ΕΝΩΣΗ ΕΛΛΗΝΩΝ ΦΥΣΙΚΩΝ

Ιχνεύσεις

στην Ιστορία & τη Φιλοσοφία της Επιστήμης

Τόμος Α

Επιμέλεια:
Γιώργος Ν. Βλαχάκης

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Τόμος Α΄

Εκδοτική επιμέλεια: Γιώργος Ν. Βλαχάκης

ΠΕΡΙΕΧΟΜΕΝΑ

The view from somewhere – Scientific practice as seen from nineteenth century Greek space

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Introduction: Locating the global

In the last two decades or so, there have been several vigorous discussions on 'decentering the picture' in History of Science, both spatially and temporally[1]. Themes like the circulation of knowledge, the communicative practices within science and recently the possibility of a global historiography of science are being reproblematized[2]. This has led to a lot of novel research being carried out, for example, on scientific practice in 19th century India, on Meiji Japan and on Late Ottoman Beirut[3]. However, there is also the tendency, especially when focusing on the period after the mid 18C, for Europe to be implicitly treated as a coherent, unified space, whose cultural and geographical borders were the same. In order to sidestep the historiographical hegemony of this thing called European science, it is tacitly assumed that we better focus our gaze west of the Atlantic or east of Caucasus.

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[1]This is of course not endemic to History of Science alone. See Davis, Natalie Zemon. "1. Decentering History: Local Stories and Cultural Crossings in a Global World." *History and Theory*50, no. 2 (2011): 188–202.

[2] Relevant literature is too vast to present. A few recent examples are Raj, Kapil. "Beyond Postcolonialism … and Postpositivism: Circulation and the Global History of Science." *Isis* 104, no. 2 (2013): 337–347, Nappi, Carla. "The Global and Beyond: Adventures in the Local Historiographies of Science." *Isis* 104, no. 1 (2013) : 102–110, Sivasundaram, Sujit. "Sciences and the Global: On Methods, Questions, and Theory." *Isis* 101, no. 1 (2010): Schaffer, Simon, Lissa Roberts, Kapil Raj, and James Delbourgo.*The Brokered World: Go-Betweens and Global Intelligence, 1770-1820*. Sagamore Beach: Science History Publications USA, 2009, Elshakry, Marwa. "Knowledge in Motion: The Cultural Politics of Modern Science Translations in Arabic." *Isis* 99, no. 4 (2008) : 701–730, 146–158 ,Roberts, Lissa. "Situating Science in Global History: Local Exchanges and Networks of Circulation." *Itinerario* 33, no. 01 (2009): 9–30, Secord, James. "Knowledge in Transit." *Isis* 95, no. 4 (2004): 654–672.

[3]Raj, Kapil.*Relocating Modern Science: Circulation and the Construction of Knowledge in South Asia and Europe, 1650-1900*. Palgrave Macmillan, 2010, Elshakry, Marwa. "The Gospel of Science and American Evangelism in Late Ottoman Beirut." *Past & Present* 196, no. 1 (2007): 173–214, Kim, Dong-Won. "On Building a Modern Japan: Science, Technology, and Medicine in the Meiji Era and Beyond." *East Asian Science, Technology and Society* 1, no. 2(2007): 255–258.

In this paper, I would like to instead propose that some interesting findings await us if we also consider the borderlands[4]. My aim here is to see what kind of historiographical narrative is constructed about 19C 'European science', if we situate our viewpoint in Greece, Belgium or Hungary. Do new kinds of questions arise? Does a different outline of nineteenth century scientific practice come forward? Do new networks of exchange appear? In the end, is our assumption of a space that can be unproblematically considered European justified and in what way? To take the first step in that direction, I will try to reconstruct how scientific practice appeared to a scholar or interested layperson, if he lived in nineteenth century Greek space. This paper, however, must be seen as an attempt to emphasize the direction this project is to go and not as a finished research. It may well be the case that such an attempt would be impossible. However, even if it is a failure, it will be an interesting failure.

I will thus explore three themes: Where Greek men of science went to study, what kind of scientific artifacts and specifically textbooks were to be found in Greeks pace and what kind of public utterances were made by Greek scientists when they confronted the public sphere. I am thus less interested on who these men were, and more on how they saw their discipline. All three themes are standard indications on implicit scientific hegemonies and help highlight what was taken for granted without actually been proposed as such[5].

Before I proceed, two clarifications are needed. First, this paper is not a claim that Greek space is for some reason the long sought ideal, objective vantage point from which to launch a "view from nowhere"[6]. In the contrary, Greece and other similar spaces in the borders of hegemonic configurations are nuanced, problematic and contested. And it is precisely these characteristics that make them historiographically useful. Secondly, this is not an internal, national history. It is the reconstruction of a narrative placed within nineteenth century Greece, looking outwards. The rest of the world will be treated, as it were, phenomenologically.

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[4]About an attempt to generalize the historiographical significance of the places in between, see Baud, Michiel, and Willem van Schendel. "Toward a Comparative History of Borderlands."*Journal of World History* 8, no. 2 (1997): 211–242.

[5]An unapologetic discussion of such themes is to be found in Gizycki, Rainald Von. "Centre and Periphery in the International Scientific Community: Germany, France and Great Britain in the 19th Century." *Minerva* 11, no. 4 (1973): 474–494.

[6] The term here is used not in its original Nagelian view, but rather in the context of localization and internationalism of science proposed by Steven Shapin. See Shapin, Steven. "Placing the View from Nowhere: Historical and Sociological Problems in the Location of Science."*Transactions of the Institute of British Geographers* 23, no. 1 (1998): 5–12.

In the rest of the paper, I will initially provide a brief contextualization of the Greek space as the locus of scientific activity. I will then discuss the picture of scientific practice that emerges if we take into account what Greek men of science said about science, what they read and where they had learned their craft. Finally, I will present some conclusions.

The new old state

The modern Greek state was recognized as a sovereign state after 1828 and especially after 1832. Even before its institution, a number of Greek speaking, Orthodox Christian scholars, working within the prosperous mercantile communities of the Ottoman Empire and abroad, had initiated a loose movement today collectively labeled the Greek Enlightenment. From the last decades of the 18C up to 1820, they pursued a political and philosophical agenda of liberation and modernization[7]. They also wrote textbooks of natural philosophy and battled what they saw as crippling superstition and lack of literacy among their fellow Greeks[8]. However, their influence waned after 1828. A decisive change of policy in the part of Britain, France and Russia, the so called Guardian Powers, forced the Ottoman Empire to concede sovereignty to the nascent Greek State, over a dominion half its current size.

Even before the state's official recognition, Ioannis Kapodistrias, formerly the Foreign Minister of the Czar, had accepted the position of the Governor of Greece in 1828. He reigned for only three years before being assassinated. During that time, he instituted a system of primary education and he founded a Normal School for training teachers, a Military Academy, a Nautical Academy and a school of agriculture. However his political modus operandi was at odds with the Greek Enlightenment, whose influence waned during these years. Thus, the natural sciences lost their primary propagators and defenders and the newly established school system had no place for them[9].

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[7] Kitromilides, Paschalis *Enlightenment, Nationalism, Orthodoxy: Studies in the Culture and Political Thought of South-Eastern Europe*. Variorum, 1994.

[8] A magisterial account of the Greek Enlightenment scholars' work on the sciences can be found in Karas, Ioannis, ed. *Η Ιστορία Και Φιλοσοφία Των Επιστημών Στον Ελληνικό Χώρο*. Athens: Metaihmio, 2003.

[9] An effort was made to describe the relationship between science education and scientific practice in Greece in Tampakis, Konstantinos. "Science Education and the Emergence of the Specialized Scientist in Nineteenth Century Greece."*Science &Education* 22, no. 4 (2013): 789–805.

In 1833, again under the influence of the Guardian Powers, the Royal Prince of Bavaria Otto became the first King of Greece. Being underaged at the time, he was accompanied by a host of Bavarian administrators that soon became wildly unpopular. During the 29 years of his reign, the capital of Greece was moved to Athens from Nafplio, and a centralized administration became the backbone of the Greek state. Tellingly, the three political parties that came into existence during that time were nicknamed the Russian, the French and the British, according to the Guardian Power whose policies they favored[10]. Under the Bavarian administration, Greece acquired a three tier educational schema[11]. Especially of importance for the appearance of the Natural Sciences in Greece were the University of Athens, the Polytechnic School of Athens, the Royal Observatory, the Botanical Garden and museums of Natural History and Geology. These institutions acted as the loci for the first community of Greek men of science.

From the founding of the University onwards, there were Chairs in Physics, Chemistry, Botany and Natural History. The same men also taught in the Polytechnic School and in the Military Academies, establishing a trend that lasted until the last decades of the nineteenth century. Later, professorships in Zoology, Geology and specialized chemistry were added. The University operated initially under a literal translation and amalgamation of German university legislation, which was soon superseded by an ad hoc hybrid of French and German traditions. There were four Schools, namely Theology, Law, Medicine and Philosophy, the latter also hosting the science and mathematics Chairs. Both the University and the Polytechnics School enjoyed great cultural prestige and operated under definite but loose governmental supervision[12].

King Otto was dethroned in 1862 and was succeeded by King George the 1st of the Danish dynasty of Glucksburgh in 1863. King George reigned for 50 years and the Greek intellectual community and the University in particular weathered the political storm and adapted very quickly. From the 1860s onwards, a new generation of scholars came into the scene, gradually replacing the Old Guard. As a result, new research and teaching laboratories and science museums appeared. By the first decade of the 20th century, a new School of Mathematics and

[10] A nuanced discussion of the political realities of Greece, and tellingly, one that moves away from simple neptostic descriptions, is to be found in Hering, Gunnar. *Τα Πολιτικά Κόμματα Στην Ελλάδα 1821-1936*. Two vols. Athens: MIET, 2006.

[11] For a comparative history of Greek education, see Kiprianos, Pantelis. *ΣυγκριτικήΙ στορία Της Ελληνικής Εκπαίδευσης*. Athens: Vivliorama, 2004.

[12] A history of the University of Athens is to be found in Lappas, Konstantinos. *Πανεπιστήμιο Και Φοιτητές Στην Ελλάδα Κατά Τον 19ο Αιώνα*. Athens: INR/HNRF, 2004. For the Polytechnic School, see Antoniou, Yiannis. *Οι Έλληνες Μηχανικοί – Θεσμοί Και Ιδέες 1900-1940*. Athens: Vivliorama, 2006.

Science was founded, marking a new era for Greek scientific practice. Also by that time, the discourse of progress had shifted towards the graduates and professors of the Polytechnic School. But these developments are outside the scope of this paper.

Places of origin and schemata of education

These then where the contextual contours of nineteenth century Greek space. We can now move on to examine the first theme of Greek scientific practice, that is the places where Greek professors of science were trained. This was more than a matter of choice. It was also an indicator of the way scientific leadership was implicitly acknowledged and appreciated in Greek space. The places that Greek men of science chose to be educated were also places of scientific consecration, where scientific credentials were acquired and were networks of communication were created. Furthermore, places like the Parisian Grandes Écoles or the old German Universities, were also spaces where a specific scientific mindset was propagated, a scientific *modus operandi*, or, as Bourdieu would have said, a scientific habitus. For all these reasons, the examination of the places Greek intellectuals went to study science can offer a way to map the reciprocal scientific power relations of the era[13].

[13]Bourdieusian thought is too complex and widespread to do justice in a few references. The idea of education as consecration can be found in Bourdieu, Pierre. *State Nobility: Elite Schools in the Field of Power.* Stanford: Stanford Univ Press, 1998. For a discussion of the forms of capital, fields and the habitus, see Bourdieu, Pierre. "The Forms of Capital."In *Handbook of Theory and Research for the Sociology of Education*, edited by John G Richardson, 46–58. New York: Greenwood Press, 1986, Bourdieu, Pierre. *Distinction: a Social Critique of the Judgement of Taste*. Cambridge, Mass.: Harvard University Press, 1984 and Bourdieu, Pierre. *Practical Reason: On the Theory of Action*. Stanford, Calif.: Stanford University Press, 1998. Specifically for the scientific field, see Bourdieu, Pierre. "The Specificity of the Scientific Field and the Social Conditions of the Progress of Reason." *Social Science Information* 14, no. 6 (1975): 19–47, Bourdieu, Pierre. "The Peculiar History of Scientific Reason." *Sociological Forum* 6, no. 1 (1991): 3–26 and Bourdieu, Pierre, and Richard Nice. *Science of Science and Reflexivity*. Chicago: University of Chicago Press, 2004.

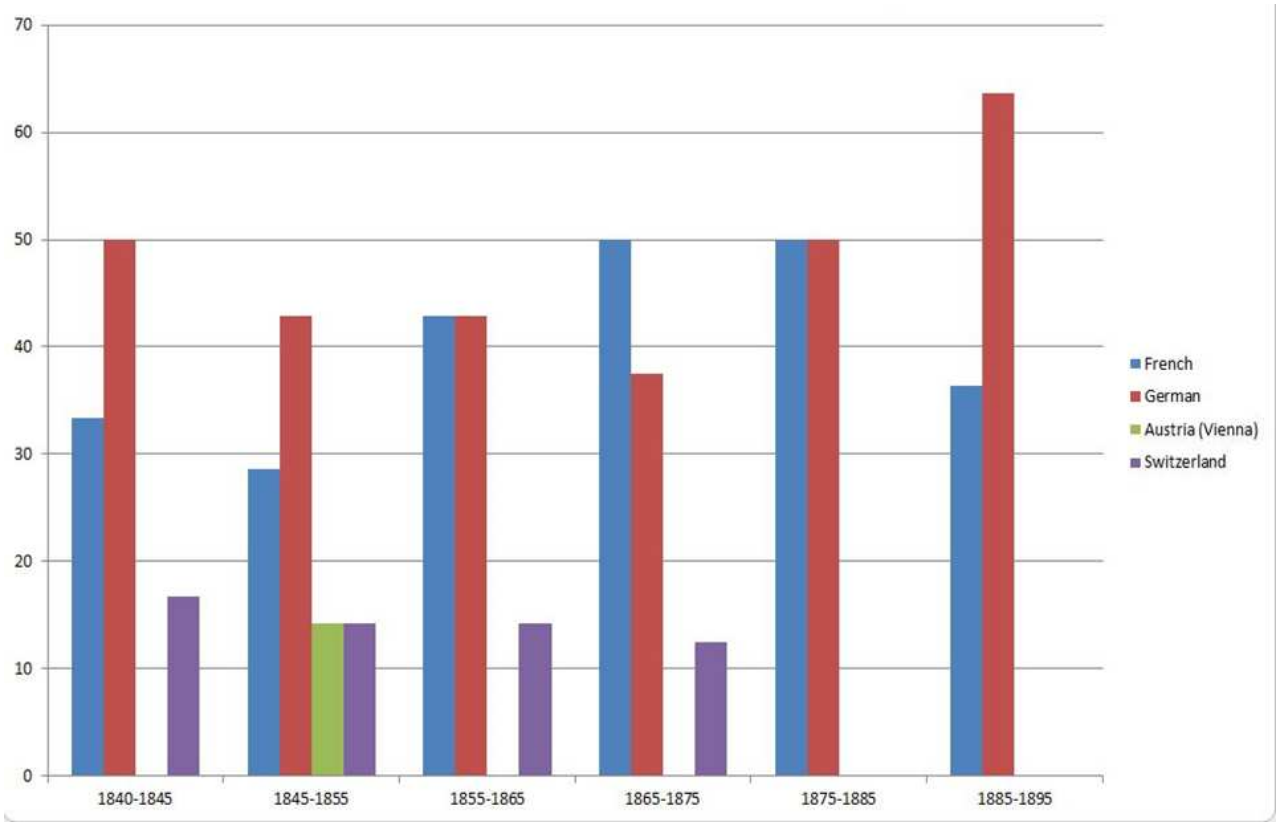
The grand majority of future professors were sent to study abroad in a state or private scholarship. Thus, their choice of institution is a pointer to a tangled web of cultural hegemony, national policy and sociopolitical stratification. The results can be summed up as follows[14]

Table 1: Education and Expertise of the Science Professors in the University of Athens

Name	Active	Expertise	Studies
Konstantinos Negris	1837-1845	Mathematics, Physics	École Polytechnique and University of Paris
Kyriakos Domnados	1837-1845	Botany	University of Paris
Georgios Vouris	1837-1855	Physics, Astronomy	University of Vienna
Nikolaos Fraas	1835,1837-1842	Botany	University of Munich
Xavier Landereer	1837-1869	Phar. Chemistry	University of Munich
Alexandros Venizelos	1840-1862?	Chemistry	Leipzig, Berlin, Heidelberg
Dimitrios Stroumpos	1839-1889	Physics	University of Geneva, École Polytechnique
Heracles Mitsopoulos	1845-1892	Natural History	University of Munich, University of Berlin
Theodoros Orfanidis	1850-1886?	Botany	University of Paris
Vassilios Lakon	1854-1900?	Physics, Mathematics	University of Paris
Anastasios Christomanos	1863-1906	Chemistry	Polytechnic School of Vienna, Universities of Giessen, Berlinίvo, Karlsruhe, Heidelberg
Georgios Zavitsanos	1863-1881	Phar. Chemistry	Παρίσι
Konstantinos Mitsopoulos	1875-1910	Natural History (Geology)	University of Athens, University of Freiburg
Dimitrios Kokkidis	1877-1896	Astronomy	University of Berlin, University of Paris
Georgios Krinos	1883-1891	Phar. Chemistry	University of Athens, University of Heidelberg
Ioannis Hadzidakis	1880-1905!	Mathematics	University of Paris, University of Berlin
Timoleon Argiropoulos	1884-1905!	Physics	University of Berlin, University of Paris
Anastasios Damvergis	1882-1905!	Chemistry	Universities of Athens, Heidelberg, Berlin, Paris
Spiridon Miliarakis	1892 – 1905!	Natural History	University of Athens, University of Wurzburg

Chart 1: Distribution % of the Places of Education of Science Professors in the University of Athens

[14] Data has been compiled from Stefanidis, Michael K. *Ιστορία Της Φυσικομαθηματικής Σχολής, Εκατονταετηρίς 1837-1937*. Vol B. Athens: National Printery, 1948.



As the chart and table show, most of the Greek science professors had studied in either Paris or in a German university. With the rare exception of one or two individuals, this distribution seems to imply that, as far as Greek intellectuals were concerned, French academic might was synonymous with the Grandes Écoles and later Sorbonne. In contrast, Germanic science was diffused in places like Munich, Berlin and Heidelberg and more rarely in Karlsruhe and Leipzig. Thus, France was (and again, 'was' means 'appeared to contemporaries to be') a centralized and contained scientific space, whereas the Germanic lands appeared diverse and decentralized.

A third academic pole was formed not by the rising British universities, but rather by Switzerland and especially Geneva. Thus, at least in the Greek case and contrary to the example of Egypt, political might was not synonymous with scientific might.

It is also worth noting how often disciplinary boundaries conformed to linguistic and cultural boundaries. All of the Greek chemists active during the 19C had studied in German Universities, alongside Liebig, Bunsen and Kirckhoff. Only much later, in the silver years of Wurtz did some Greek chemists find their way to France. The same holds true for Geology and general Natural History. In contrast, Physics and Mathematics were studied in the Parisian Grand Écoles and later in Sorbonne. Geneva was also a possibility for Physics and later Zoology. Despite the fact that by

1872, the University of Athens itself had produced some graduates specialized in science, all Greek men of science had to study abroad for at least two years in order to be considered for an academic post.

All in all, for the Greek government and for the science savants themselves, one became a proper scientist only by studying in the institutions found east of Paris, west of Vienna, north of Lausanne and south of Berlin. But did this spatial confinement also translate to a material or even discursive delineation?

Textbooks in transit

To answer this question, we now turn to the circulation of artifacts and specifically textbooks. I am here referring to publications from foreign authors in their original language of publication that appeared in Greek space during the nineteenth century. Textbooks were the scientific artifact *par excellence* during this period. They were considered as a vital indicator for the maturity of a scientific community and they also helped articulate a whole range of processes in effect during the period under discussion[15]. Thus, the appearance, or lack of appearance, of certain textbooks in certain spaces, signals quite clearly which nations should be considered the superpowers of the era. For the sake of brevity, I will focus only on textbooks that were titled as Physics, in various languages. However, our conclusions do not change, if we include textbooks of Chemistry or Natural history.

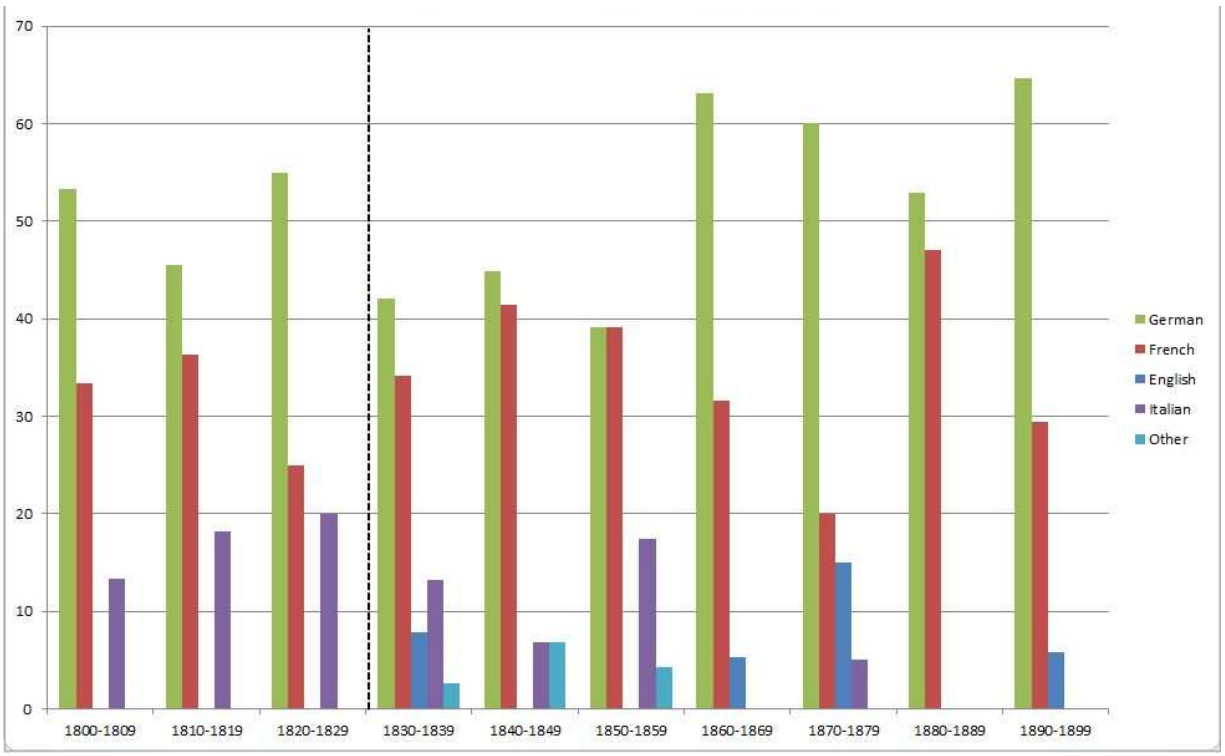
All in all, it seems that there were approximately 270 distinct physics textbooks in circulation within Greece in the period from 1800 to 1905, probably not much more. Their main repository

[15] For a discussion of the role of textbooks in scientific practice, see Simon, Josep. *Communicating Physics: The Production, Circulation and Appropriation of Ganot's Textbooks in France and England, 1851-1887*.Pickering & Chatto Ltd, 2011; Garcia-Belmar, A., J. R. Bertomeu, and B. Bensaude-Vincez. "The Power of Didactic Writing: French Chemistry Textbooks of the Nineteenth Century." In *Pedagogy and the Practice of Science: Historical and Contemporary Perspectives*. The MIT Press, 2005 and Lundgren, Anders, and Bernadette Bensaude-Vincent.*Communicating Chemistry: Textbooks and Their Audiences, 1789-1939*.Science History Publications/USA, 2000. For an examination of the Greek case, see Tampakis, Constantin, and Constantin Skordoulis. "The Many Faces of Textbooks: Science, Education and Science Education in the Early Greek State (1838 – 1931)." *Archives Internationales D' Histoire Des Sciences* 60, no. 164 (2010): 93–116.

is the National Library of Greece for a variety of historical and archival reasons. The National Library initially doubled as the library for the University of Athens. Furthermore, many of the professors bequeathed their books in the Library. Finally, in recent years, all old books from the various University Departments were sent to the National Library. The combination of these factors makes the National Library the biggest repository of nineteenth century scientific books in Greece, forming a very inclusive sample. An examination of other large Greek libraries, such as the Gennadeios Library, has confirmed these assumptions. The sample which will be detailed here is, thus, very close to inclusive and should be considered representative of the era.

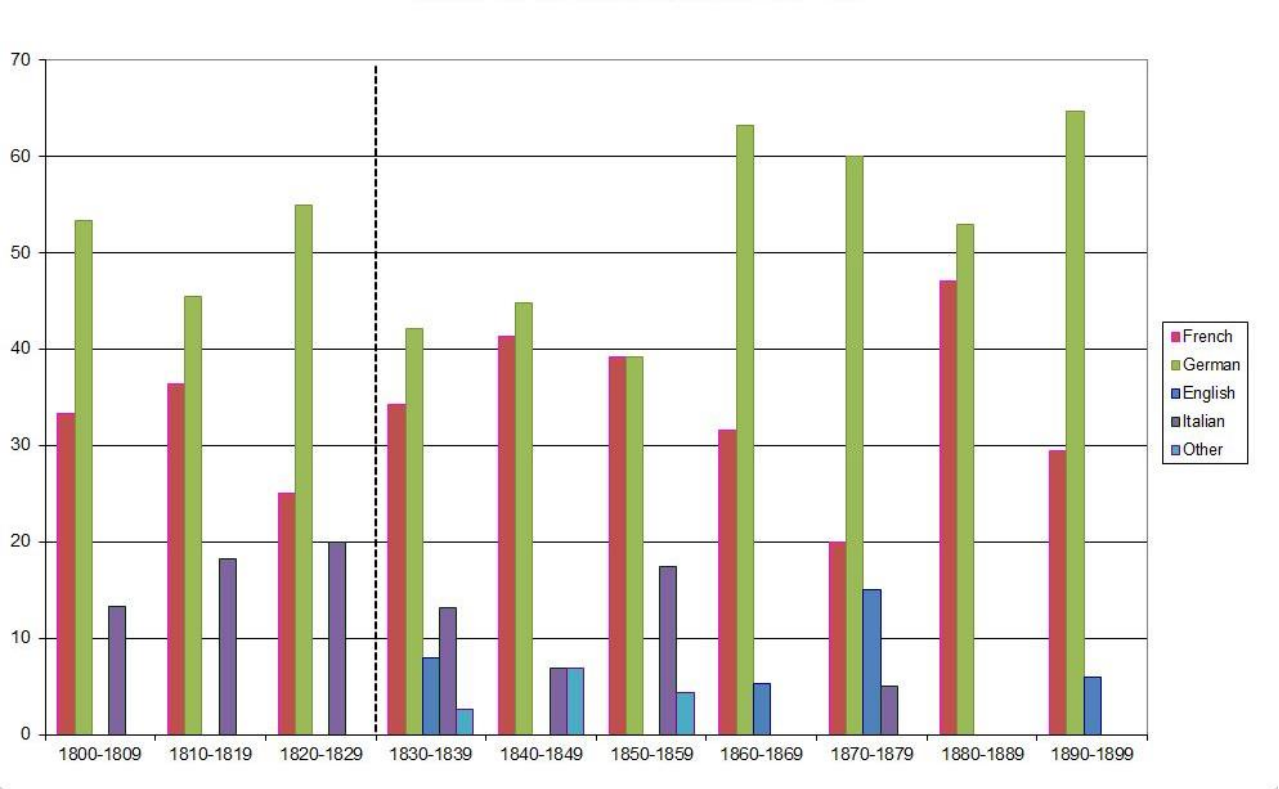
The first step in this part of research has been to compile a full listing of all the authors appearing in Greece during the nineteenth century. The result has been included as an appendix in the end of the paper. Next, we looked at the comparative distribution of languages in which Physics textbooks were written in our sample. The results are as follows

Chart 2: Language distribution % of Physics textbooks



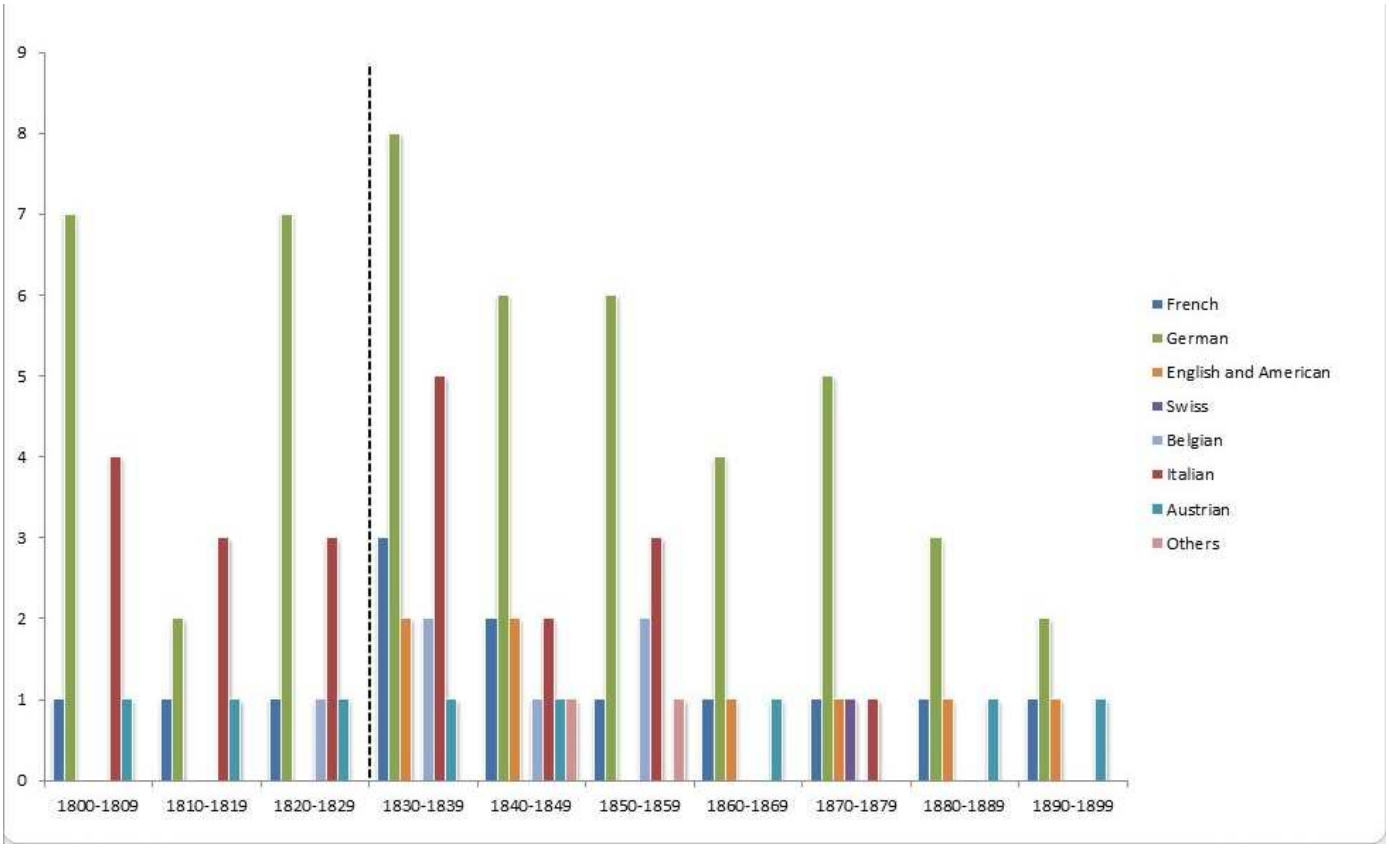
We also looked for the percentile distribution of the nationality of authors, as seen here

Chart 3: Nationality % of the authors of Physics textbooks



And lastly, we created a chart for the sites of publication of the various textbooks, as seen in the following chart.

Chart 4: Sites of publication of Physics textbooks



What then is the picture that emerges from studying textbooks? Firstly, it does not appear as Greece was an isolated scientific wasteland. Even expensive publications, like the Helmholtzian *Cosmos*, were accessible to the Greek scholar. Secondly, as is to be expected German and French publications dominate the scene. However, again we note the difference in diffusion: Most French publishing activity stems from Paris, whereas German textbooks hail from many different places. More importantly, there is a crucial distinction between the point of origin and the language used. More textbooks are written in French and German that get published in French and German publishing houses. That means that, for example, one can find textbooks in French being printed in Milan or St. Petersburgh. In tandem, the language used in the textbook and the nationality of the author do not always match. As an example, Ganot 's textbooks appeared in Greece in both English and German translations, while Fischer's treatise was also found in Biot 's French translation. Other examples are Helmholtz's *Cosmos* and the textbook by Kohlrausch, which appear in Greece in French. This is especially the case with works by English and American authors, like Stillman, who are more likely to be found in German and French translations than in the original language.

Of course, a first and obvious explanation is that, after all, most if not all Greek scientists had studied in France or the German lands. The Greek scientific community was small, rarely having more than twenty members all over Greece at the same time, making it easier for personal preferences to show. Can we thus just conclude that textbook circulation was mainly conditioned by where the scientists themselved had studied?

Yes and no. There is of course a strong correlation between the appearance of textbooks and the origin oft he credentials of Greek scientists, but the respective statistics do not exactly match. The greatest number of textbooks in French appears when German educatedscholars hold the majority of Chairs, for example. Thus, we should rather conclude that textbook circulation was a semi-autonomous process, influenced by a variety of factors, such as personal preference, the cultural significance of French and German science and the mobility of the Greek scientists itself.

More importantly, theimportanceof language and translation for the constitution of the scientific worldview is brought forth prominently in the Greek case. As far as a scholar active in Greece was concerned, to speak French or German meant more than being able to study in French and German institutions. It also gave access to publications that crossed the Franco-German border. It allowed the study of advances that were being made in Georgian and Victorian England, filtered and annotated by French and German commentators. And again, here we must note how political might was not identical with scientific or cultural might. The University of Athens had from the start regular and cordial relations with the Universities of Edinburgh and Washington. British policies had significant and lasting effect in Greek life, as the Piourifoy incident and the Crimean War showed. Despite these facts, English speaking authors, for the duration of the 19C, were mostly known through translation. And, as I will have the chance to show again later, this also worked towards the disjunction between English science and English scientists. The former was all but unknown, the latter well known and respected.

Finally, and closely tied to the problematic of science and translation, is the ‘decentralized‘ nature of the networks of circulation. Textbooks did not simply originate on one of the traditional scientific metropoleis, to be later brought to Greece. Rather, a multitude of publishing sites, from Milan to St. Petersburgh and from Freiburgh to Philadelphia published, translated or transcripted textbooks and treatises, in various languages, which then appeared in Greek space through various modes of mobility. This is of course not to say that all nodes in these networks were equal and indistinguishable. Paris was still a publishing powerhouse and Munich and Berlin appear constantly as places of origin. Rather, it seems that the various other smaller nodes seem

to play collectively a crucial role in forming alternate paths of textbook mobility, which is usually not taken into account.

Utterances in the public sphere

But let us move now to the third and final theme I want to explore, the public utterances of Greek men of science. During the 19C, Greek scientists engaged the public sphere often and in various ways, by publishing journals, writing articles in newspapers, delivering eulogies and jubilees and giving provostial and inaugural lectures[16]. In this part oft he paper, I would like to discuss paradigmatic practitioners and institutions that appear in these utterances, and to identify the implicit and explicit assumptions Greek scholars make about the geography of scientific practice.

The begin with, in Greek rhetoric, there is a distinction between European space and progressivescience. Greece at the time wanted to disassociate its national character from its Ottoman past. But that did not mean that Greece belonged to a vague modernistic Europe. The goal was for Greece to become the model state of the East, which would act as a bridge for the superior achievements of the West to reach the uncivilized people of the East. And in fact, the defining dichotomy in the contemporaries' view was exactly the one between West and East, not between Europe and the rest of the world. Greece belonged to Europe, but that was an historical and spatial characterization. What Greece admired, and dreaded, was the West.And science, in Greek scientific discourse, was the indicative achievement not of European, but of Western, progress.

Says Anastasios Christomanos, a student of Bunsen and Liebig, in his inaugural lecture as a Professor of Chemistry in 1864[17]

[16] A more complete analysis can be found in Tampakis, Kostas. "Onwards Facing Backwards: The Rhetoric of Science in Nineteenth-century Greece." *The British Journal for the History of Science* FirstView (2013): 1–21.

[17]Christomanos, Anastassios,*Λόγος Εναρκτήριος εκφωνηθείς την 2 Μαΐου 1864* , Athens: Mavromatti, 1864, p. 4 . Translation from Greek is mine throughout the text.

If we want to find a place on the face of the earth where intellectual life, as was initially nurtured by the Greek soil, is unheard of, we must turn our gaze towards the East, as far as the most distant lands of Asia..

Natural sciences and their respective arts have become the necessary condition for civilization in the West· thus it our duty to facilitate with all our strength their introduction in Greece, in order to achieve material prosperity.

Thus, Greece was and had been a part of Europe, but not an equal partner of Western civilization. Scientific progress and Europe were not synonymous. The West and modernity were.

Which then,were the exemplary topoi and which were the heroic figures of this Western scientific progressiveness? Greek scientists were lavish in their descriptions. In order to valorize their discipline and personal status as cosmopolitan experts, they had to show how well informed they were to the happenings abroad. Depending on the specialty and the period of the speaker, the names of Darwin, Etienne St. Hillaire, Bunsen, Faraday, Liebig, Dulthiers and Lobatchevsky, among many many others, are invoked and their work discussed. Alongside them, one often finds Edisson and Stephenson as paradigmatic torch carriers of modernity. Progress and technical innovation went hand in hand. In these narratives, it is not progress that defines science but science that defines progress.

However, under the deluge of names, there are implicit hierarchies. France and Germany are always the exemplars. Georgios Remoundos, in his inaugural speech as as a Professor of Mathematics in 1906, is very explicit[18]

France is great and admirable because it can field an army of reknowned scientists, soldiers of the intellect, heroes of science...

And who can deny that the majesty of Germany is due in large part to its army of brilliant scientists?

[18]Remoundos, Georgios, *Περί των προόδων της Μαθηματικής Ανάλυσης κατά τον λήξαντα αιώνα και κατά τα τελευταία έτη*, Athens: Estia, 1906, p. 14-15

Other places are mentioned only when there is a need for the exhibition of concensus on a disputed claim. Says Nikolaos Apostolidis, professor of Zoology in his inaugural address in 1894, trying to justify the need for a laboratory of marine zoology[19],

Not only France and Germany have these laboratories, but all the states that care for the progress of science, have recognized the need for them. England, Belgium, Holland, Switzerland, Russia, the US, Australia, even Japan have instituted well organized and well funded similar facilities

Thus, France and Germany are the undisputed paradigmatic scientific spaces. Most other places, Britain first, can produce and nurture great scientists, but they cannot be considered prima facie topoi of exemplary science.

And in that international arena, Greek men of science are adamant that Greece must achieve its ancestor-ordained status, despite its small size. Belgium, Switzerland and Denmark, they often say, are examples of such succesfull integration and progress.

Conclusions

In this paper, I tried to sketch what the picture of scientific practice would be, if one situated his viewpoint within the Greek space. There is an implicit narrative in History of Science concerning Europe, especially during the nineteenth century. It is never spelled out completely (what narrative is?) but it has to do with the Grandes Écoles, with disciplinary formation, with teaching and research laboratories and with the rise of the German university. It has also to do with modernity, with colonialism and with networks of circulation. It unwittingly invites characterizations of centres and peripheries, and of metropoleis and borderlands. The driving question behind today's presentation was if, from the viewpoint of nineteenth century Greece, this narrative changes and how. By way of conclusion, I would like to point out the most prominent themes that emerge from a preliminary sketch of the era.

[19] Apostolidis, Nikolaos, *Τα θαλάσσια ζώα και τα επιθαλάσσια εργαστήρια*, Athens: Estia, 1894, p. 10-11

To begin with, it seems that in a Greek centered narrative, the concepts of Europe and the West are much more ambiguous than it is usually assumed. In the eyes of Greek scientists, science was a component of Westernity, not modernity. Progress stemmed not from Europe, but from the West, and the divide between them was clear. In a borderland like nineteenth century Greece, the two concepts of European space, the cultural and the geographical, were being negotiated and problematized through the mediation of Western science (among other things). Thus, it seems that it was not a European space that spawned a kind of science, but also that science spawned a specific kind of European space. When the divide between the Western ideal and the European became non existent, the process was complete.

In tandem, it seems that notions of scientific centers were nebulous at the time. France was an hegemonic scientific space, but in practice its eminence was synonymous with the Parisian institutions. Germany on the other hand, was also considered a scientific exemplar, but it consisted of a variety of topoi. It is not at all certain than Greek scientists considered themselves peripheral in respect to their colleagues in Marseille, Clermont or Bordeaux, not to mention Washington or St. Petersburg. And they often expressed their admiration for Belgium or Switzerland, despite them not having the canonical status of a center.

Nor was the existence of famous and renowned pioneers enough to delineate a national space as exemplary. Again, the most obvious example is Britain. Faraday, Darwin and Davy were often hailed as heroes by Greek scientists. British science, however, was another matter, despite the strong political presence of Britain in Greek affairs. Greek scientists rarely brought British institutions as examples, did not learn English and did not go to study over the English Channel. And here, it is also apparent that the relationship between scientific, economic and political hegemony was not always straightforward during the long nineteenth century.

Finally, it seems that education, translation and language played a very important role in the construction of a discourse on science. In the case of Greek scientists, at least, national, linguistic and disciplinary horizons converged. A chemist studied in Germany and got informed by German publications, even if the author of the publication was not himself German. A physicist spoke French, communicated in French and usually had studied in France, but not always. The way these boundaries were formed, however, was not through the imposition of a radial network, which transferred artifacts from a metropolis outwards. Much of the traffic happened through secondary networks, which linked not only Athens with Munich, but also Grenoble with Brussels, Milan with Geneva and Washington with St. Petersburgh. Circulation seemed to be unequal, but in a way also decentralized.

And that brings me full circle to the original historiographical question. Is it necessary to cross the Volga in order to discern the patterns of a global history of science? Is it beyond the straits of Gibraltar that the historiographical attraction of a “European science” faints? I believe that, as the case of Greece at least hints, research in the borderlands of Europe can shed some additional light in these questions. It could be the case that, as every geographer knows, in history of science too, borders defines spaces as much as spaces created borders. It remains to bring a full such research program to fruition, to answer such problematic decisively.

Appendix

Table of Authors whose Physics textbooks appear in Greece

	Name of author		Name of author
1	Ampere , A. M.	**25**	Frick, J.
2	Baenitz, C.	**26**	Fries, J. F.
3	Bareau , A.	**27**	Gerbi, R.
4	Baumgartner , A. F. Von Bergert , Al.	**28**	Gren , F. A. C.
5	Belli, G.	**29**	Grimm , J. C. P.
6	Bernoulli ,C.	**30**	Grunert , J. Au.
7	Botto, G.D.	**31**	Jamin , J. & Bouty , E. M. L.
8	Brandes , H. W.	**32**	Hellmuth, J. H.
9	Brewer, C. E.	**33**	Herschel , J. F. W.
10	Brettner, H. A.	**34**	Hessler
11	Buchner , J. A.	**35**	Heussi, J.
12	Büchner , L.	**36**	Hofer, J.
13	Cazo , R	**37**	Hoff ,J. H.
14	Chappuis , J.	**38**	Hoffmann , J. J. I. Von & Kastner , K. W. G.
15	Cruger, J.	**39**	Kerz, F.
16	Dandolo, V. C.	**40**	Kirchhoff, G.
17	Deal, J. N.	**41**	Kollert, J. Au.
18	Dove , H. W	**42**	Koppe K.
19	Dufet, H.	**43**	Krebs, G.
20	Eisenlohr, W.	**44**	Kries , F. C.
21	Ettingshouse, A.	**45**	Krist , J.
22	Fechner, G. Th. Von	**46**	Lang, V. Von
23	Filippo C.	**47**	Lame , G.
24	Fischer , J. K.	**48**	Lardner, D.
49	Leduc , A	**69**	Rubrom , M.
50	Lichtenberg , G.C.	**70**	Schreiber, H.
51	Lommel, E.	**71**	Schodler, F.
52	Marianini, S.	**72**	Siber ,T.
53	Matteucci, C.	**73**	Silliman , B.
54	Mayer , J. T.	**74**	Snell, K.
55	Mengotti, F. C.	**75**	Stewart , B. &Gee , W. W. H.
56	Mueller, F.	**76**	Strauss , A. F
57	Muller, J. H. J.	**77**	Subic, S
58	Munch, P. A.	**78**	Ubermayer, A. Von Tsejeidl , W.
59	Muncke , G. W.	**79**	Venturi, G. B.
60	Oersted, H. Ch.	**80**	Vogel , F.
61	Paci, G.	**81**	Voigt, W.
62	Palmieri, Luigi	**82**	Waeber,R
63	Pisko, F. J.	**83**	Westermann,H. & Weyrauch, J. J.
64	Pisko, F. J. & Hessler J. F.	**84**	Whewell , W.
65	Poppe , J. H. M. Von	**85**	Wullner, A.
66	Pozzi, G.	**86**	Zamminer, F.
67	Redtenbacher, F. J.	**87**	Zambra, B.
68	Reinhard, W.	**88**	Zantedeschi , F.