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Science in Transnational Settings: Knowledge Exchange in Expeditions in 1920s Republican China

Yinuo Cai[1, a, *]

[1] *Department of Chemistry, University of Oxford, United Kingdom*
a. yinuo.cai@spc.ox.ac.uk
**corresponding author*

Abstract: The 1920s to the 1930s in Republican China witnessed rising academic interest in exploring China's frontier regions, both from abroad and within the nation. This paper examines the nature of foreign exploration in China at that time and the resulting exchange of knowledge that shaped science's development worldwide. The exchange was facilitated through an elite network of international specialists in Beijing, while Chinese academics and local residents became increasingly indispensable to foreign investigators—thanks to their local knowledge and control over the sites. Together, they not only contributed to the establishment of indigenous scientific institutions but advanced the geology, archaeology, and paleoanthropology fields internationally. However, the nominally objective work of Western scholars often masked hegemonic inclinations, both explicit and implicit, which tended to vary according to the country sponsoring each investigator. By the late 1920s, rising Chinese objections to foreign exploration caused conflicts between imperialist motivations and nationalistic powers. Thus, it would be equally a reductionist reading of history to simply assume Republican China's intelligentsia were the victims of imperialist aggression or to draw a rosy picture of transnational collaboration. This paper suggests that early twentieth-century Republican China offers a rich example of the intersection of scientific internationalism, imperialism, and nationalism.

Keywords: geology, expeditions, Ding Wenjiang, Republican China, transnational collaboration

1. Introduction

As previous historians have stated, China's history during the early Republican era was inextricably linked to the political context and "must ultimately be interpreted according to the nature of its foreign relations" [1, 2]. Scientific and technological activities, which were considered an important part of a nation's construction and modern history, could not be understood without being viewed in such transnational settings [3]. Not only did Chinese students study overseas, but scholars from other nations came to China's borders and worked closely with Chinese intellectuals.

In the late nineteenth century and at the turn of the twentieth century, many Chinese students went abroad for education, aiming to apply multilingualism in order to access new areas of knowledge, normally of highly specialized subjects. They also had the goal of returning and serving the nation, which, at the time, was emerging into the modern world as a weak player and forced to compromise

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its sovereignty by the imperialist powers on the ground [4].[1] They were involved in demonstrating the link between science and the nation's standing on an international stage, particularly when, after the May Fourth Movement, scientism fully established its status as an authority in epistemological and later moral and political ways [5]. Geology was one of the scientific disciplines considered by some participants as a means of raising the national profile and honing the national identity. Equipped with such specialized knowledge, these returning students became leaders in the political, social, and scientific fields, establishing new educational systems and releasing new periodicals to raise Chinese science's standing.

Meanwhile, foreign intellectuals became more interested in the opportunities of scientific expeditions in China's outlying territories, as they thought this exotic land was the best opportunity to uncover mysteries from millions of years ago. The areas around Beijing and the city itself received the most attention, as most of the scientific fieldwork took place there. With the Boxer indemnity funds and institutions like the Rockefeller Foundation, international scholars—mainly Europeans and Americans—were invited to teach at Chinese universities or assist research within local institutions [6]. Some were also co-sponsored by organizations in their own nations. Many researchers worked alongside Chinese scholars and lived in Beijing, while others saw Beijing as a temporary stop to prepare and gather information for further investigations in the border regions, such as Xinjiang, Yunnan and Mongolia. The Central Asiatic Expedition led by Roy Chapman Andrews and the French exploration team headed by Sven Hedin are two examples.

Like the May Fourth intellectuals, foreign researchers believed in the authority of science and claimed to conduct expeditions out of academic concerns only, but their intentions were not completely free of political implications, including the desire to showcase national strength by collecting specimens and excavating fossils. Other than being imperialistic, nationalistic or purely scholastic, personal reasons also might have been involved, as the living standards in Beijing were high enough to impress the foreign explorers working there [7]. Despite different forms of collaboration, competition, and friction, scholars working in China all shared a similar goal: searching for the human origin [7, 36]. During the 1920s, both academic meetings and social activities such as formal dinners made Beijing a cosmopolitan intellectual center. The National Geological Survey of China (Dizhi diaochasuo) and later Geological Society of China, two of the crucial academic institutions in Beijing's scientific network during the 1920s, were lively and highly international in character.

2. The International Scientific Network and the Cultural Milieu

The Geological Survey, launched in 1916 under Ding Wenjiang's leadership, was a key institution open to international influence. Just as many Chinese intellectuals of his generation, Ding had received education abroad, from Japan to England, including at the University of Cambridge, and graduated from the University of Glasgow with a double degree in zoology and geology [5, 8, 9].[2] After returning to China, Ding trained young geologists with Weng Wenhao at the Nanyang Geological School and was devoted to the development of geology and paleontology.

Ding Wenjiang was an important figure in communication between international and Chinese academics and often presented as a representative of Chinese scientists on the world stage, thanks to his fluent, almost native English. For example, 27 letters between Ding and American scholars were all written in English — collected and organized in *V. K. Ting's Correspondence (1919–1934) in*

[1] In the speech recorded in the newspaper *The China Press*, Ding Wenjiang reminded students to not be too Americanized and keep their Chinese originality, which was his goal during his overseas study period.

[2] For a general introduction to Ding Wenjiang's multi-faceted career, see Furth, 1970; for more information on his scientific activity and professional practice, see Shen, 2007.

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American Collection by Qi Han [10]. Ding's linguistic resources and skills allowed him to ask for support, negotiate, and express subtle warnings against the imperialist plans of the American Museum of Natural History. He also managed to send publications overseas [10].[3] Like geological surveys in other countries, the Geological Survey in China was committed to practical utility: mapping the terrains and surveying of mineral resources. The primary missions were not just confined to such fundamental functions but also sought to carry out purely scientific research in paleontology and archeology. Ding invited Johan Gunnar Andersson, the eminent Swedish geologist and archeologist, and Amadeus William Grabau, formerly a professor of paleontology at Columbia University and, at the time, a professor at the University of Peking, to work at the Geological Survey and contribute to this branch of scientific work. The survey also worked closely with famous scientists all over the world, such as Schlosser of Germany and Boule of Paris [10].[4]

The members of the Geological Survey mentioned above, together with other intellectuals of Beijing's elite transnational network, founded the Geological Society in 1922 and intellectuals continued to join the community [2]. As the earliest geological academic society in China, it became the most important platform for scholars from different nations to share thoughts and discuss academic problems with native support. The Chinese Weng Wenhao served as the vice-president, and Ding Wenjiang, the Swede Johan Gunnar Andersson, the Americans Amadeus Grabau and Walter Granger, the Canadian Davidson Black and the French Pierre Teilhard de Chardin were all core members of the society in particular and the scientific network in general [11, 12]. Strong bonds of friendship were formed between the members [7]. Provided with native support, the members could meet on equal footing, talking frankly and casually without being confined to regulations. These meetings were valuable to every member and shaped Ding's view towards forming a close and collaborative scientific circle [13].[5] As Pierre Teilhard de Chardin wrote in his letter discussing the dinner celebrating Andersson's departure, "I believe that never in all my life —family life included— have I spent hours so rich and cordial as that evening. As so many other times in Peking, the occasion was pervaded by a dimly sensed triumph at the overcoming of racial, national, and religious barriers" [14]. The warmth and internationalism of the Society, which emerged from a synthesis of nations and intellectual collisions, allowed the community to achieve "complementary riches of East and West" [14]. The structure of the Society crossed national boundaries, framing a fluid, ever-changing yet lively atmosphere for the pursuit of science.

The widespread usage of English and other European languages among elite scientists ensured the feasibility and effectiveness of this form of knowledge exchange. The majority of the communication between Chinese intellectuals and scholars from other countries was in Western languages, including correspondence, scholarly journals, lectures, and everyday conversations [7]. For example, Weng Wenhao spoke and wrote excellent French, and Ding Wenjiang published preliminary reports and conversed in English with Swedish geologist Andersson and American explorers [2, 15]. Moreover,

[3] From his letter to George Edgar Vincent, president of the Rockefeller Foundation from 1917 until 1929, it was clear that Vincent helped Ding publish works of the Chinese Geological Survey in the U.S. "The National Geological Survey of China, 1916–1922", written by Ding in English, can be found in the American Museum of Natural History Library, Yale University Sterling Memorial Library, Academy of Natural Science, Harvard University Museum, and Johns Hopkins University. More on the details of the correspondence between Ding and American scholars will be discussed in the second section.

[4] In the letter to Henry Fairfield Osborn, the president of the American Museum of Natural History, Ding Wenjiang attached a memorandum explaining the basic settings of the survey. He hoped Osborn could support them to obtain the Boxer indemnity funding. Andersson and Grabau were the two foreign scientists of the survey, which had 20 total staff members in 1924.

[5] In the speech Ding delivered to the Union Club, he talked about his view towards forming a comfortable and collaborative environment for scientific discussions, which was likely shaped by the lively atmosphere of Beijing's transnational circle.

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The Bulletin of the Geological Society of China, now named *Acta Geologica Sinica*, was the official organ of this organization. Articles were published primarily in English by scientists of different nations, with occasional Mandarin, French, and German papers. To name a few, Chinese scholars such as Zhang Hongzhao (H.T. Chang), Wang Chongyou and Weng Wenhao, all had essays written in European languages published in both Chinese and foreign periodicals [2, 16, 17].

English had become the new *lingua franca* of science and diplomacy. This development was indicative of the considerable shift in the power structures and geopolitical relationships. Rather than the passive, inefficient way missionaries translated texts verbally into spoken Chinese and then to classical Chinese that occurred in the 19th century, Chinese intellectuals acted as active players in adapting to the new situation by immersing themselves in the foreign language and seeking new knowledge forms [18]. In contrast, most foreign scholars did not speak Chinese, and almost all the conversations were in Western languages if foreign academics were involved. This tacit linguistic requirement not only confined community members to the upper-class Chinese intellectuals but also indicated the unequal power relations and potential hierarchies within this seemingly rosy depiction of the community. In fact, after living in China for four years, Pierre Teilhard de Chardin only had got "good half-dozen [Chinese] friends", with whom he kept in touch [14]. This is an example of Western researchers becoming acquainted only with the highly Westernized Chinese intellectuals who spoke in their tongue.

The informality and linguistic flexibility of the Geological Society had indeed encouraged the development of geology, paleontology, and other aforementioned disciplines. The Society adopted the strategy of turning its weakness — non-dominance in the field — into diversity and "scientific sociability" and thus formed its unique identity [2]. However, these interactions and changes aligned with the greater historical trends and ought to be understood as a part of the cultural milieu. The participants of the transnational collaboration were not always on equal footing but rather had to navigate the existing inequities. After this brief introduction to the background, I will take a closer look at the correspondence between the Ding Wenjiang and American scholars, which further demonstrates the approach employed by Chinese intellectuals towards the tide of foreign explorations on China's frontiers in the 1920s.

3. Openness and Negotiation

The Asiatic Expedition, sponsored by the American Museum of Natural History, was a series of expeditions spanning over ten years on Chinese frontiers starting in 1916, which was considered one of the most important land expeditions in exploration's history. Before Ding Wenjiang took a hiatus from the scientific field to undertake a political role as the mayor of Greater Shanghai in 1925, he frequently corresponded with Henry Fairfield Osborn, the president of the American Museum of Natural History at the time, as well as Roy Chapman Andrews and Walter Granger, American explorers who visited China for surveys and fossil collection for the museum. Besides discussing the scientific plans of both the American Museum of Natural History and the Geological Survey, their social activities such as dinners, were accommodated. In their correspondence, both parties exhibited a willingness and practical dedication to collaborating [10]. However, there was a need to negotiate the details of the expeditions to avoid potential competition.

Ding Wenjiang wrote his first letter to Osborn on 29th January 1919 after he had stayed in America for a short period. Following this, he embarked on trip to Europe with Liang Qichao and other students, who functioned as China's unofficial delegation to the Peace Conference [19]. This was an important period for Ding as he engaged with the international and U.S. geological and paleontological institutions. He visited George Otis Smith, an American geologist, and Charles Doolittle Walcott, a famous paleontologist, who agreed to send several publications to the Chinese Geological Survey to assist with the development of its working library.

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After being introduced by Walcott, he travelled to New York to visit Osborn, who unfortunately was not present during Ding's visit yet expressed great interest in cooperating with the Chinese Geological Survey in his subsequent letter to Ding. In fact, Osborn noted that he was willing to send a set of his publications and vertebrate paleontology publications to support the survey [10]. The decision to assist with the development of the Geological Survey and offer complete cooperation, however, cannot be simply attributed to pure benevolence but rather the ongoing expeditions into the borders of China under the leadership of Roy Chapman Andrews, the Associate Curator of the American Museum of Natural History.

A friendly relationship with the host country's Geological Survey was beneficial for the museum's expeditions, as the terrains appeared unfamiliar and exotic. Foreign explorers who collected information from different parts of the world engaged with native actors and procured knowledge from them. They relied on indigenous human resources who might not be able to converse in English but could act as guides [20].[6] Knowledge production was reliant on the physical and intellectual labor of both experts, whose participation guaranteed their contribution to shaping the scientific fields, and uneducated non-experts. To quote Ding Wenjiang, "Although foreigners have better achievements than us, they do not speak Chinese and do not know China's needs. Without capable Chinese to guide them, they cannot work to the best of their ability" [7].[7] Ding and the Geological Survey were closely associated with the geology of the land as they held sufficient resources and experience about local sites and certain political influence with both foreigners and Chinese. Thus, they were considered the perfect mediators and translators in language and academics.

The Asiatic Expedition mentioned above was the first of a series of expeditions announced by the Trustees of the American Museum of Natural History in March 1916 to search for rare forms of animal life in China and Mongolia. The conceptual foundation could be traced to Osborn's theory in 1900, which suggested that Asia might be the center of dispersal for Northern terrestrial mammalian life as similar mammalian fossils were found in Europe and North America [21]. Osborn reiterated the hypothesis in his book *Men of the Old Stone Age* in 1916 by emphasizing that ancient Asia was a huge "dressing room" wherein new races of mankind evolved before moving to the European Pleistocene stage and playing their part [22]. Meanwhile, William Diller Matthew, the principal vertebrate paleontologist at the American Museum of Natural History, believed that Asia's plateau was the place where humans first came into being [23]. One of the most effective ways to prove this hypothesis was to conduct scientific fieldwork on the site of the Chinese frontiers, a proposal made by Andrews and supported by Osborn in 1915. As stated in *The New Conquest of Central Asia*, "if it was Osborn's scientific insight that inspired the expedition, it was Andrews's experience that ensured its successful issues" [24]. Andrews led The First Asiatic Zoological Expedition in Yunnan and the Tibetan frontier in 1916 and The Second Expedition in Mongolia in 1919 so that expedition members could become personally acquainted with the sites before going deep into inner Mongolia [7, 24].[8] Following that, the largest and more comprehensive Third Asiatic Expedition (or Central Asiatic Expedition, CAE) took place in inner Mongolia in 1922 for over ten years.

While American expeditions were already equipped with advanced technologies, such as moving picture cameras, snares to trap animals of all sizes, from mice to elephants, and Dodge automobiles

[6] For more discussions about the roles of local guides and surveyors in shaping the knowledge production on these expeditions, see Erik Mueggler, "The Age of Wild Ghosts: Memory, Violence, and Place in Southwest China".

[7] Ding Wenjiang, "Woguo kexue yanjiu shiye [Scientific research work in our nation]", Shenbao, December 18, 1935, as cited in Yen, 2015.

[8] The two Asiatic expeditions before the inner Mongolia one were a success: A huge number of specimens, fossils, and geological information were collected, which encouraged further expedition. The Third Asiatic Expedition in 1922 and five more journeys in 1922, 1923, 1925, 1928, and 1930 to inner Mongolia were generally referred as the Central Asiatic Expeditions. For details of the expeditions, see Roy Chapman Andrews, "The New Conquest of Central Asia: A Narrative of the Explorations of the Central Asiatic Expeditions in Mongolia and China, 1921–1930".

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to commute across the desert, the Geological Survey was China's first step in developing geology and paleontology fields [25, 26].[9] Well-versed in the geopolitical situation and observing the growing interest in China's land from overseas scholars, Ding Wenjiang knew that China at that time was not capable of completing the expeditions independently. Meanwhile, he was aware of the mutual reliance that characterized the project, as it would be difficult for foreign expeditions to succeed without native Chinese support. As the leader and leading scientist of the Geological Survey, he actively cooperated with the Central Asiatic Expedition's visit and invited Osborn to conduct a few lectures at the National University of Peking [27].[10] He expressed great interest in their expedition to Mongolia in the Far East, which he referred as "the most encouraging" for scholars in China who have been "struggling [with] for the past few years" [10, 28].[11] This attitude, however, seemed to oppose the later approach of the National Commission for the Preservation of Chinese Antiquity that tried to provide safeguards from being invaded by foreigners for the national heritage. In the end, Ding sent a gentle reminder to Osborn to "kindly send a complete set" of the publications to the American Museum of Natural Science since they hadn't received any after 1919.

Despite openness to collaboration, Ding Wenjiang was a patriot who served China first and foremost. He fully comprehended the importance of regulating the prioritization of Chinese expeditions in favor of the Geological Survey instead of working towards fulfilling the expectations of explorers hailing from other nations. The letter Ding sent to Andrews in 1921 serves as an example of how he negotiated with the Western explorers and attempted to optimize the Geological Survey's benefits by determining the American expedition's parameters. In the letter, he clarified that he wanted to preserve certain sites for the Geological Survey and set limits for expeditions to avoid possible repetition and competition.

The Central Asiatic Expedition team spent an entire year preparing in Beijing before its first departure for Mongolia in April 1922 [24]. Upon arriving in Beijing, Andrews immediately visited the Geological Survey and received a cordial reception. When Andrews met Ding Wenjiang in his office, they discussed each other's expeditions. Ding informed him that the Geological Survey had an interest in places such as Chihli, Shantung, Shansi, Honan, Shensi, Kansu, Manchuria, small areas around Hallong Osso, and the District of Kueichoufu and Wanhsien (Szechuan) and hoped to preserve the areas for Dr. Andersson, the survey's mining advisor. In return, he would ensure that Walter Granger, another member of the Central Asiatic Expedition, was positioned in "some of [their] best localities" and would "try to give [them] all the help" and share duplicates with the American Museum of Natural Science to the best of their capacity. This assistance would be rendered only if the Central Asiatic Expedition team promised not to "make any collections of fossil mammals in or write any paper on the areas mentioned above," and the team kept their word [9].[12]

Though, after further deliberation, the survey handed over the districts of Guizhou, Sichuan, and Hallong Osso to the American team, which were of considerable importance as they contained a distinctive fauna [10]. Both Ding and Andersson agreed on this decision—partly as a friendly gesture and partly because Andersson had just returned from a previous field trip and the Geological Survey was too busy to carry out expeditions in that area [28]. Granger discovered rich quantities of fossils in the later years, proving that Sichuan was of considerable importance, just as Ding had suggested [29].

[9] The moving-motion camera was a new noiseless product that the media reported about several times in 1916. Not only did the explorers send the dead animals' hides to the museum, but pictures were also taken by motion-moving cameras when the animals were killed to reproduce the locality in which each animal had lived in the scenery glass.

[10] Osborn didn't come to China until 1923, and his visit was reported in "From Day to Day".

[11] Previous attempts to Mongolia before the Central Asiatic Expedition team were performed by Johan Gunnar Andersson in 1919, see "Essays on the Cenozoic of Northern China".

[12] Letter from Ding Wenjiang to Roy Chapman Andrews, April 18, 1921, could also be found in Special Collections, American Museum of Natural History.

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Andrews not only collaborated with his Chinese counterparts in academic research in Beijing but had personal contact with them [10]. The members of Central Asiatic Expedition often joined the formal meetings held by the Geological Society of China and informal associations with other geologists and naturalists in Beijing to discuss problems of mutual interests. Casual meetings were held at various places, such as the residences of Andrews and Andersson and the headquarters of the Third Asiatic Expedition. Ding Wenjiang, whose name was often listed first on the reports, Weng Wenhao, Davison Black, and other core members of Beijing's intellectual network attended these informal meetings, which attracted media attention and significant interest from academic fields. [30].

Andrews and Osborn demonstrated appreciation for the Chinese Geological Survey for its support and complimented the institution's scientific work. Andrews claimed that it was "an institution of recognized importance throughout the world" in *Science*. It was noticeable how the comment had changed from "China has no institution wherein natural history objects can be studied and exhibited by modern methods" highlighted in the same journal two years ago [31, 32]. He also mentioned that both sides had agreed upon a plan of operations, referring to the site arrangement discussed earlier. Osborn was pleased with the reports from the Third Asiatic Exploration and informed the press that the results had vindicated Osborn's theory that the American and the Asiatic continents were once connected, as the mineral formations found in Mongolia were identical to those in Utah and Wyoming [27]. He also expressed his appreciation for Ding Wenjiang for his cordial manner and the "generous spirit of scientific interest" by contributing to the scientific exploration in China. He was sure that the Geological Survey would not regret the cooperation and these mutual benefits would strengthen both sides [33]. Annual reports, copies of magazines, and expedition finds of the American Museum of Natural History were sent to the Geological Survey in return for the cardinal help [27]. Osborn later visited Beijing in 1923 to inspect the expeditions' work and prepared for a two-week trip to Mongolia with Andrews, where he received a great welcome from the Geological Society [31].

Moreover, it was agreed as early as 1921 that the American Museum of Natural History would provide a duplicate set of the collections to the Chinese government. Osborn mentioned that the Geological Survey could include the collections, but he also conceived a plan to help establish a Chinese Museum of Natural History institution, with the duplicates forming its foundation [10, 32]. The proposed institution was to house and exhibit a valuable nucleus of specimens from the Central Asiatic expeditions and the American Museum so that Chinese experts could carry on the work.

However, Ding Wenjiang's unspoken lingering concerns about this plan were soon dispelled in his letter to Andrews dated January of 1923. He emphasized that the Chinese Geological Survey, through a considerable amount of work and money, had already established "a geological and paleontological museum before any scheme of forming a general natural history museum was thought of" [2, 10, 34].[13] Hence, it should not be marginalized to merely making maps, even if these same branches of science were to be presented in a brand-new museum named using the terms "Natural Science." Rather, as a native scientific institution, the Chinese Geological Survey ought to be the "official representative of the sciences of geology, mineralogy, and paleontology including prehistoric archaeology." The new natural museum was welcome to include zoology and botany to facilitate cooperation [10, 35].[14]

Ding Wenjiang exemplified a cosmopolitan Chinese individual who was savvy and resourceful and understood imperialist ambitions; yet, he used his cosmopolitanism to forward his national interest and investment in geology. The specimen donations from the American Museum of Natural History would add diversity to the geological academic field in China. However, if a natural history museum were to be established by the Americans with their donations forming the basis, the

[13] Andersson had been asked to start a museum in the Geological Survey, mentioned in "Swedish Geologist Narrates Experiences in China".

[14] Eventually, the new Museum was not established.

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American government and its institution would gain more control over the primality of Chinese natural history as a discipline and an essential part of the modern nation. Hence, Ding Wenjiang wanted Osborn and the team to take a step back and relinquish control over the already established indigenous institution that was to function as the primary representative of modern China's natural science. Ding's apprehension and tough attitude were not based on blind confidence, but the Geological Survey's exhibitions of mineral deposits, stratigraphy, dynamic geology, paleontology, and archaeology [10].[15] Only with such an accomplishment was he confident to point out that Andrews's idea that the Geological Survey "[confined its] attention to practical geology" was "by far not the case", and Andrews should go through the survey's museum personally before presuming its capability and making any plans [10].

Despite the cosmopolitanism and collegiality of the network, existing geopolitical differences and unevenness shaped some of the relationships. America, in the early twentieth century, was ambitious, imperialistic, and quickly growing, while the resources available to Chinese scholars at the start of the 1920s were inadequate for them to solely rely on, regardless of the improved native institutions and expanded fieldwork coverage. Therefore, instead of excluding foreign research interests in the Chinese territory, the Geological Society led by Ding framed the Chinese territory as a shared concern and supported it with a free scientific platform to rope in foreign scientists for assistance by enabling them to partake in the Society's functions [2]. While this inclusive vision gave Chinese geologists access to foreign research networks, the globally enhanced profile of Chinese research was gained potentially at the cost of compromised sovereignty and strategic negotiation was required.

However, equipped with local knowledge and certain forms of enterprise sought by foreigners, the Chinese Society became increasingly indispensable to the expeditions and was capable of leveraging their strengths during negotiations, despite the existing power inequalities. This resolved the supposed contradiction of why actors like Ding were highly nationalistic and yet seemed to be so cosmopolitan. He sought Westerners' expertise and engagement in the scientific endeavor as he expanded geology as a field in China; at the same time, he set well-defined parameters and prioritized certain scientific enterprises to restrict imperialist ambitions.

China was an agent in its pursuit of scientific knowledge and the expeditions, which later became the basis of the modern fields, were heavily reliant on the physical and intellectual output of both uneducated local people and researchers. Acting as collaborators within the cosmopolitan scientific circle, they did not just accept knowledge from abroad but also presented local knowledge about the sites and influenced how expeditions could take place. The traditional way of considering the notion of modern science as being solely Western and non-Western scholars bringing knowledge back to their nations ought to be challenged. Science has always been global in nature, and the development of geology in Republican China is merely one example.

4. Comparative imperialism when facing rising nationalism

The Central Asiatic Expedition gradually altered their line of inquiry, focusing on the origins of humans after sufficiently proving Osborn's theory that the whole Central Asian plateau was the dispersal center of mammalian life. This new investigative direction was also stimulated by the discovery of the Peking Man by Gunner Andersson, the Swedish adviser of the Chinese Geological Survey. Two hominid teeth were found in a cave deposit a few miles outside Beijing in 1926. They dated to around a million years old and seemed to be directly linked to humans' ancestry. The team's

[15] As mentioned, American institutions had published Ding's memorandum in 1922, and the survey was collaborating with foreign institutions. In the memorandum Ding sent to Osborn in 1924, he claimed that by then, the library contained nearly 20,000 volumes and exchanged with scientific institutions all over the world.

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chief concern then was to look after traces of the two-million-year-old "pre-dawn" man, who was ape-like but showed some human characteristics [36].

However, the friendly relationship between the Central Asiatic Expedition team and the Chinese institution was severely hindered by the rapidly rising anti-foreign nationalism faced by explorers since 1927 [14]. In 1928, when the Central Asiatic Expedition went on an exploration sanctioned by the Peking government and sponsored by the United States Minister John Van Antwerp MacMurray, the expedition went beyond Kalgan, and 87 boxes of their collections were detained by the National Commission for the Preservation of Antiquities (Zhongyang guwu baoguan weiyuan hui) [7, 37]. This institution was founded by the Chinese nationalist government, inaugurated in Nanjing in 1927, to implement restrictions on foreign expeditions and the preservation of ancient relics, as the nation-state viewed control over national heritage and antiquities as inextricably linked to the construction of its nationhood.

The radical responses of both the government and younger generations were not completely surprising, given the long history of looting prior to the expeditions. The Century of Humiliation could be dated to the First Opium War in the mid-19th century amidst the political unraveling of Qing China [38]. By preventing foreigners from stealing and exporting ancient relics overseas, the government maintained its sovereignty and, hence, asserted national identity [39]. While Andrews's excavations of paleontological and archaeological objects were freely made using only a hunting passport, his actions were considered stealing and a violation of Chinese sovereignty by the Chinese public and the committee [40].

The detention of the specimens was only the beginning of a series of altercations between Andrews and the officials of the Chinese National Commission. After the fifth season of the Mongolian expedition in 1930, the National Commission for the Preservation of Antiquities refused Andrews's request for further expeditions in the Gobi Desert and declined an interview with Andrews in 1931. In response, Andrews announced that he would close down the Beijing headquarters and turn to the Manchukuo government, which he claimed was more liberal than the Nanjing government. In the exchanges of letters released and published in newspapers, the commission implied Andrews did not keep his word as he had repeatedly declared that the 1930 expedition ought to be the last one, so further discussion was unnecessary [41-43]. Andrews admitted his words but immediately explained that the president and trustees of the American Museum of Natural Science had unanimously agreed upon the urgency of completing the work to solve the unexpected problems produced; otherwise, the scientific value of the ten-year-long research would be lost. However, the proposal was rejected again.

He then accused the National Commission for the Preservation of Antiquities of "obstructing world science", which was "unprecedented in international relations" and must bear the entire responsibility for "great discredit [brought] upon China." The commission soon replied, alleging that Andrews's arrogant personal attitude should solely be responsible for the failed cooperation. Despite his "discourtesies toward Chinese scientific institutions" and carrying out expedition without legitimate certificates, the commission had already released his collections in 1928 and allowed his expedition in 1930. The commission blamed him for attacking the Chinese government in the American press and demanding more research opportunities instead of showing appreciation [43]. This heated controversy lasted until Andrews moved the headquarters to Mukden in 1933, bringing the expedition's work to a close [44]. It received significant attention from America and China, raising the issue to the political level with a bearing on Sino-American cooperation and relations, as each side was representative of its nation's profile. While the commission ensured that the questions related to exploration had always been referred to the national government, Andrews was the vice director in charge of the American Museum of Natural Science's research by then. Osborn confirmed that Andrews officially represented the museum in China at all times [41].

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The very aggressive strategy taken by the commission was in great contrast to the collaborative approach Ding Wenjiang cultivated with imperialists. By the 1930s, improved native institutions and expanded fieldwork coverage led to a lower appetite across the board for foreign expeditions. The rising nationalism in China and the growing awareness that the imperialist agenda of the scientific expeditions could be at the expense of Chinese sovereignty meant Ding's method gradually became out of step.

The National Commission for the Preservation of Chinese Antiquity published a sarcastic statement, noting that "the great American institution [did] not really intend to use any political weapon to intimidate the Chinese government" to obtain authority [41]. This irony did not emerge in a vacuum, despite Andrews's insistence upon the scientific pursuit of the American Museum of Natural History and denial of any interest in politics or economics as the expedition had never taken anything of commercial value from the country and had already presented collections and publications to China [41].[16] As early as 1916, when Andrews initiated the expeditions, the American Museum of Natural Science had begun to reveal some of its imperialist ambitions. *The China Press* reported that the expeditions were the first step planned by the museum to encompass the entire Asian continent, taking "every possible specimen of birds, mammals, fish, and reptiles", and with the goal of bringing New York "the greatest animal collection in the world" [26]. Yet, the American Museum of Natural Science's explorations were part of a larger initiative to expand the museum's collections not only to Asia but also to North and South America, Europe, Africa, and in sum, all over the world [7]. As pointed out by Lukas Rieppel, the skeletons displayed by the American Museum of Natural History were a "scientific and popular sensation" that went beyond pure paleontology to enhance the prestige and serve commercial purposes [45]. Other than entertainment and educational value, complete sets of specimens and remains from across the globe signified national strength and scientific advancement, and displayed significant power and wealth. Thus, on the one hand, Ding Wenjiang's agency seemed beneficial; on the other hand, it was undoubtedly risky.

The Central Asiatic Expedition team was not the only expedition influenced by the anti-foreign movement that started in 1927; almost all the scientific work led by foreigners was influenced by this movement. When facing this rapidly changing political situation in Beijing, Teilhard de Chardin blamed the actions of the young Chinese as xenophobic, calling them ill-conceived and "[buffeting] the young and promising tree of the Geological Survey" [14]. However, his criticism and prejudices were slightly different from American scholars' condescension towards ordinary Chinese people, such as Osborn, who complained about the "immense amount of time [given] to the Chinese problem" due to "the absolute ignorance of the Chinese" [2].[17]

Although Teilhard de Chardin criticized the Chinese youth for blindly rejecting all foreign investigations, he questioned the traditional "psychologically diminished, weakened" portrait of China. He had several Chinese friends who were "exceptional, terminal individuals" and probably represented "a germ and a blueprint for the future" [14]. This subtle difference in attitudes can be shown more clearly with Swedish scientists. As introduced by Hsiao-pei Yen, the investigation into Northwestern China, led by the Swedish geologist Sven Hedin, was vehemently opposed by Chinese student organizations in 1927. Foreign teams had to accept a Chinese co-director, and half of the expedition staff would have to be Chinese, with their expenses paid by foreigners. While Sven Hedin continued to praise Chinese students in public—but complained about their lack of specialist knowledge in private—Andrews openly opposed the cooperation mode and condemned the Chinese government and the commission for holding back scientific work [7].

[16] In fact, the offers presented to the American Museum of Natural History for the 25 eggs discovered in 1925 were up to $2000 per egg, so they were of great economic value.

[17] Henry Fairfield Osborn's letter to Childs Frick, in Special Collections, American Museum of Natural History, as cited in Shen, 2014.

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The Swedish geologist Johan Gunnar Andersson was the director of the Geological Survey of Sweden from 1903 to 1915, after which he was the geological advisor of the Chinese government. While he was considered one of the founders of the Geological Survey of China, he was modest in an interview, claiming that he "was only fortunate enough to be there at its founding while the real work was done by Chinese geologists, including Ding and Weng" [34]. During his stay in China, Andersson contributed to a large amount of crucial paleontological and archeological discoveries, including the most famous—the discovery of the Peking Man at Choukoutien.

In 1927, when he left China for a better position in Sweden, Andersson was permitted by the Chinese government to bring a large number of materials he had unearthed to Sweden to study. He faithfully brought back the promised materials to China in 1936, and they became the property of the Geological Survey of China [34]. In contrast, the Central Asiatic Expedition team refused to compromise with the National Commission for the Preservation of Chinese Antiquity because they wanted to keep all their collections, although only the representative duplicates of fossils and casts of the specimens were required [7].[18] Andersson continued to maintain a friendly relationship with China. During his visit to China in the mid-1930s, he accepted interviews and delivered scientific lectures about the bronzes of the ancient Huns to local educational institutions, like the Royal Asiatic Society. He also dedicated his first book of travel experiences in China, *The Dragon and the Foreign Devils*, to the Geological Survey [34, 46].

As a citizen of a noncolonial European country, he was far less imperialistic than some other scientists. However, he still had some stereotypic attitudes about ordinary Chinese people, and Ding was characterized as "not a typical Chinese." Though more gentlemanly, he was not completely immune to the European imperial hegemonic contexts and his Swedish-sponsored fieldwork was viewed as a great opportunity to advance Sweden's prestige and scientific accomplishments.

Among the countries manifesting their imperialism, European and American intellectuals showed different degrees of condescension towards ordinary Chinese people and various forms of imperialism. These biases and ambitions, however, were not just an articulation of aspects of individual personalities. Instead, they were a product of certain societies and ideologies. In the elite social circle itself, transnational conversations and partnerships took place, whereas the larger backdrop was geopolitical unevenness. Benefiting from immense natural resources, huge capital, and advanced equipment, America was an upstart superpower at the turn of the twentieth century. Compared to the thriving powerhouse of America, European countries, like Sweden, tended to be seen as aging and impaired due to the impact of the First World War and were consequently less aggressive. Even within that friendship group, the scientific exchange became increasingly tense when scholars faced fierce competition from each other for fieldwork opportunities, leading to a tenuous sense of equality in this "Chinese-American-Swedish milieu" in Beijing [14]. Scientific discoveries and analyses do not occur in a political and cultural vacuum. Instead, they arise in the zone where nationalism and transnationalism meet and cross over [39].

With reviving nationalism and recognition of the inherent Western imperialism, the ambivalent position of Ding Wenjiang as a nationalist supportive of international engagement resulted in controversy. Even today, Ding is sometimes criticized for not being nationalistic enough and too familiar with Westerners. While the so-called pure science research and academic scientific exchange were covered up with imperialist intentions, he tried to fulfill Westerners' collection requests in China's sovereign territory. Yet, China's indigenous institutions and technologies were indebted to the knowledge brought by foreigners.

As explained in the previous sections, the nation and its scientists benefited from the shared raw data—fossils and relics—and dynamic discussions with intellectuals in the international network.

[18] Andrews eventually shipped all but one box of archaeological relics detained after the 1928 expedition to America and did not return any specimens as the commission had wished.

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China desired to obtain Western skills and capital for its natural science development. Moreover, when the Chinese scholars gained access to publishing and discussing their outcomes internationally, they also strengthened geologists' domestic position, attracting native scientists and enriching the understanding of Mongolia as well as other frontier regions. The fieldwork experience gained during the Sino-American or Sino-Swedish collaboration and the technology introduced abroad served as the basis for native research institutions, such as the Cenozoic Research Laboratory founded in 1929. The Geological Society was also shaped as a professional society defining the discipline of geology and paleontology not only in China but also worldwide.

5. Conclusion

Early twentieth-century Republican China offers a rich example of the interaction of scientific internationalism, imperialism, and nationalism. European and American expedition leaders came to China with both scientific pursuits and imperialistic attitudes. Due to their unfamiliarity with the terrain, knowledge production was reliant on the physical and intellectual contributions of local residents and non-experts, whose value was not appreciated but relegated to ordinality. Foreign explorers also had to collaborate with Chinese scholars, who had received overseas education and at the same time were equipped with indigenous knowledge and power to set parameters on the fieldwork. The dynamic transnational conversations and activities were mutually beneficial to both sides, not only contributing to each nation's science but also global science.

Their seemingly rosy picture of an equal partnership, however, should be interpreted in a larger geopolitical situation where inequity and unevenness were under the gentlemanly veneer of collegiality. Chinese scientists were working from a position of weakness, though they could negotiate to facilitate the possibility of building native institutions, and attitudes toward scientific enterprise in China varied even among Western scientists. European geologists, represented by the Swedes, clearly demonstrated different manners from the well-equipped and sufficiently funded American Central Asiatic Expedition team.

The complexity that characterized Republican China cannot be simply reduced to a dichotomy of Western imperialism versus Chinese nationalism, nor should the entire process of knowledge production be labeled as the indigenization of Chinese native institutions. Chinese people were capable of leveraging their strengths and asking for equal treatment in terms of fieldwork and collections. Ding was one example of a scientist who actively invested in building native organizations and supporting Chinese geology as a field. Growing opposition towards foreigners' unrestricted access to the frontier areas in the late 1920s was precisely proof of the success of Ding's method—the surveys were less reliant on foreigners and less tolerant of imperialist ambitions. Chinese scholars built these fields by adapting foreign knowledge, but their participation in these expeditions and in the international conversation helped form modern geology, paleontology, and archeology. The knowledge that defined the notion of Western science and modern science is produced internationally. From collaboration and negotiation to later tension and friction in the Republican era in China, this period witnessed how knowledge production was shaped in these transnational settings, shedding some light on the reasons why the authorship of those scientific fields must be understood in global terms.

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