between Southern Methodist religious instruction and the teaching of science as well as between his home state of South Carolina and Dongwu College in Southeastern China, where he served as a science educator for over three decades (Haas

1996). But Haas's account is highly descriptive at the expense of analytical clarity (see Flynn 1997; Wright 1997). The book does not shed light on Gee's long-lasting impact on Chinese biology, his love-hate relationship with the Rockefeller Foundation with which he was affiliated, or the state of knowledge of sponge taxonomy, his field of specialization.

Gee was a key figure in the introduction of the MBL model to China. He was the one, for example, who asked Edwin Grant Conklin (1863–1952), who spent almost every summer at MBL after completing his dissertation research there in the 1890s, to give a lecture about the aims and institutional outline of the MBL at the PUMC in 1925 in order to "give encouragement to the effort to establish a marine biological laboratory in China."[6] Gee also wrote letters to Rockefeller Foundation officers in New York seeking funding for building China's first modern marine biological station at Amoy University (Luk 2020). Above all, he was an avid collector who accumulated a wide range of fauna and flora even before marine stations existed in China. Unlike laboratory scientists who preferred to spend time at the bench and leave seaside collecting to others (see Cohen 1985), Gee chose to do the collecting himself, and his fondness for nature and fieldwork led to his advocacy for building marine biological stations in China.

Gee's belief in the importance of marine biological stations for biological work was influential. As Flynn noted, "even though Westerners had been studying natural history in China for decades, Gee wanted China to have its own collections of specimens and its own literature about them" (1997, p. 416). This raises the question: what was the reason behind Gee's sympathy for China's biological collections? Is it possible that Gee, as a non-ethnic Chinese, sympathized with China's biology because he identified with the Chinese nation, as suggested by Fa-ti Fan in his study of nineteenth century Chinese national essence authors. According to Fan, the articulation of "national essence" (*guocui*) by conservative Chinese thinkers drew on Confucian classics, such as the philological scholarship in the Qing dynasty, as the analytical ground for studying "natural history" (*bowu*) (Fan 2004). Nature was subordinate to nation among the Chinese *guocui* authors during the time when China was in social and political upheaval. Gee, however, was clearly not one of the *guocui* authors, nor is there any evidence that he was influenced by this particular strand of nationalistic thinking. Gee's sympathy for Chinese natural study probably has less to do with his identification with the Chinese nation and more with his familiarity with the natural environments in which native organisms lived, as well as the long time he spent working along the shores of the China coast.

Gee's unusual footprint on Chinese marine biology deserves closer scrutiny. His story relates to the seemingly fixed boundary between low-status, field-collecting activities and high-status, laboratory work that took place at the seashore. Robert Kohler has challenged the artificial separation of field biology from laboratory science and has supplied an impressive array of historical evidence regarding the

[6] See letter from William S. Carter to Edwin G. Conklin, 11 November 1925, Box 3, Folder 12, Edwin Conklin Papers (C0322), Department of Rare Books and Special Collections, Princeton University Library, Princeton, NJ.

mixed practices that blurred the lab-field cultural distinction, such as vivaria, columbaria, field gardens, biological farms, and experimental stations. Yet when it comes to seaside stations, Kohler held that "Marine stations, despite their seaside location, were essentially extensions of campus labs, bound tightly by the web of teaching and supply to laboratory culture. In marine labs it was not the natural surroundings but cultural habits and customs that shaped practices most powerfully" (Kohler 2002, p. 44). The elevated status of laboratory science, with its controlled environment and sophisticated instruments, enabled a score of embryologists, geneticists, and ecologists to approach previously unexplored problems with new concepts and tools. However, understanding the nature and origin of this lab-field distinction is impossible without first comprehending the historical context in which this mode of thought emerged.

Lijing Jiang has studied the fieldwork experience of Chinese naturalists in the first half of the twentieth century vis-à-vis their American counterparts. Tracing what she called the "fieldscapes" of experimental biology in Republican China, Jiang has juxtaposed the American experience of lab-field traffic with Chinese perceptions and manifestations of lab-field demarcation. In contrast to the American case, where the lab-field traffic was policed to maintain the professional status of lab science, Chinese field biologists of the early twentieth century did not consider the lab-field distinction in terms of scientific hierarchy. This is mainly because China's national circumstances at the time did not give Chinese field biologists the luxury of professional autonomy. For the first generation of Chinese scientists, how to continue their work in a wartorn, poverty-stricken country with poor working conditions was much more important than disciplinary disputes. Survival trumped status competition, and Chinese biologists approached the lab-field debate by adapting to the pragmatic circumstances, particularly during the Pacific War between 1941 and 1945 (Jiang 2016b). At the national level, China was simply not ready for a narrowly defined marine biological profession concerned with boundary keeping. A comparison on the national level alone, however, is not enough—such a macro-level comparison can sometimes serve to obscure insights that more detailed analyses at the micro-level can reveal. It is thus worth taking a closer look at marine biology and its relationship with laboratory studies at the institutional level.

As a byproduct of the proliferation of seaside stations, marine biology was considered a moving target by both practitioners and amateurs. In the late nineteenth and early twentieth centuries, marine biology was patently not a unified or coherent discipline, nor did practitioners identify themselves as "marine biologists." In fact, most of the marine-oriented biologists embraced methodological diversity to embrace both observational and descriptive approaches and preferred to define marine biology "as an endeavor unified by place rather than as a discipline organized around a central problem and/or technique" (Ellis 2007, p. 477). Lacking a coherent definition, marine biology inevitably shared some common ground with neighboring disciplines. As such, the boundary between marine biology and biological oceanography or field biology was not always clear. Even though marine biology overlapped with natural history, through their shared emphasis on outdoor collection and observation, the boundary between laboratory and field science was flexible and invited much overlap. Katharina Steiner, for example, has recently explored how the

Scientific Fishery program at SZN connected laboratory and field with the faunistic research of Wilhelm Giesbrecht, who moved between laboratory and field and integrated experimental data with zoogeographical collection (2020).

The lab-field dynamic was a key attribute of marine biology in the early twentieth century, given that marine biology was manifestly biology practiced near a marine setting.[7] Moreover, biology during this timeframe was composed of a host of subdisciplines, from classical genetics to embryology and physiology. This wide range of perspectives, methods, and epistemologies makes the notion of a "marine biology" difficult to confine within a rigidly defined lab-field dichotomy. Marine biological laboratories, exemplified by the MBL, embodied marine study and laboratory investigation; they also offered a place-based avenue for examining the relationship between the "making" and "moving" of scientific knowledge, as Lynn Nyhart has noted (Nyhart 2016, p. 14). But scientific sites can hardly function without people and their roles as both knowledge-makers and knowledge-movers. Chen Ziying was one of these MBL-visiting Chinese biologists who played an important role in "moving" the MBL approach to China and later for "making" the field of marine biology in modern China. It is to Chen and his effort to introduce the MBL approach to China that we now turn.

Chen Ziying (Chen Tse-yin) and the Biological Station in Amoy

Chen Tse-Yin (1896–1966) was born in Suzhou, Jiangsu province, in 1896. He received his bachelor's degree from Dongwu University in 1921, the very same university where Gist Gee had taught. Receiving a fellowship from the Rockefeller Foundation in 1925, he went to Columbia University in New York City to study with the famous geneticist Thomas Hunt Morgan. His dissertation research was on the genetic mutation of wild-type fruit flies and their mutants (Chen 1929, 1931a). The study was part of the moral economy of the Morgan school of *Drosophila* research, especially the new focus on development (Kohler 1994, p. 244). A year before Chen graduated from Columbia, Morgan encouraged him to spend a summer working at the MBL at Woods Hole. In 1928, Chen returned to China, initially working at Peking University but soon joining the ranks of intellectuals who flocked to the University of Amoy in Southern China. Amoy University was a private university endowed by the overseas Chinese philanthropist Tan Kah Kee (1874–1961), a Chinese entrepreneur in Singapore of Amoy descent. Since Mr. Tan ran a successful rubber business in Singapore, it was rumored that the pay level at Amoy University was probably better than publicly funded universities in the hinterland. In any event, Chen went off to Amoy University and took up the role of head of the Biology Department, serving from 1930 until 1945. Between 1945 and 1949, Amoy University was taken over by the Japanese navy and used as a base during the Pacific War. After the Communist Party established the People's Republic of China in 1949, Chen left Amoy. Chen spent the remainder of his life in Shanghai, where

[7] I thank one of the reviewers for bringing this point to the forefront.

he taught aquaculture and aquatic biology at what is currently known as Shanghai Ocean University, formerly the Shanghai Fisheries College, passing away in 1966.

One of the major steps Chen took to transfer his MBL experience to China was his establishment of the summer marine survey commenced in 1930 at Amoy. The survey was conducted under the auspices of the Rockefeller Foundation, which supported not just the travel costs of a group of twenty-five biologists from all over the world, but also the completion of an outdoor seawater system of the marine biological station at Amoy University.[8] As the first summer marine survey drew to a close, Chen reported the station's summer surveying activities to the university's board of directors. In this 1931 report, Chen explained the rationale and significance of the first summer survey this way: "Although the so-called summer biological survey is temporary and seasonal, the purpose of the marine biological survey we conducted last summer was intended to be a cornerstone of a larger project, and that is the founding of marine biological station in China" (Chen 1931b, p. 6). He proudly mentioned the leading marine biological stations in the world, namely the MBL at Woods Hole and the Naples Zoological Station, bemoaning the lack of any such research facility in China.[9] The desperate need to establish a marine biological laboratory in China was all the more apparent when compared to Japan; as Chen lamented, "even Japan had four or five such stations, with world-class marine labs sited at Misaki and Asamushi" Chen 1931b, p. 6).

After addressing the mission, approach, and basic equipment that made up a marine biological station, Chen highlighted the importance of community-building emerging from the summer marine survey:

> the survey participants came from everywhere and convened here in the summer. Previously they only knew each other by reputation, now they get a chance to put names to faces and learn from each other academically, thus avoiding the limitation of intellectual isolation and ignorance. The encounter of like-minded people with shared interests is a great joy in life. The cooperation among Chinese biologists from all over the country matters tremendously to the future development of Chinese biology. The summer survey is a good opportunity to cultivate friendship among biologists and constitutes one of its major goals. (Chen 1931b, p. 9)

The emphasis on community-building and friendship-fostering echoes the spirit of the MBL, which, as Maienschein noted, is "an exemplar for community research in biology, a hotbed of intense, dedicated biological research.… [It] is a place to

[8] Box 38, Folder 312, Series #601, RG#1, CMB Collection, RAC.

[9] The place-name "Woods Hole" was transliterated by Chen into Chinese as "胡史屋" (*hu shi wu*). David Wright (1998) has discussed the problem with translating foreign place-names to Chinese before the standardization of Chinese in the 1950s. The same place-name of foreign countries could have multiple translated names by different translators. For example, "Persia" was rendered as *baixi*, *baoshe*, *bashe*, *baiershe*, *bierxi*, and even *gaoshe*. In the present case, the current Chinese translation of "Woods Hole" is "伍兹霍爾" (*wu zi huo er*), but it has appeared in Chinese print materials as other names. In addition to Chen's suggested translation, Bing Zhi, another eminent Chinese biologist in Republican-era China, translated "Woods Hole" as "烏子吼耳" (*wu zi hou er*). See Bing (1923).

learn the sharing and cooperation that makes cross-fertilization of ideas possible, to ignore or overcome the boundaries existing elsewhere in the research world" (Maienschein 1989, p. xvi). While one might question the extent to which such a communitarian research culture is unique to the MBL, it is important to remember the historical context of Chen's report. In the early 1920s, China was not a convivial place for community-building; rather, it was marked by significant political turmoil. The end of the imperial order in 1911 was followed by the establishment the following year of the Beijing-headquartered Beiyang government, which was replaced by the Nanjing-headquartered Nationalist government in 1927. The entire Republican era then came to an end in 1949, as the Nationalist party retreated to Taiwan. Regime change, together with regional warlords and factional interests, reduced the governing capacity of the state. The consequences of the absence of a strong, centralized state was keenly felt in the scientific community. Luo Guihuan has discussed the division among Chinese biologists in Republican-era China. Based on their educational backgrounds and social network, a substantial schism developed between Japanese-trained and American-trained students (Luo 2014). Chinese students who received their scientific credentials in Japan argued that the nation's fledgling scientific enterprise should imitate the Japanese system, given the shared cultural lineage and the profusion of Japanese loanwords in the modern Chinese vocabulary, particularly in the realm of natural science.[10] In contrast, those who received their training primarily in the US suggested that the nation should learn directly from the West rather than via the route of Japan, since modern science stems from Western civilization and culture.

The Japan-US split was by no means restricted to the Chinese intelligentsia. The competition between Japan and the US as sources of influence on China's intellectual and cultural affairs extended to each nation's funding agencies and the outcomes of their educational projects. The apparent failure of Japan's Oriental Cultural Work was contrasted with the success of the American remissions of the Boxer Indemnity in 1908 and 1924, and this consolidated the overriding preference for Euro-American educational and research models over those of Japan (Reynolds 1993; Teow 1999).

With this historical context in mind, it is not difficult to understand why Chen tried to highlight a community spirit arising from the marine biological surveys.[11] Given the disunity within the circle of Chinese biologists and his own US training, he was consciously leading China's marine biology towards the American style of community-learning and research-sharing. Charles Whitman, the first director of the MBL, was said to be very concerned with building a cooperative culture at

[10] For a general history of the translation of modern Western science in modern China, and particularly the country's ambivalent attitudes towards adopting Japanese scientific loanwords, see Wright (1998).

[11] Fa-Ti Fan has contrasted the biological surveys vis-à-vis geological surveys in Republican-era China. Unlike the geological surveys, which were centrally coordinated and administered by the government, biological surveys in early twentieth-century China did not receive such focused attention from the government. In this respect, biological surveys in Republican China were similar to social surveys, as they were quite contingent upon the availability of local resources and opportunities. See Fan and Mathew (2016).

this seaside laboratory: "Individuals should learn from each other…. People should cooperate even as they pursue their separate research" (Maienschein 1989, p. 6). Aside from stressing the camaraderie of marine biological work, Chen also discussed the advantages of summer living at the seashore:

> Leaving the scorched cities and coming to the breezy seaside labs in the summer is quite attractive. One could do collecting in the field and observe nature closely; one could also take a leisure walk along the beach or take a dip in the sea to work out. Doing these seaside activities with cordial fellows and friendly colleagues is conducive to academic exchange. With this pleasant environment, a fully-equipped lab, and a healthy body and mindset, one could make substantial contribution to research. This is the reason why many countries in Europe and America construct marine biological laboratories, and why China should build one as well. (Chen 1931b, p. 10)

Although such text resembles an advertisement for beach holidaymakers, these additional benefits actually form an important justification for doing biology at the sea. Since researchers are going to spend part or all of the summer at a seaside location, it helps to give potential researchers or patrons a little preview of summer living by the seashore. Moreover, the recreational aspect of living by the sea is suggested to have research implications. Chen saw the wholesome beachside atmosphere as beneficial to doing benchside research—and argued that therein lay the raison d'être of marine biological laboratories in Europe and America. The appeal of seaside vacations is an important factor that contributed to the advancement of marine natural studies. In tracing the rise of oceanography in nineteenth-century Anglo-American maritime culture, Helen Rozwadowski highlighted the mutual reinforcement between "serious scientific beachcombing and dredging" and summer holidays at a seaside location (2005, p. 107). Marine research excursions and beachside holidaymaking are not just compatible, that is, but also mutually beneficial.

But where did Chen get this idea? Existing evidence shows that he had only visited one of these marine biological laboratories, namely the MBL, where the perennial question——"why study biology by the sea?"——has been raised many times and invited sustained scholarly interest.[12] Jane Maienschein has suggested that the breezy and relaxing atmosphere at the seashore is conductive to an open exchange of ideas (1989, 2020). In an age when marine specimens could be delivered to individual labs, skepticism abounded as to why one should go all the way to the sea to pursue biological research. But specimen availability was not the only reason for doing biology at the sea. The study of marine life was not just the product of the intellectual appeal of marine fauna; it was also partly a result of the rising social appeal of seaside holidaymaking. Likewise, what Chen's 1931 report shows is the linkage between studying seashore life and living along the seashore. The latter might sound too much like a summer vacation, but playing hard and studying hard are two sides of the same coin. At least for Chen, there was nothing shameful about embracing

[12] A recently published co-edited volume, *Why Study Biology by the Sea?,* collects scholarly attempts to address this perennial question; see Matlin, Maienschein, and Ankeny (2020).

the recreational aspects of seaside biology. His articulation suggests that he saw no inherent contradiction between research and leisure.

Chen realized that another important way to bring the MBL model to China was through music and songs. The intertwining of music and science dates back at least to Pythagoras, with his formulations of harmony and geometry which echoed geometrical propositions in musical theory. But what about the biological or medical sciences? Fantini offered a historical analysis of the conjunction between music and biology, arguing that Anton Dohrn, founder of the Naples Zoological Station (SNZ), developed the concept of *Functionswechsel* [change in function] that underlined the connection between music and biology (2015). Fantini carefully showed how Western music and biology came to share analogous patterns of representation throughout history, from Galenic medical humoral theory and *temperamentum* of musical composition in the late Middle Ages, to the fibrous bodily theory and instrumental vibration in the Renaissance. Also, the eighteenth-century new science of "biology," based on form and function, and Dohrn's conception of "embryonic form" and *Functionswechsel*. Music and biology thus share the same set of vocabulary and emotions, because "biology and music are both at the same time an epistemic and an aesthetic experience and both produce epidemic and aesthetic emotions" (Fantini 2015, p. 354). Although others have considered the relationship between music and science, Fantini is particularly relevant to my analysis because he focuses discussion on the relationship between music and biology around the pivot of the SNZ, known as the "mecca for zoologists." The SNZ and the MBL shared many historical ties, not least of which is the time-honored tradition of singing songs with biological motifs.

"The Amphioxus Song" was one of the earliest and best-known songs that gained popularity among evolutionary biologists at the turn of the twentieth century. Betty Smocovitis presented a chronological analysis of this song, believed to have originated at the Cold Spring Harbor Laboratory in the 1920s. It was printed in the MBL songbook in 1921, officially published in *Songs of Biology* in 1939, and reprinted by the MBL and the Beta Beta Beta Biological Society in 1978. The song epitomized what Smocovitis called "songs of evolutionary biology by and for biologists" (Smocovitis 2009, p. 608). It was a song "of" evolutionary biology because the spread of the song embodied the practice of using music to disseminate Darwinian evolutionism, which Smocovitis discussed in her analysis of nineteenth-century sheet music with Darwinian themes. At the same time, "The Amphioxus Song" was also a song "for" biologists. Since the song captured the evolutionary significance of a primitive marine organism, it was used by Maienschein as a prelude to her analysis of the epistemic difference between the amphioxus-ascidian theory and the annelid theory during the last quarter of the nineteenth century. Maienschein noted that the song "was a favorite as MBL participants spread out from Woods Hole and colonized biology elsewhere" (Maienschein 1994, p. 466).

Chen must have been fascinated by "the Amphioxus Song," since he was eager to popularize the song to students and faculty of biology at Amoy University (*Amoy Weekly* 1936, p. 22). Chen was probably impressed with the way the MBL drew upon cultural resources and human sensory experiences to bond the lab's different participants together. At the MBL, singing was said to be a core cultural activity

for the community. As noted in the MBL's centennial commemorative volume, "so many MBL people have said that the musical offerings in the little town of Woods Hole remain one of the major drawing points…. Music gives a cosmopolitan and educated air to the setting" (Maienschein 1989, p. 162). Songbooks and poems from the MBL archives contain traces of songs and musicals sung by students and instructors at the MBL Club. In particular, *Songs and Poems of Woods Hole* from 1921 included several themed songs, such as "The Darwinian Theory," "It's a Long Way from Amphioxus," "Oh Chromosomes," and "The Biologist's Wife." These were not just sung at the MBL, but were also reprinted in an album of eight biology-related songs compiled by the Department of Bology at Amoy University, which was under Chen's chairmanship (*Amoy Weekly* 1936, p. 12).

While "the Amphioxus Song" was an American biology song that was directly imported to China, other songs exemplified the indigeneity of Amoy's natural and cultural elements. At the closing remark of his 1931 report, Chen used a short bilingual verse as a dedication to the support offered by Amoy University's founder (Chen 1931b, p. 10):

All Blessing of the free,
Thy great founder, Tan Kah Kee.
Sees the world all turn to thee.
Oh Amoy, Oh Amoy.
造福桑梓子弟,

興學祖國領袖, 陳嘉庚。

普世頌揚

偉哉廈大, 壯哉廈大

Crediting the founder's philanthropic contribution to China's educational enterprise, the increasing cosmopolitanism of the time, and the place that brings all of these elements together, the above bilingual verse explicitly linked the cosmopolitan values, such as freedom and ecumenism, with Amoy University and its founder. It is worth noting that the English portion of this verse was taken from a song titled "Song of Amoy," with verses set to the tune of the Illinois state anthem:

Song of Amoy
(Tune: "Illinois")[13]

By the harbors soft bright sand,
Oh Amoy, Oh Amoy.
Close behind the mountains stand,
Oh Amoy, Oh Amoy.

Of thy beauties such as these,

[13] Official state song, "Illinois." https://www2.illinois.gov/Pages/about/StateSong.aspx.

We will tell across the seas.
In our song upon the breeze,
Oh Amoy, Oh Amoy.

By thy gracious invitations,
Oh Amoy, Oh Amoy.
We are come from several nations,
Oh Amoy, Oh Amoy.

Amphioxus, fish and bee,
Polymorphis, crab and tree.
All supplied to us by thee,
Oh Amoy, Oh Amoy.

As the men from China's soil,
Oh Amoy, Oh Amoy.
Seeking to bring by their own toil,
Oh Amoy, Oh Amoy.

All blessings of the free
Thy great founder, Tan Kah Kee
Sees the world all turn to thee
Oh Amoy, Oh Amoy.

For the privilege of coming,
Oh Amoy, Oh Amoy
And the work that's smoothly running,
Oh Amoy, Oh Amoy.

Thy good fellowship we know,
We are glad to see thee grow.
We're here to tell thee so,
Oh Amoy, Oh Amoy.[14]

Although the lyricist made only one passing reference to amphioxus, it is indicative of the extent to which this marine animal was emblematic of Amoy. Evocative of biological themes, with its inclusion of fish, bee, crab, tree, soil, and more, much of the lyrical content of the song has to do with the natural surroundings of Amoy. It conveys the image of Amoy as enveloped by its fauna, flora, and natural landscape. More importantly, the "Song of Amoy" captured the cooperative spirit between Chinese and foreign biologists as they convened the first station for sea life study at Amoy (Allgood 1930).

[14] Cora D. Reeves, Amoy, July 1930. Box 38, Folder 312, Series #601, RG#1, CMB Collection, RAC. I bolded the stanza that corresponds to the English portion of the aforementioned bilingual verse.

In this ode to Amoy, penned by Cora D. Reeves, an American ichthyologist from the University of Michigan, the admiring lyricist notes "thy good fellowship" and that "we are glad to see thee grow" (Allgood 1930). Given the context of the song, "thy" and "thee" here most likely refer to the community of marine biologists gathered around Amoy University. Not only was the founder of Amoy University, Tan Kah Kee, honored in the song, but the chorus line "Oh Amoy, Oh Amoy" repeatedly reminds the audience of the significance of Amoy as the location of China's first sea life study. This ode invites us to consider the legacy of China's marine biology, not in terms of its domestic output, but rather in terms of transnational outreach made possible by its locality. Marine biology in Republican-era China was thus explicitly linked with the country's international image, as manifested in "thy good fellowship" among scientists of different backgrounds and nationalities.

Independence, Nationalism, and the MBL-Amoy Marine Connection

In view of the sense of camaraderie among the marine biologists as glorified, if not mystified, in the "Song of Amoy," it is important to bring in Chin's overall historical context in the first three decades of the twentieth century. The early twentieth century witnessed an outburst of nationalistic sentiment in tumultuous China. Since the 1911 Revolution, patriotic concerns over the fate of the country fueled the May Fourth Movement of 1919 and became a dominant discourse throughout the 1920s.[15] In the early twentieth century, Chinese biologists were confronted with trending forces in ideological, political, cultural, and scientific realms such as imperialism, modernity, nationalism, and evolutionism. Fa-ti Fan has proposed to study science in Republican-era China by focusing on the "creative tension between scientific nationalism and scientific universalism" (2008, p. 184). On the one hand, science was imbued with nationalistic elements and impulses, resulting in thematic slogans such as "national medicine," "national goods," and "science for national salvation." On the other hand, science was also universalistic and cosmopolitan. Common to many scientific institutions and activities at this time was the financial and intellectual connection with transnational enterprises and expertise. Many Chinese scientists received their education overseas and maintained contact with their foreign colleagues and audiences. This was permissible by the Chinese governing body at the time largely out of pragmatic concerns. Although the Nanjing government introduced attempts to nationalize scientific institutions and expeditions, it was militarily and financially impoverished. As much as the Nanjing government valued science and scientists, it simply lacked the economic power to support many scientific pursuits. This explains why many research centers and projects were founded and sponsored by foreign organizations, such as the PUMC and Amoy University. PUMC was founded by the Rockefeller Foundation in 1921; Amoy sought financial

[15] For an overview of the influence of escalating nationalism on modern Chinese intellectual history, see Schwartz (1983); for a critique of the May Fourth paradigm, see Chow et al. (2008).

assistance from the Rockefeller in 1929 to support its enterprising educational endeavor, particularly in launching its summer marine surveys (Luk 2020).

Earlier, I suggested independence was one of the core features of the MBL. One of the reasons why Chen Ziying was able to bring some of the MBL practices to Amoy has something to do with Amoy University's institutional independence. Although there were other private scientific establishments in Republican China, few were situated at the seashore. As a point of comparison, the PUMC was located in the inland capital city of Beijing. Since Amoy was a private institution situated in one of the few coastal provinces along China's southern seaboard, it gave Chen plenty of opportunities to investigate the physical, biological, institutional, and oceanographic conditions of the fishing industry at or near Amoy. Between 1930 and 1936, three marine biological surveys were conducted as part of Amoy University's marine biological program. The "Marine Biological Survey Reports of Fujian Province," "Fisheries Survey Reports of Fujian Province," and "Surveys of Amphioxus Fisheries in Amoy" were authored by Chen and another Amoy-based biologist, Jin Dexiang (Chen and Dexiang 1933). Each of these reports captured certain aspects of the geography of the coastlines, typology of fish, statistics of fishermen, fishing apparatus, fishing grounds, and annual fish catch in different parts of Fujian province. [16] Among the various types of fish one could find along the Fujian coast, one marine animal seemed to receive the lion's share of scholarly attention, and that was amphioxus.

"Surveys of Amphioxus Fisheries in Amoy" placed an investigative lens solely on this classical marine organism. Like elsewhere, the authors emphasized the importance of amphioxus as the ancestor of vertebrates. But the authors also recognized the uniqueness of Amoy, for it was only here that one could find "amphioxus fisheries." Although amphioxus was widely distributed across the globe, rarely could one find so bountiful a supply of amphioxus except in Amoy. Amphioxus makes Amoy distinct, but it also connects China to the wider biological community through the common concern over the evolutionary linkage between amphioxus and vertebrates. "Survey of Amphioxus Fisheries in Amoy" was an interim report on a larger set of amphioxus study programs undertaken by researchers based at Amoy University (currently Xiamen University). Since 1923, with the discovery by S. F. Light, an American zoologist from the University of California at Berkeley, of the unparalleled abundance of amphioxus near Amoy University, Amoy-based scientists were inspired to pay close attention to the scientific study of amphioxus near Amoy (Light 1923). Unlike most other fisheries surveys that focus on measuring and strengthening the economy of common food fish, economics was not the driving force behind the "Survey of Amphioxus Fisheries in Amoy." Drawing upon nineteenth-century Euro-American writings on the evolutionary value of amphioxus (Hatschek 1893; Willey 1894), Chen aimed to offer Chinese perspectives on the enduring puzzle over the amphioxus-induced dispute over vertebrate origins (Gee 1996, 2008). In his

[16] Areas under investigation include seventeen counties in the Fujian province: Fu Ding, Xia Pu, Fu An, Ning De, Lian Jiang, Min Hou, Chang Le, Fu Qing, Ping Tan, Xing Hua, Hui An, Jin Jiang, Jin Men, Tong An, Si Ming, Hai Cheng, and Dong Shan; see Chen (1935).

1935 report, Chen situated the amphioxus study within an international biological framework that began with the amphioxus-ascidian theory in the 1870s, combined with Herbert Walter's reiteration of Light's discovery of amphioxus fisheries off the coast of Southern China in his textbook *Biology of the Vertebrates* (Walter 1928). For Chen, the biology of amphioxus mattered, but so did the particularity of Amoy, which nurtured the amphioxus along the Fujian coast (Chen 1936).

Such was Chen's effort to do marine biology in the mode of "scientific universalism." But this was by no means the only political force at play. The other side of the proverbial coin, that of "scientific nationalism," was equally important. Fa-ti Fan has examined the restrictions introduced by *Academia Sinica* that limited the collecting of Chinese zoological and botanical specimens by Westerners in Republican-era China. The most famous case was probably the restriction against the Central Asiatic Expeditions of the American Museum of Natural History, led by Roy Chapman Andrews (Fan 2013). Aijie Shi has presented a focused discussion of the restriction against one Japanese-led freshwater expedition along the Yangtze River in 1929, while also placing this incident under the interrogating lens of the institutional history of *Academia Sinica* and its relationship with the Nationalist party (2017). Her focus is exclusively on *Academia Sinica*'s capacity to nationalize science by intervening in foreign biological expeditions after its founding in 1927. Under the "Conditions under which Foreigners may Collect Biological Specimens in China," prepared by *Academia Sinica* in 1930, all foreign scientific expeditions conducted in Chinese territory were required to obtain formal approval before being allowed to proceed. Although Shi reconstructed the chronology and context that led to the interruption of Kishinoue Kamakichi's third expedition along upper Yangtze in 1929, it was not necessarily the case that all subsequent foreign biological expeditions were hindered to the same degree. For example, the summer marine biological surveys conducted at Amoy between 1930 and 1936 under the auspices of the Rockefeller Foundation were ostensibly undisturbed by *Academia Sinica*. The subsequent release of the survey results, in both Chinese and the English language, suggests that the surveys were not hidden away from public scrutiny or institutional record-keeping. This then begs the question, Why weren't the marine biological surveys at Amoy restricted by the regulation imposed by *Academia Sinica*?

The answer probably has something to do with the interpretation of "foreign" and "foreignness." In the framing context of the above regulation, "foreign" seems to refer to "foreign nationals" rather than "foreign-supported" or "foreign-trained Chinese nationals." As a matter of fact, all of the "foreign" scientific explorations that were explicitly targeted by *Academia Sinica* were led by foreigners. From Henry Fairfield Osborn's aborted Central Asiatic Expedition, Kishinoue Kamakichi's interrupted freshwater expedition, H. G. Macmillan's botanical expedition trip to Xinjiang, to Henry Smith's applied-and-approved biological expedition, it seems that *Academia Sinica* was targeting scientific explorations undertaken by foreigners. The summer marine biological surveys at Amoy, however, were chaired by a Chinese national at a Chinese university, in distinction to the "foreignness" that characterized Chen's academic background, Amoy University's founder, and these summer surveys. The fact that Amoy's summer marine surveys went on unimpeded for five years after the promulgation of *Academia Sinica*'s regulation speaks to the

plural understandings and diverse reception of "foreign" elements in Republican-era China.

Neither "nationalism" nor "foreignness" were clearly conceptualized in an era of rising nationalist fervor and anti-imperialist rhetoric. This is not to say that marine biology was isolated from nationalistic policy or discourse. Indeed, nationalism continued to resonate with Chinese science throughout the twentieth century. For example, in portraying the life and work of C. K. Tseng, an important Chinese oceanographer in the second half of the twentieth century, Peter Neushul and Zuoyue Wang argued that Tseng was committed to the science of kelp farming partly due to "his nationalistic drive" (Neushul and Wang 2001). Based in Qingdao for most of his career, Tseng's expertise was primarily in the aquaculture of marine botany rather than the exploratory surveys of marine fauna. But, the point here is that despite its widespread currency, "nationalism" is notoriously difficult to define clearly. The lack of conceptual clarity and regulatory uniformity that characterize *nationalism* and *foreign* behooves us to approach the relationship between biology and nationalism in Republican-era China with circumspection and skepticism. Chen's Woods Hole experience and his seemingly uncensored attempts to bring the MBL ideals and practices to China in the 1930s reveal the transnational facet of biology in the context of soaring nationalism during the Nanjing Decade. Under the historical circumstances of preserving Chinese national sovereignty, Chinese marine biologists were still able to celebrate and imitate the scientific ideals that hailed from the West, and the US in particular. As scholarly efforts concentrate on the connection between biology and nationalism in Republican-era China, I suggest that the transnational dimension in the formation of Chinese biology during this period is equally important. In particular, my emphasis is not so much about foreign intervention on China's domestic science; rather, I am arguing that the global network of marine-based biological institutions shaped the historical development of one of China's non-terrestrial types of science—marine biology. Just as the core defining principle of the MBL has always been its emphasis on "marine"—using marine organisms collected near the sea to investigate marine-based research problems——my study of the MBL-China connection is also strictly limited to the marine aspect of scientific affairs in America and China.

Conclusion

Foreign presence in modern China gradually began to disappear in the second half of the twentieth century. As more scientific establishments became nationalized, including the PUMC and Amoy University, the pendulum of "scientific nationalism and scientific universalism" seems to have swung completely to one side. As the Chinese state grew stronger, and with the appearance of many "national key laboratories," it has now become unimaginable to relate "Chinese science" with any notion of "independence." Amoy University has been nationalized for more than seven decades and is now publicly known as Xiamen University, replacing the old name with the standard, state-approved *pinyin* system. On the other hand, the MBL institutional independence, lasting for more than twelve decades, is no longer

tenable. Since 2013, the MBL-Chicago affiliation has kept the MBL's core mission on marine science.

This article zeroed in on one American-trained Chinese biologist and his prewar attempts to bring the MBL experience to Republican-era China. The MBL figured prominently as a model of a leading American institution, given its prestige in defining the essence of American marine biology. My analysis shows that, as the MBL-styled marine biology began to gain momentum around the turn of the twentieth century, Chinese students who went to the US to pursue graduate studies were drawn to the American approach of building a seaside laboratory to facilitate marine biological study. They also cultivated camaraderie not just in vision statements but also by incorporating songs of biology. Although some Chinese biologists urged the country to learn from Japan's marine heritage and scientific excellence, the American model of marine biology prevailed. Referencing the MBL's collaborative culture for building a world-class marine research facility, Chen was determined to modernize the development of China's biological development with external institutional incentives. The international trend of developing coastal biology in the early twentieth century was something coveted by Chinese scientists. They noticed China's lack of marine research sites at the time and were motivated to transform the research and teaching of biology with the construction of such facilities. Bringing the MBL institutional model and cultural practice to China between 1930 and 1936, Chen Ziying established a Chinese connection with Woods Hole at a time when science was shaped by the overriding force of nationalism.

Science is a many-splendored thing, and so was the idea of nationalism. Although foreign scientific expeditions were not unburdened by the weight of nationalist ideologies, the vagueness of *nationalism* and *foreign* gave Republican-era Chinese scientists certain latitude to participate in transnational scientific collaboration. One may see the MBL-China historical connection emerging at the marine frontier as a counterforce to the terrestrial scientific activities overshadowed by nationalistic impulses.

Much of the discussion of the history of science in modern and contemporary China has concentrated on the role of science for national preservation and empowerment. But China was also a significant member of the world community. Biologists working at the coastal metropolis continued to be inspired by and connected to the international scores of marine sites and stations. The historical connections between Chen Ziying and Woods Hole, the MBL and Amoy, the United States and China, call for scholarly awareness and reflections on the interplay between scientific nationalism and internationalism in considering the history of science in modern and contemporary China.

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