

# Was There an Ottoman Science? Circulation of Knowledge and the Making of the Agronomic, Forestry, and Veterinary Disciplines (1840–1940)

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This thesis examines the circulation of scientific knowledge between Europe and the Ottoman Empire in the long nineteenth century, focusing on three emerging disciplines – agronomy, forestry, and veterinary medicine. I analyse these fields together to avoid imposing anachronistic disciplinary boundaries, since contemporary practitioners regarded them as an ‘indissociable whole.’ By tracing the movements of Ottoman students sent to Europe and European experts dispatched to the empire on scientific missions, I reconstruct how cross-border knowledge flows shaped these disciplines in their formative decades. While human mobility forms a central thread, the study also follows the movement of technoscientific instruments, exploring their adaptation to local contexts and the challenges of maintenance and repair.

By foregrounding marginalised professions in the historiography and examining the often-overlooked routine scientific exchanges between Western and non-colonial spaces, this research contributes to decentring the history of science and technology.

## Genesis of the Topic

The project began with a serendipitous archival find: a 1909 letter announcing the imminent departure of thirteen Ottoman scholarship-holders for Marseille aboard a Paquet Company steamship. Funded by the imperial government, they were bound for France to study agronomy, forestry, and veterinary medicine. Strikingly, these thirteen students accounted for 54% of all Ottomans sent to France that year – an imbalance that raised important questions: why did the state invest so heavily in these fields, and why was foreign training deemed necessary in disciplines so rooted in local environmental realities, seemingly ill-suited to transfer? These questions became the starting point for a long-term investigation spanning nearly a century, from the founding of the first Ottoman schools in these fields to their full institutionalisation.

## Research Questions and Structure

My thesis provides empirical answers to two fundamental questions, the first being *why* and *how* knowledge moves across borders. While the secondary literature in the field often identifies the *who*, *when*, and *where* of knowledge transfers, it rarely examines the *modus operandi*. To take an example: earlier studies readily note that French forestry

engineer Louis Tassy undertook a scientific mission in the Ottoman Empire, offer some biographical details, and list his main works. What they do not address are the deeper questions: why the Ottoman government was investing in forestry at that moment; why Tassy, rather than another engineer, was selected; why he agreed to go; why and how he was seconded from public service in France; how the terms of his contract were negotiated; how he built and sustained a professional and personal life in a foreign setting (including how he communicated with local counterparts); and how he reintegrated into French institutions upon his return.

The first four chapters address this issue. The introductory chapter explores why these circulations took place, looking at the political and economic motivations behind the scenes. The next three chapters focus on how, examining the concrete modalities of circulation depending on the categories of actors involved. Chapter II follows Ottoman students in France, looking at administrative procedures, material conditions, academic experiences, and everyday life. Chapter III turns to French scientific experts in the Ottoman Empire: their recruitment, contracts, relations with local actors, and social integration. Chapter IV focuses on the circulation of instruments – microscopes, dental devices, agricultural machinery – highlighting financial, logistical, and epistemic issues.

The second central question my thesis asks is: what happens to knowledge in motion? Given that flora, fauna, climate, and diseases vary by region, foreign knowledge could rarely be applied wholesale; it required adaptation to local environmental realities. Chapter V examines how Ottoman scientists not only appropriated foreign knowledge but also generated original contributions, some of which circulated back to Europe – revealing a bidirectional exchange, even if marked by asymmetry. Chapter VI focuses on naming foreign knowledge, examining the terms used to designate new scientific realities, the efforts at terminological standardisation, and the tensions created by the gap between the rapid evolution of science and the slow pace of lexicographical production. Chapter VII concentrates on wider social responses to the introduction of these disciplines born out of scientific exchange with Europe, showing how Ottoman agronomists, forestry engineers, and veterinarians fought to assert authority in the face of scepticism from farmers, farriers and townsfolk, even when the state recognised their expertise.

## Sources

My research employs a cross-archival approach, giving equal weight to Ottoman and French materials. Archival, library, and museum work in Turkey was complemented by extensive research in France, producing an unusually diverse body of sources. In addition to amassing the books and journals produced by the scientists at the centre of my research, I sought to extend my inquiry beyond conventional state archives – examining, for example, laboratory equipment once belonging to Ottoman veterinarians in museums – and to locate and draw from numerous personal collections. Notable among these are photographic albums by Asaf Cemal, one of the first Ottomans trained at the *École des eaux et forêts* in Nancy, now held in a museum in Bursa; the private papers of Samuel Abravanel Aysoy, an Ottoman veterinarian trained at the

*École nationale vétérinaire* d'Alfort; and rich documentation at the *Institut Pasteur* on bacteriologists sent to the Ottoman Empire. Unexpected finds such as hotel bills, tennis club membership cards, and expense notebooks offered glimpses into everyday lives, underscoring the ordinariness of these scholarly trajectories. Together, these sources allowed me to reconstruct not only institutional histories but also the lived experiences of those moving between these worlds.

## Contributions to Historiography

### *From Civilisational Narratives to Pragmatic Imperatives*

One of the thesis's key contributions is to unsettle the entrenched framing of late Ottoman knowledge imports as driven primarily by abstract aims of 'Westernisation' or its more politically correct sibling 'modernisation.' Such frameworks impose a civilisation-based paradigm where none is necessary. Consider, for example, Kevork Torkomyan, trained in Montpellier, who adopted Louis Pasteur's *grainage cellulaire* method to combat *pébrine* (*karataban* in Turkish), a silkworm disease affecting the Mediterranean, and applied it at the institute he directed in Bursa. Should his efforts be read as a sign of Westernisation, or a transfer of modernity? Could this transfer not simply be a straightforward response to an urgent economic problem? For the Ottomans, what mattered was that the method worked, not its provenance, and that the silk industry was strategically vital: silk tithe constituted one of the Ottoman Public Debt Administration's chief sources of revenue, alongside salt, tobacco, spirits, stamps, and fishing.

In fact, such categories often produce a circular logic: knowledge is deemed to have been imported because the late Ottomans wished to Westernise or modernise; once imported, it becomes proof that they were doing precisely that. Yet, I found no evidence of 'Westernisation' or 'modernisation' rhetoric in the writings of Ottoman scientists or officials. What emerges instead is a pragmatic calculus.

These abstractions obscure the concrete political economy of knowledge transfer. In practice, the Ottoman state's investment into scientific exchanges (with, at one point, 16.4% of the Ministry of Agriculture's annual budget earmarked for foreign scholarships) was part of a deliberate strategy to address fiscal crisis. In the aftermath of the Crimean War and under the burden of mounting foreign debt, the government prioritised sciences described as 'useful,' 'beneficial,' or 'necessary' (*'ulûm-ı nâfi'a; fûnûn-ı lâzime*). Convinced that the empire was a perfect 'agrarian country' (*zirâ'at memleketi*) blessed with fertile soils, vast woodlands, and abundant livestock, Ottoman officials saw agriculture, forestry, and animal husbandry as the basis of the empire's comparative advantage in the international division of labour. This logic explains why agronomic, silvicultural, and veterinary knowledge was deemed 'useful' and attracted substantial public funding: agronomists, forestry engineers, and veterinarians were expected to increase the productivity of the empire's natural resources (*tabî'î servetler*), transforming natural capital into economic capital.

*From State Agendas to Personal Desires*

Why did France agree to give up some of the very limited places at its universities to Ottoman students, and send its scientific experts to the Ottoman Empire, when this meant losing highly qualified personnel? The Ottoman emphasis on primary production aligned neatly with European interests: It ensured a steady supply of raw materials from the empire while safeguarding markets for European manufactured goods against Ottoman competition. Science also functioned as a geopolitical tool. Determined to maintain influence in Ottoman scientific life in rivalry with Germany, France launched initiatives such as the ONUF to attract foreign students and pursued strategies to secure overseas appointments for French nationals – efforts that intensified after its defeat in the Franco-Prussian War of 1870. For instance, when Maurice Nicolle was appointed director of the Imperial Bacteriology Institute (*Bakteriyölöljîhâne-i şâhâne*) in 1893, Émile Roux, Pasteur's close collaborator, commented approvingly: 'He will bring the good word to Constantinople, and without a German accent – that's what matters.'

My microhistorical approach, however, reveals that individual careerism was equally important in setting knowledge in motion. French scientists did not take up Ottoman posts out of patriotic duty (though they could present them as such to their superiors) but because these appointments offered higher salaries, more prestigious positions than they could obtain at home (often leveraged for promotion upon return), and the opportunity to publish research on a different geo-climatic zone, thereby enhancing their scientific authority. Nicolle was merely a laboratory assistant (*préparateur*) at the Pasteur Institute before being appointed director of the Imperial Bacteriology Institute in Istanbul and saw his annual salary more than tripled. Forestry engineers recruited in 1866 saw their pay multiplied by 4.7, returning to France with promotions to the rank of *conservateur*.

The personal allure of travel to the 'Orient' further heightened the appeal. For most scholars, such journeys remained prohibitively expensive – a short tour of Athens, Constantinople, Jerusalem, and Cairo was priced at 2,400–3,000 francs in contemporary travel guides. Ottoman missions thus combined professional advancement with the fulfilment of a romanticised adventure. Reports from these experts often blended scientific observation with ethnographic description, architectural admiration, and elements of travel writing.

*Restoring Ottoman Agency*

It is tempting to assume that the reverse question – why Ottoman students agreed to go to France – has an obvious answer. Yet for them, as for the French experts on mission, studying or working abroad required leaving behind families and hometowns, and involved its own careerist calculus. A European diploma conferred legitimacy, eased entry into elite positions in the capital, and offered protection from undesirable provincial postings.

At home, the authority of those trained within the empire could be fragile. Agronomist Süleyman Fehmi [Kalaycıoğlu] recalled being mocked for wearing the uniform of the Halkalı Agricultural School – the empire’s only domestic agronomy degree. Villagers jeered: ‘Look at him, he couldn’t find a real school, so he went to a manure school!’ and pelted him with questions about ‘types of dung’ until he was reduced to tears. In this light, the circulation of students was not only beneficial to the Ottoman state, which sought to boost productivity through new expertise, but also to the individual scientists themselves. Connections with European scientific institutions and learned societies signalled membership in global networks of expertise, enhancing prestige in a fraught context where farmers mocked agronomists and veterinarians were often dismissed as glorified farriers.

Against this backdrop, my thesis restores the agency of Ottoman scientists by following them beyond their studies in France, examining what they produced after returning home. They were not passive conduits of Western science but active co-producers. This is not my interpretation but an emic one: rather than invoking the need to emulate Western science, Ottoman scientists stressed the importance of *localising* it – a concern reflected in their terminology, such as *memleketleştirme*. Agronomists, forestry engineers, and veterinarians argued that their disciplines could not always generate universally valid knowledge, unlike mathematics. Instead, validity was contingent on context – or, as agronomist Hayzagun Bekyan put it, on the ‘local touch’ (*mazrûb-ı mahallî*).

These experts made deliberate choices about what to borrow and what to discard. Their translations of foreign manuals often omitted entire sections irrelevant to local conditions, and university curricula prioritised endemic plants and diseases. The research they published in European journals further demonstrates that Ottoman scientists also exported knowledge they had produced locally. Veterinary bacteriologists, for example, contributed numerous articles to the *Annales de l’Institut Pasteur* (17 between 1896 and 1907). One of the most significant discoveries was perhaps Adil Mustafa’s 1902 co-discovery of the infectious agent responsible for rinderpest: with Nicolle, they identified it as a filterable virus, earning international recognition even as the disease continued to devastate herds worldwide, including in southern Africa, where 80% of cattle were killed by it at the turn of the century.

### *A New Material Reading of Science on the Move*

This thesis establishes that the driving force of knowledge circulation was mutual convenience. Exchanges took place because they served the interests of actors on both sides, whether states seeking revenue, institutions seeking prestige, or individuals pursuing career advancement. This was a win–win arrangement operating at multiple levels. By reframing East–West knowledge exchanges as transactional, I move away from exoticised narratives. I treat France and the Ottoman Empire as points A and B, not as opposites yearning to impose upon or imitate one another, but as historically situated, yet analytically neutral, nodes within a wider network of circulation.

By grounding the analysis in budgets, salaries, recruitment practices and working conditions, the thesis strips away the rhetoric of ‘cultural clash’ to reveal pragmatic realities. When French bacteriologist Paul Ambroise Remlinger accused his Ottoman colleagues of conspiring to have him dismissed, the underlying cause was less xenophobia than resentment over salary disparities: as a foreign expert, he earned far more than Ottoman counterparts bound by civil service pay scales. Likewise, the failure of imported agricultural machinery stemmed not from conservatism or technophobia, but from the lack of training for peasants who would use the machines, the absence of repairmen and spare parts, high fuel costs, and the failure to assess whether imports from Europe and the United States suited local terrain and crops.

These insights were possible only by widening the archival lens beyond the familiar focus on intellectual debates between ‘(hyper-)Westernists,’ ‘partial-Westernists,’ and conservatives. Rather than confining myself to the writings of contemporary commentators who theorised about exchanges with the West, my aim was to recover the voices of those directly involved in the circulation of scientific knowledge. By attending to the everyday lives of these vectors of knowledge, I was able to normalise knowledge flows – revealing them as ordinary and grounded primarily in material considerations rather than in ideals such as the universality of science or the aspiration to become part of Western civilisation. In short, this thesis calls for leaving the realm of the abstract and entering the realm of the concrete, in order to uncover the mechanics – the nuts and bolts – of how science travels, a question far more illuminating than where it originates or to whom it belongs.