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Scientists Attached to Diplomacy: French and German Explorers Calling for Diplomatic Accreditation Before the First World War

An InsSciDE Case Study

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The figure of the scientist attached to a diplomatic mission appeared before the First World War, not after the Second as is commonly thought. Although such attachments were few in number and confined to a narrow circle, they shed light on a major historical feature of science diplomacy pertinent right up to the present day: the will and ability of scientists to mobilize diplomats. In a climate of competition, scientists indeed “politicized” the stakes underlying their research voyages abroad, in order to obtain the official recognition and immunity conferred by the status of diplomatic attaché. In the decades preceding the First World War, the rivalry between France and Germany proved to be fertile ground for both field research and the production of the first “scientific attachés”.

Keywords:

Archaeology, geography, ethnology, diplomatic mission, scientific mission, commerce, nationalism

Image credit: Bibliothèque nationale de France (gallica.bnf.fr)



Scientists Attached to Diplomacy:

French and German Explorers Calling for Diplomatic Accreditation Before the First World War

The term “scientific attaché” describing an agent dealing with scientific matters and linked to a diplomatic or consular representation appeared in Europe at the end of the 19th century. The discussions and occasional experiments around the creation of this role prepared the diplomatic corps for a scientific graft that would finally take the form of science attaché in the second half of the 20th century.

“Gentlemen, the experience of travel has taught us that too often, abroad, travelers dispatched by the government on scientific missions are not (...) welcomed and treated as they should be (...). I therefore express the wish that scientific travelers sent on mission by the Ministry of Public Instruction receive from the government some sort of title of official scientific attaché to the legations.”

Charles Wiener, 1878 (Deloncle, 1879, p52)

Why and how should “travelers dispatched by the government on scientific missions” be protected and recognized as official envoys abroad? For the young and ambitious Franco-Austrian Charles Wiener, a popular explorer, the response was simple: it was in the interest of both individual scientists and the government covering their costs that they be given diplomatic status.

When Wiener called for the creation of the title of “*attaché scientifique*”, non-career diplomats had already penetrated the French diplomatic apparatus, benefiting from temporary status as attachés with key foreign affairs specialization. Military attachés had been posted at some embassies since the 1850s, with naval attachés soon following. Financial and commercial attachés were seen from the first decade of the 20th century, and cultural attachés from the late 1930s onwards.

In this genealogy, the appearance of science attachés has usually been dated to the 1950s, in France and other countries alike, following the technoscience mobilization of the Second World War and the advent of so-called Big Science, which sparked national (and therefore also foreign) science policies. It is undeniable that several broad and lasting national networks of science attachés took root from mid-century. However, Wiener’s proposal forces reconsideration of this widely accepted chronology, showing that in fact requests and experiments in view of conferring diplomatic status on scholars carrying out missions abroad existed as early as the end of the 19th century. This occurred not only in France but in Germany as well – hardly coincidentally, for these two countries were fierce competitors on the international scientific and diplomatic stages in the decades preceding the First World War.

Protagonists: Scientists on a mission

Varied profiles were found among the 19th century European scientists who claimed or obtained the status of “scientific attaché” as it was then called in French, German, or American English. Some, like Charles Wiener, were geographer-adventurers collecting all sorts of knowledge ranging across the natural sciences, linguistics, and archaeology. Others had a stronger academic profile and specialization, like the ethno-anthropologist and art theorist Ernst Grosse. All were part of scholarly networks emerging in parallel at national and international scale.

France’s ministry of foreign affairs had already recognized the diplomatic importance of certain scientific missions by placing them under a consular umbrella: Assyriologist Paul-Émile Botta was named French consul in Mosul, 1842, so that he could investigate the biblical city of Nineveh; Ernest de Sarzeq was appointed vice-consul in Basra in 1877 and immediately

set out to seek Sumer. Wiener spoke on behalf of the much greater number of scientists craving to work in the field but who found no such royal road. In Germany, after a long period of caution the Foreign Office finally agreed to send Ludwig Borchart to Cairo as *außerdiplomatischen wissenschaftlichen Attaché*. At the start of the 20th century Adolf Fischer was appointed to be the first *wissenschaftlicher Attaché* to the Peking legation, followed in 1907 by the architect Ernst Boerschmann, and in 1911 by Grosse.

This status was useful only insofar as it was recognized by the host state. Central or local host government authorities in archaeological destination states were not passive, but key protagonists too in this story. Despite the unequal balance of power with the Europeans, they had their own views and strategy, to the extent of course that these had not been formally excluded by colonization.

Stakes: Turning scientific voyages – or raids – into diplomatic relations

By requesting diplomatic status, scholars proposed that scientific missions become a component of the diplomatic relationship with the destination country. The stakes were both practical and political.

On the practical side, scholars sought embassy or consular support in order to connect with local authorities as well as with other representatives (such as the Navy) of their own mandating state. The travelers also hoped to acquire some protection from the threat of physical attacks or prosecution in lands where their intervention was not always welcomed, by virtue of the immunity traditionally guaranteed to diplomats. All in all, such relationships and immunity were essential to negotiate field access and then to extract data and resources conveniently. More and more countries levied export bans in response to private and state-sponsored raids on antiquities, starting in Rome in the 1800s, then in Greece and the Ottoman Empire (Egypt) towards the 1820s-1830s. Scientists like Wiener, who sent back to French public authorities nearly 4000 boxes of objects from South America alone, probably felt that obtaining diplomatic status would at least allow them to distinguish themselves from the many private actors who looted without a public mandate, essentially (but not exclusively) to supply the private collectors' market.

However, to justify their request to government, scientific travelers did not insist on the pressures they encountered locally. Instead, they pleaded the game of international competition, asking for help to win the race for knowledge and material finds that the modern nation-state needed to rise in global status. As symbols of prestige, national museums had to be filled with the best and most impressive pieces. Moreover, to get an edge on trade competition, intimate knowledge was needed of foreign countries and cultures. In 1911, Ernst Boerschmann argued for maintaining a scientific attaché at the German legation in Peking by pointing out the need to understand China in order to profit from its forced political and economic opening – something that other Western countries, as well as Japan, did not hesitate to do, according to him.

Scholars thus actively constructed the political stakes of their missions, without denying their more personal motivations such as the vivid desire to learn and to gain recognition. Imperialist power shaped the application and reach of the sciences it needed; so did scientists try to harness the political power they needed.

Wiener's wish

Born in Austria and trained in France, Charles Wiener was a young language teacher in a Parisian high school when he obtained funding from the French ministry of public instruction's *Service des Missions Scientifiques et Littéraires* (Scientific and Literary Missions Department) for a 14-month "archaeological and ethnographic" mission to Peru and Bolivia. Formed in 1842 and reformed in 1874 by the addition of a commission of some twenty leading scholars responsible for giving advice to the minister, the department selected and financed scientific missions deemed worthy of governmental support. Wiener's own mission started in 1875. Over the course of 21 months, Wiener enjoyed the support of the French diplomat stationed in Lima, Ludovic d'Aubigny, who interceded with central and local authorities "with the most gracious solicitude" (Wiener, 1880/2010). Soon enough though he ran out of money and approached French naval personnel in the Pacific to provide him with logistical assistance. The station commander was finally moved by the patriotic argument that a French scientist should not be left destitute while Germans enriched the collections of museums across the Rhine.

On the strength of this experience, Wiener upon his return would seek to make life easier with his "wish that scientific travelers sent on mission by the Ministry of Public Instruction receive from the government some sort of title of official scientific attaché to the legations" (this and the following quotes in this paragraph are drawn from Deloncle, 1879). The title would facilitate gaining the support of French representatives – embassies, consulates and also military forces – and would strengthen scientists' legitimacy in the eyes of local authorities as well as their security under diplomatic immunity. For the man who saw his mission as a "great struggle against a world and men" the proposal was not lightly made. Formulated at the inaugural meeting of the French Geographical Societies in early September 1878, Wiener's wish met with both general approval and the active support of influential luminaries. Among these, Henri Duveyrier, the world famous explorer of the Sahara, confirmed that he had "experienced the need for the title that Mr. Wiener requires for travelers on scientific missions." His book *Afrique nécrologique* (1874) told the story of colleagues who had died – or were assassinated – while exploring the continent. His friend Charles Maunoir, who would long be secretary general of the Paris regional Society and chief lobbyist for exploration missions, approved and rephrased the wish, suggesting instead that the ministry of public instruction "should ask the Ministry of Foreign Affairs to grant the title of scientific attaché to the legations for travelers on mission". The wish was unanimously adopted by the inaugural assembly.

Wiener's expedition made him a prominent figure in Paris. He was awarded the *légion d'honneur* and then naturalized as a French citizen. He convinced the authorities to create an ethnographic museum of material cultures foreign to Europe – the basis of the current Quai Branly-Jacques Chirac Museum in Paris. However, he did not meet his goal of creating the title of *attaché scientifique*. The ministry of foreign affairs appears to have refrained from populating its diplomatic and consular posts with scholars who were both uncontrollable and in one way or another expensive. Nonetheless, it offered Wiener the position of vice-consul of Guayaquil (Ecuador), in the footsteps of other scholars appointed as consuls before him, notably his "dear master" Léonce Angrand, a specialist of pre-Columbian civilization who had been consul general for twenty years. In October 1879, Wiener was able to embark on a new 14-month exploration. The aim was to find "a natural trade route, (...) putting the Entre-Cordillera, the inaccessible granary of South America, in communication with (...) France" (Wiener 1881) and thereby beat the English, Americans and Germans in establishing exchange with this exceedingly rich resource.

The clearly political framing of his new mission did not prevent Wiener from carrying out innumerable surveys of scientific interest over more than 3,000 km of riverways, gathering barometric, astronomical, ethnographic and linguistic data. Vice-Consul Wiener embodied a continuum along science, commerce and diplomacy, which he would have liked to freeze and formalize temporarily through the title of scientific *attaché*. Entering the consular career through science, he gradually moved away from it as he progressed in the diplomatic corps, reaching in 1899 the high rank of minister plenipotentiary.



Charles Wiener (1851-1913). Source : gallica.bnf.fr

The idea of posting *attachés scientifiques* did not reappear in France until the First World War. The ministry of foreign affairs continued to favor integration into the consular system on a case-by-case basis, particularly in contexts where – unlike in Rome, Athens, Cairo or later Saigon – there was no permanent scientific mission in the form of the uniquely French institution of the *Ecole française*.

The meanings of missions

If religious missions were undertakings of spiritual conquest, scientific missions were undertakings of scholarly conquest. Although the two were distinct, they were nonetheless linked. Since the late Middle Ages, European religious missions had uncovered, created and circulated knowledge from which would spring disciplines such as ethnology; conversely, they were also at the forefront of knowledge transfers from Europe, to the Chinese imperial court for example. The "civilizing" mission that the Europeans set themselves in the 19th century secularized this heritage in the colonial movement. Science and technology occupied a central place as instruments of both domination and "development", of taking and giving, in a dynamic expansion of the European order.

Field sciences:

Mapping and extracting resources from abroad

Historian Suzanne Marchand (2015) accounts for 19th century dynamics of modern European field sciences such as archaeology, geography or ethnography with two key concepts.

The first key is "open door science", thanks to which "Europeans ranged more or less freely across the world, and used their access, their superior wealth, and sometimes their imperial power to extract vast collections of flora, fauna, and archaeological treasure." Doors might be opened by local authorities as in Japan, or access forced as in China – obliged to open its harbors to foreigners after the two Opium Wars (1839-1842; 1856-1860).

Secondly, field investigations took place in the context of an "antiquities rush", defined as "a roughly simultaneous attempt by several individuals or states to take advantage of an opportune moment to extract antiquities for export". Archaeologists, but more broadly all sample collectors, were able to leverage national resources and sponsorship for this extraction – fueled by a shared attraction to novelty, conferring status and recognition to modern states and individual explorers alike. The competition among states was simultaneously a harsh competition among scholars, internally and at international scale.

“Außerdiplomatischen wissenschaftlichen Attaché”

In Germany too, it was the learned communities that pushed for the diplomatic accreditation of scientists, using the same argument of international competition (in particular with regard to their neighbor across the Rhine), while the diplomatic corps was reluctant. Here again, the game was played outside Europe, first in Egypt and then in China. The outcome, however, differed in that the German scientists, unlike the French, finally won their case.



Ludwig Borchardt (1863-1938). Source: ancientegyptian-facts.com/pyramid-of-sneferu-at-meidum.html/ - egyptologist-ludwig-borchardt

In Egypt, Chancellor Bismarck's discrete strategy of the 1880s was to favor the ongoing competition there between the French and the British, thus preventing these two powers from joining forces against Germany. In the scientific domain, this translated into a lack of state support for German field Egyptology, while the active French had taken charge of the country's antiquities service in the late 1850s, set up an academic base in Cairo in 1880 and went on expending energy trying to keep the British on the sidelines. In 1898, the *Ecole française* was formalized under the name of the French Institute for Oriental Archaeology in Cairo. The light German mission in Cairo by now was feeling very much pushed out. Adolf Erman, the powerful founder of the Berlin School of Egyptology, in turn

sent a request to his ministry for official diplomatic status for the German mission in order to obtain support and consideration from the local authorities. True to its traditional strategy, the German Foreign Office, which saw Franco-British rivalries culminating in Fashoda in Sudan – scene of a crisis in the struggle for control of East Africa – hesitated and then finally agreed to create a title of attaché, “but under certain conditions, namely that it could be suspended at any time, that it would not enjoy diplomatic status, that it would remain under the control of the Consulate General and that the British and French representations would not issue a contrary opinion” (Voss, 2012). Trained in architecture and Egyptology in Berlin under Erman, Ludwig Borchardt was appointed *außerdiplomatischen wissenschaftlichen Attaché*, extra-diplomatic scientific attaché, at the German Consulate General in Cairo in September 1899.

Although “extra-diplomatic”, Borchardt used his title to start important excavations at Tell el-Amarna. He was thus able to “discover” the bust of Nefertiti in 1912 and obtain its transfer to Berlin, where it quickly attracted the crowds. The “Mona Lisa of Berlin” has been the subject of dispute with Egypt since the 1920s.



Chancellor Angela Merkel visited Nefertiti in 2009. Source: Alamy 2D260E0.

From Egypt to China

German Egyptologists' situation however did not brighten. They continued to complain of Germanophobia and lack of professionalism among British and French scholars who, for the latter, “even when copying the simplest inscriptions (...) cannot manage to give a line without it being wrong in several places,” as Erman wrote to the German ministry of cultural affairs in May 1900. The German consul delayed, but through joint pressure, Erman and Borchardt obtained the creation in 1907 of the Imperial German Institute in Cairo for Egyptian Antiquities,

of which Borchardt became director. The Foreign Office nonetheless continued to refuse to fund excavations in Egypt. Contrary to what the French thought and said at the time, neither the extra-diplomatic attaché nor the Institute were thus tools of German foreign policy. Instead, they depended on the dedication of Egyptologists and their private supporters.

Three other German *wissenschaftlicher attachés* were appointed in the 1900s, in China, this time not "extra-diplomatic" but accredited. While France's strategy in Asia was to establish once again a permanent archaeological mission (in Indo-China as of 1898), Adolf Fischer was simply attached to the embassy in Peking (1904-1907), developing German collections and knowledge with a flow of objects and information from the civilizations of China, Japan and Korea. Architect Ernst Boerschmann requested to join the Peking legation in December 1906 as an "attaché" or "scientific expert". In that position he carried out a complete survey of religious monuments, for – as he later asserted – knowledge of Chinese religion and cultural representations would be of great use for completing Germany's commercial conquest of China. His work was very closely supervised: each of his excursions had to be validated by the legation's representative, his reports sent to the Foreign Office and his files left in good order for any successor. The ethnologist, Sinologist and art theorist Ernst Grosse was attached to the Peking legation until 1913.

German scientists thus obtained diplomatic accreditation for a handful of individuals, compensating for the lack of permanent institutes abroad like those enjoyed by French scientists.

Attachés towards Europe:

Pork and science diplomacy

A separate bilateral dispute with a scientific dimension may have contributed to the German Foreign Office's view on granting "extra-diplomatic" attaché status to Borchardt in Cairo in 1899. German Egyptology may have been indirectly served in this way by the American meat trade.

In 1898, the United States requested diplomatic accreditation for an "agricultural and scientific attaché" in Berlin. Charles W. Stiles was sent by the U.S. department of agriculture when Germany imposed hygiene measures on imports of American pork accused of carrying trichinosis, a serious disease for humans. Appointed to the international commission on zoological nomenclature after having reconciled the French and Germans at a critical juncture of the International Zoological Congress of 1895, Stiles was a renowned zoological diplomat. A parasitologist and microscopist trained in Germany, he above all spoke the language and was well introduced. His

investigation quickly cleared the American outgoing inspection services and invalidated the complaints of their German counterparts. Protectionist measures continued, but could no longer hide behind a public health argument. Convinced by this successful experience, the U.S. ministry sent more "agricultural attachés" abroad, but it was not until the First World War that it posted "scientific attachés" again: this time in Paris, London and Rome, to fight against Berlin.

At least one other scientific attaché was sent to Europe before the war. Clotilde Luisi (1882-1969) was "the first female scientific attaché at the Embassy of the Republic of Uruguay in Brussels" according to the French newspaper *La Presse* (22 March 1912). A special educator of the deaf and dumb, she was involved in the creation of a pan-American student network. Luisi was also her country's first female lawyer. The duration and content of her Brussels mission remain unknown.



Charles Wardell Stiles (1867-1941). Source: Special Collections, USDA National Agricultural Library. nal.usda.gov/exhibits/spec-coll/items/show/8157

Conclusions: Immunizing science

Today's science attachés have common ancestors in the first few "scientific attachés" sent from (and to) Europe in the decades preceding the First World War. French and German scientists requested this appointment themselves in order to confer a diplomatic character on a scientific undertaking conducted abroad. Scientists as well as their supporting scholarly and (often private) funding networks expected that an attaché would gain protective immunity and official recognition by host authorities and the legitimacy to mobilize, as needed, their own state representatives *in situ*. To gain attaché status, scientists essentially offered increased state prestige through the extraction of resources to enrich the collections of national museums, and also promised better commercial penetration through the construction of useful knowledge. Their requests were thus a form of instrumentalization of diplomacy in the service of scientists, in a mutually beneficial relationship whose terms were defined by the scholars themselves.

In France, the collective request for diplomatic status initiated in 1878 by Charles Wiener went unheeded. In Germany, by contrast, Egyptologists and Orientalists won their case. While scholars on both sides leveraged the argument of political competition between nations, it was not the weight of this argument that made the difference, but the institutional context. French authorities supported the establishment of scientific institutions abroad and included scholars in the consular corps, whereas the German authorities favored, at least initially, the nomination of a handful of scientific attachés with, and in one case without, diplomatic accreditation. In the same period, Europe received short-term scientific attachés from the USA and Uruguay.

These experimental configurations were interrupted by the First World War, before being profoundly transformed during the conflict. At that time, reinforced cooperation between the United States and its European allies through the reciprocal exchange of scientific attachés became seen as an arm likely to hasten victory over the enemy camp. Science and diplomacy thus formed a new alliance, to be strengthened again mid-century. The establishment after the Second World War of the science attaché program – as we call and know it still today – was first and foremost marked by these military experiences. The rush this time targeted the precious resource of knowledge. In the early years of this renewal, something that had been a matter of course in the 19th century came up for debate in most chancelleries: shouldn't science attachés be able to carry on personal scientific activities while on diplomatic mission? Strengthening attachés' credibility locally and their employability back home was, and in many countries probably still is, an issue.

Stakeholder Takeaways

For diplomats	For scientists	Overall
<ul style="list-style-type: none">• 19th c scientific attachés used diplomacy to build valuable social links, knowledge and reputation; they aimed at securing extractive activities.• 20th c science attachés often used social links, knowledge and their reputation to build valuable diplomatic relations; they aimed at cooperating, opening flows of knowledge between peer countries.• There is no historical determinism: France refused to create scientific attaché positions in the late 19th c but 100 years later developed one of the largest global networks of science counselors and attachés.	<ul style="list-style-type: none">• Science diplomacy is both about science using diplomacy and diplomacy using science. When they interact, they co-shape each other.• 19th century export bans transformed archaeological practices and finds: deeper local relationships, longer, more attentive fieldwork; focus not only on art but also on traces of social structures.• The massive arrival of objects outside the usual Greco-Roman canons shook Eurocentric views of art and transformed European aesthetics.	<ul style="list-style-type: none">• The activity of a science diplomat is not a given: it ranges widely between doing science with a diplomatic status and doing diplomacy with a scientific title.

Study Questions

- Were you surprised to learn about the active role by explorers and archaeologists in the creation of the science attaché role? Was the U.S. example of the “agricultural and scientific attaché” (Stiles) more expected?
- Who has more to gain today from the creation of an attaché post – scientists or states, or even other interests? What are the motivations and goals?
- The early scientific attachés, or the states that mandated them, were often eager to remove natural resources and cultural goods from host countries. Does this past handicap science diplomatic relations today?
- Today the restitution of cultural property is on the agenda. What prospect does this open up for European science diplomacy?
- The “scientific attaché” was an innovation that took time to be established. Today are new roles needed that have not yet been understood or accepted? Who is asking for them? Who should be active in their creation?

Endnotes

- This InsSciDE work will be more fully discussed in a forthcoming peer-reviewed article: Laborie, L (in preparation) Attachés scientifiques. La difficile greffe de la science sur le corps diplomatique (fin 19e siècle - années 1950).
- Cover image: The intrepid Charles Wiener (1851-1913) inspired some of the adventures of Hergé’s Tintin. In this image drawn from his book Voyage to Peru and Bolivia (1880/2010) he is depicted accessing a cave between Chuvin de Huantar and Huanuco Viejo. Source: Bibliothèque nationale de France (gallica.bnf.fr).

References & Further Reading

- Deloncle MPF (1879) Réunion des sociétés françaises de géographie les 2, 3 et 4 septembre 1878. Imprimerie Emile Martinet, Paris
- Marchand S (2015) The dialectics of the antiquities rush. In Fenet A, Lubtchansky N (eds) Pour une histoire de l’archéologie xviiiè siècle - 1945 : Hommage de ses collègues et amis à Eve Gran-Aymerich. Ausonius Editions, Pessac
- Wiener C (1881) Lettre de Monsieur Wiener à Monsieur le Ministre des Affaires étrangères, à Paris, 4 May 1881. Archives de la Société de Géographie de Paris, box WZ 1057. BNF, Paris
- Wiener C (1880/2010) Voyage au Pérou et en Bolivie (1875-1877). Gingko, Paris
- Voss S (2012) La représentation égyptologique allemande en Égypte et sa perception par les égyptologues français du XIXe au milieu du XXe siècle. Revue germanique internationale 16. doi.org/10.4000/rji.1351

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Selected Publications

(with Bledniak S, Matamoros I, Virgili F) (eds) (2022) Chroniques de l'Europe. CNRS Editions, Paris

(with Arapostathis S) (2020) Governing technosciences in the age of grand challenges. A European historical perspective on the entanglement of science, technology, diplomacy, and democracy. Technology & Culture 61(1):318-332. doi.org/10.1353/tech.2020.0005