



2015 10 - 13 June, **Porto** - Portugal
INTERNATIONAL MEETING

AMS / EMS / SPM
american mathematical society european mathematical society sociedade portuguesa de matemática

**THE REASONS BEHIND THE REQUEST OF
THE MATHEMATICIAN GOMES TEIXEIRA
TO BE TRANSFERRED TO THE
POLYTECHNIC ACADEMY OF PORTO**

A PECULIAR EVENT IN THE PORTUGUESE CONTEXT

HÉLDER PINTO

(HISTORY OF MATHEMATICS GROUP – CIDMA, UNIVERSITY OF AVEIRO)

GOMES TEIXEIRA

Gomes Teixeira (1851-1933)

- 1874/75 Graduation in Mathematics Faculty of Mathematics from University of Coimbra (student; maximum grade)
- 1875 PhD in Mathematics
- 1876 Substitute professor Faculty of Mathematics from University of Coimbra (professor)
- 1879 Full professor
- 1879 Observatory + Parliament (Lisbon); Why? (Royal Academy of Sciences)
- 1880 Return to Faculty of Mathematics
- 1882 - 1884 Return to Parliament (Lisbon)

In politics, I am and have always been deeply ignorant. Look, I was deputy once (...) and I did not like! As a parliamentarian, the best I've done in that time, when I was in Lisbon, was listen a splendid opera in San Carlos! GT, 1927

- 1884 Transferred to Academy Polytecnic of Porto
- (- 1911 The Academy Polytecnic of Porto was transformed in Faculty of Sciences)



GOMES TEIXEIRA

Gomes Teixeira (1851-1933)

- **Transfer to the Academy Polytechnic of Porto by his own request (1884)**
- Director of Academy Polytechnic of Porto: 1885
- Rector from the new University of Porto: 1911



Why?

“for family reasons”

(the reason traditionally presented)



Was it the only reason?

(we will try to show that there were other reasons that probably influenced his decision)



HIGHER EDUCATION IN THE XIX CENTURY

Before the creation of PAP (1837)	After the creation of PAP (1837)
University of Évora (Jesuit); 1559 and closed in 1759	
<p>University of Coimbra (Theology, Canons Law, Civil Law, Medicine, Mathematics and Philosophy schools); 1290 and reformed in 1772</p>	
The Royal Academy of Navy and Trade Affairs of the City of Porto (1803)	The Polytechnic Academy of Porto; 1837
Royal Navy Academy; Lisbon, 1779	The Polytechnic School of Lisbon; 1837
Royal Academy of Fortification, Artillery and Drawing; Lisbon, 1790	The Army School; Lisbon, 1837
Royal Academy of Midshipmen; Lisbon, 1792	The Navy School; Lisbon, 1845
Royal School of Surgery; Porto and Lisbon, 1825	Medical-Surgical School; Porto and Lisbon, 1836

GOMES TEIXEIRA

Why is so peculiar the transfer of GT to Porto?

In general, there were three possible situations for the Portuguese mathematicians/professors at the time:

University of Coimbra (student) -> University of Coimbra (lecturer)

University of Coimbra (student) -> Polytechnic School of Lisbon (lecturer)

Polytechnic School of Lisbon (student) -> Polytechnic School of Lisbon (lecturer)

Why the most remarkable mathematician of his time chose, by its own initiative, to be transferred to the Academy Polytechnic of Porto?



THE POLYTECHNIC ACADEMY OF PORTO (1837)

The Royal Academy of Navy and Trade Affairs of the City of Porto that now should be designated by – **Polytechnic Academy of Porto** –; with the special aim of teaching Industrial Sciences, and should graduate:

1. **Civil Engineers of all classes, such as
Mines Engineers,
Constructors Engineers,
Bridges and railroads Engineers;**
2. Navy officers;
3. Sailors;
4. Trade business men;
5. Farmers;
6. Factory directors;
7. Artists.

January, 1837. = *Passos Manuel*.



THE POLYTECHNIC ACADEMY OF PORTO (1837)

4 Sections – 11 disciplines

Mathematics:

1. Arithmetics, Elementary Geometry, Plane Trigonometry, Algebra up to second degree equations
2. Continuation of algebra, and its application to geometry, Differential and Integral Calculus, Principles of mechanics
3. Descriptive geometry, and its applications
5. Spherical Trigonometry, Principles of Astronomy and Geodesy, Theoretical and practical Navigation
6. Artillery and Naval Tactics

Natural Philosophy:

7. Natural history of the three kingdoms of nature applied to Arts and Crafts
8. Physics and industrial mechanics
9. Chemistry and mines
10. Botanic, Agriculture and rural economics, Veterinary

4. **Drawing**

11. **Trade Affairs, and industrial economics**



THE POLYTECHNIC ACADEMY OF PORTO (1837)

Although, theoretical (and by law) both Polytechnic (Lisbon and Porto) were similar, in reality the level of both were very different:

- The Polytechnic of Lisbon fought to be «equal» to the University of Coimbra

- The Polytechnic of Porto fought to survive

(lack of prestige, lack of money, classes in an unfinished building, lack of conditions to teach and to do investigation; lack of teachers that were also scientists; just some of its professors were formed by the University and the teachers with PhD were very few (none in mathematics)).



THE POLYTECHNIC ACADEMY OF PORTO (1837)

Significant is the fact that in **1882** (2 years before de arrival of GT...) there was a proposal (by Rodrigues de Freitas, professor of Polytechnic Academy) to merge this institution with the Industrial Institute of Porto

The Industrial School of Porto (1852)

-> The Industrial Institute of Porto (1864)

graduated factory worker (preparatory for all the others)

factory director

overseer of public works

overseer of machines (steam engines)

overseer of mines

telegrapher

master of public works

master of chemistry

With these changes, the academy became a very practical school not prepared to theoretical studies.

Why a **scientist** in pure mathematics as GT chose a school like this?



GOMES TEIXEIRA

“He created new periodicals in Portugal, devoted to the mathematical sciences. At his request, leading European mathematicians contributed to these periodicals, and due to his insistence, his Portuguese colleagues were made to publish in them.

Finally, in the later years of his life, he became interested in the history of mathematics and, in a sense, pioneered a modern approach to this discipline in his country.

Gomes Teixeira was the first man in Portugal to engage in mathematical pursuits in the manner that they were practiced in Europe at the time. He was perhaps the first in Portugal to understand the practice of mathematics research as we understand today: as a participation in an international community. Anyone who compares his career in mathematics with those of his immediate predecessors will notice an enormous gap in the difference of mentality – possibly also in talent.

It was only in Gomes Teixeira’s time that the University became the institution *par excellence* for study and research mathematics.”

([Leitão, 2004]; pp. 31-32)



GOMES TEIXEIRA

GT participate in the process of formation of the mathematical community

For example, he participated in the creation of the journal ***L'Enseignement Mathématique***; which was adopted as the official publication of ICMI (*International Commission on Mathematical Instruction*) created in the fourth International Congress of Mathematicians (Rome, 1908).

the first volume came out in 1899 (Paris) and the name of GT was included in its Patronage Committee (accompanied by several important names of contemporary mathematics as, for instance, Klein and Cantor).

*“among the authors there were [...] famous mathematicians (E. Borel, C. Bourlet, L. E. J. Brouwer, E. Czuber, G. Darboux, F. Enriques, M. Frechet, Z. G. de Galdeano, J. Hadamard, D. Hilbert, F. Klein, H. Lebesgue, B. Levi, C. Méray, P. Painlevé, H. Poincaré, **F. Gomes Teixeira**, H. Weyl, etc.)”*

[Coray, D.; Furinghetti, F.; Gispert, H.; Hodgson, B. e Schubring, G. (ed.); *One Hundred Years of L'Enseignement Mathématique – Proceedings of the EM–ICMI Symposium* (2000); Genebra, **2003**, p. 33].

Why a mathematician with this profile (the very best in Portugal) asked to be transferred to the Academy Polytechnic of Porto and didn't choose any of the two best schools in Portugal?



FAMILY REASONS

Family reasons (with no more explanations) were indicated in a biography of GT in 1918, published by the Royal Academy of Sciences from Lisbon

(this is the source most used and quoted throughout the time)

[**Guimarães, Rodolfo**; *Biografia de Francisco Gomes Teixeira, in História e Memórias da Academia das Ciências de Lisboa*, tomo XII, parte 2 (1910-1915); IN, Lisboa, **1918**]

However, it was not the first time that this reason was presented:

Gonçalo de Almeida Garret (colleague of GT in the Faculty of Mathematics) said the same in a speech on the parliament in **1900**

(he used the same exact words; was this the original source of Rodolfo Guimarães?)

These statements were produced before GT die in 1933

(there are documents proving that GT knew about this two declarations)

If he wasn't comfortable with these reasons, he had many opportunities to refute that

Just in **2004** [PhD thesis of **Graça Alves** about GT], there was more explanations about the family reasons:

The GT grandchildren's stated that: “[...] **our grandfather came to Porto to marry. Our grandmother did not want to move to Coimbra and he made her will.**”



FAMILY REASONS

Is this enough to justify the transfer to Porto?

In my PhD thesis [*The Mathematics in the Polytechnic Academy of Porto*, University of Lisbon, 2013] I present two more facts that, by its importance, could have influenced GT in that decision:

- the existence of important conflicts within the *Faculty of Mathematics* at the time;
- his friendship with Wenceslau de Lima (also lecturer of the Polytechnic Academy), who was responsible for the approval in the Parliament of the important Reform of 1885, soon after GT became a Professor in Porto.



GT AND THE FACULTY OF MATHEMATICS

«CONGREGAÇÕES» OF THE FACULTY OF MATHEMATICS OF COIMBRA (1871-1886)

[Note: this was an academic council composed by all the teachers of the Faculty of Mathematics]

In the 1870s, we can find in the minutes of this institution several conflicting situations

The majority of them involved the lecturer **Rocha Peixoto** (one of the youngest professors).

Rocha Peixoto was also a deputy in parliament at the time of GT.

It was in February of 1879 that the most significantly episode involving GT and Rocha Peixoto took place.



GT AND THE FACULTY OF MATHEMATICS

«CONGREGAÇÕES» OF THE FACULTY OF MATHEMATICS OF COIMBRA (1871-1886)

12th February, 1879

Presences in the meeting: Castro Freire, **Venancio Rodrigues** [lecturer of the 4th **discipline**], Barreto Feio, Torres Coelho, Luiz da Costa, José **Falcão**, Souto e Almeida Garret [8 members].

Venancio Rodrigues said that newspapers stated that a draft law was proposed in the parliament to change the subjects of the 4th discipline of the Faculty of Mathematics.

He asked if the others participants in this meeting had been consulted on the subject.

All participants declared to have not been consulted.



GT AND THE FACULTY OF MATHEMATICS

DIARY OF THE PARLIAMENT (1879)

5th February, 1879

PROPOSED LAW

Article 1. In the fourth discipline of the Faculty of Mathematics of the University of Coimbra, it will be explained, besides the descriptive geometry, the superior geometry (half of the school year for the descriptive geometry, and another to the superior geometry).

Art. 2 All the legislation in contrary is revoked.

Date: 3rd February 1879.

Proponents: Gomes Teixeira and Rocha Peixoto (both young professors at the Faculty of Mathematics).

They didn't ask for the opinion of any other colleague in the Faculty of Mathematics, even from the professor who was responsible for the discipline...



GT AND THE FACULTY OF MATHEMATICS

«CONGREGAÇÕES» OF THE FACULTY OF MATHEMATICS OF COIMBRA (1871-1886)

12th February, 1879

Venancio Rodrigues made a declaration that he also didn't participate in this proposal and suggested to send a letter to parliament saying that the law must not be approved.

The major argument used in the letter was that the Faculty of Mathematics opinion wasn't previously heard about this subject (although it was proposed by two of its professors...)

14th March, 1879

The letter was presented in the parliament by the deputy *António José Teixeira*
(another lecturer of the Faculty of Mathematics)

What happened next?

- In May, Rocha Peixoto said again, in a speech in the parliament, that the law they proposed should be approved (reaffirming the disagreement with his colleagues...)
- There were several parts of the minutes of the Congregation that were deliberately erased (although it's possible to see that those parts were about this proposal of law); these are the only minutes that were erased from this book of minutes in 15 years...
- At the end, the proposal of law wasn't approved (or rejected) by the parliament.



GT AND THE FACULTY OF MATHEMATICS

Why this episode happened?

The proponents have a lack of experience?

They tried this way because it was difficult to get the consent of the elder professors to reform and modernize the Faculty of Mathematics curriculum?

The method chose by GT and Rocha Peixoto to made this change hardly could be accepted by the installed power in the Faculty.

8th February, 1882 (3 years later)

GT proposed, again, in the parliament almost the same law.

Once again the proposal wasn't approved (this time we cannot find any reaction of the Faculty about it)

(note that the question was not about the subjects of the 4th discipline because the Faculty of Mathematics proposed almost the same in 1887...)



GT AND THE FACULTY OF MATHEMATICS

Conclusions and final remarks:

Fact: there were conflicts between the professors of the Faculty de Mathematics
Apparently, it was a generational question («elderly» vs. «youngest»)
(the conflicts were public; for instance the newspapers publicize what was happening in the parliament)

Remarks about Porto:

- In 1885, GT participated in the elaboration of the new programs of the Polytechnic Academy;
- Short after, he was designated Director of the Polytechnic Academy (this kind of promotion was impossible in the University where the main criterion was age);

Have these influenced GT to move to Porto?

It is difficult to believe that this situation had not been, somehow, taken into account in the GT's final decision.



GOMES TEIXEIRA E WENCESLAU DE LIMA

Wenceslau de Lima (1858-1919)

- He was born in a rich and important family
- Graduation and PhD in the Faculty of Philosophy of the University of Coimbra (1882)
- Deputy in the parliament; elected for the first time in 1883 within the same political party of GT
(over the time, he had many important political positions such as mayor of the city and prime-minister of Portugal)
- Professor of the Polytechnic Academy of Porto in 1883 (Mineralogy, Geology, Metallurgy and Mines)
- **In March of 1885 he presented in the parliament a proposal to reform the Polytechnic Academy of Porto**



GOMES TEIXEIRA E WENCESLAU DE LIMA

Relation between Gomes Teixeira and Wenceslau de Lima

*“In the first time that I visited the Alps, in **1876**, I was in the company of Wenceslau de Lima (...).”* [GT, Santuários de Montanha, 1926]

If the date is correct, they knew each other since their youth (in this travel GT was 25 years old and Wenceslau only 18). Were their families related? Was GT a kind of tutor of Wenceslau de Lima?

- Both of them were deputies in the parliament in **1883** and **1884**

They proposed some laws together such as, for instance, the restitution of the 6th discipline of the Polytechnic Academy, now dedicated to Mineralogy, Geology, Metallurgy and Mines, in 1883 (proposed in April 19 and approved in May 8).

The first lecturer of this discipline was... Wenceslau de Lima (he «created», with the support of GT, a discipline for himself...)

-There are some letters written by GT to Wenceslau de Lima (without date or dated after 1900) on which both exchanged several favors such as the nomination of certain friends to some positions related to the Academy and others institutions of the city.

This indicated a very proximal relationship (curiously, there wasn't any letter from Wenceslau de Lima in the Archive of GT in Coimbra; he didn't save these «less noble» letters ...)



GOMES TEIXEIRA E WENCESLAU DE LIMA

The Reform of the Polytechnic Academy of Porto in 1885

(GT arrived to Porto in the previous year)

24th March, 1885

Wenceslau de Lima proposed a project of law in the parliament to reform the Polytechnic Academy of Porto

- creation of 5 new disciplines; before that, the Academy only had 13.
- the academic council of the Academy (i.e., the professors) should revise the programs of all disciplines
- more budget to the institution.

13th April, 1885

Wenceslau de Lima presented a letter from the Polytechnic Academy to the deputies asking their approval for this project

[compare this with the situation lived by GT in 1879...]

24th April, 1885

The Reform presented by Wenceslau de Lima was approved without discussion.

[just one month after his initial proposal...]



EVOLUTION OF THE TEACHING OF THE HIGHER MATHEMATICS IN THE CITY OF PORTO

1803; **The Royal Academy of Navy and Trade Affairs of the City of Porto (1803):**

NAVY + TRADE AFFAIRS

Math (with Nautics) (3) + Philosophy + English + French + Drawing
+ Trade Affairs **[8]**

1837; **Polytechnic:** MATH (with Engineering and Nautics) (5)

+ PHILOSOPHY (4) + Trade Affairs (1) + Drawing (1) **[11]**

1885; Major Reform

Navy / Nautics have disappeared already **[18]**

Polytechnic: MATH + ENGINEERING (5 + 4)

+ PHILOSOPHY (6) + Trade Affairs (1) + Economics (1) + Drawing (1)
(ended in 1897)

1911; **FAC. SCIENCES University of Porto:** SCIENCES + ENGINEERING



GOMES TEIXEIRA E WENCESLAU DE LIMA

Yearbook of the Polytechnic Academy of Porto, 1885-1886



It was the first time that a young professor (only **28 years old**) had the honour to see his image printed in the yearbook of the institution. Generally, this distinction was only given to old professors (and, for the majority of them, just after death).

This is significant to understand that all the Polytechnic Academy was pleased with this reform.

GT in the next yearbook (1886-87), in his condition of Director, said that this tribute was fully deserved by his work in the approval of the 1885 reform.



GOMES TEIXEIRA E WENCESLAU DE LIMA

Conclusions and final remarks:

- Wenceslau de Lima and GT were friends;
- GT knew, almost certainly, the intention of Wenceslau de Lima to reform the Polytechnic Academy when he decided to go to Porto;
- Wenceslau de Lima, although young, was a personality with sufficient political influence to approve this reform.

Have these influenced GT to move to Porto?

It is difficult to believe that this situation had not been, somehow, taken into account in the GT's final decision.

With this reform, GT was able to proceed with his mathematical activities in a position of prestige such as a Director of a Polytechnic in expansion and in its scientific apogee.



CONCLUSIONS

Possible reasons that lead the important Portuguese mathematician Gomes Teixeira to move from the University of Coimbra to Porto in 1884

Three possible reasons:

- Family reasons (the official one...; the noble one...; appeared during the lifetime of GT but was never stated or rejected by GT).
- The existence of some conflicts within the Faculty of Mathematics at that time;
- His friendship with Wenceslau de Lima (also lecturer of the Polytechnic), who was responsible for the approval of the important reform of 1885 in the Parliament, soon after Gomes Teixeira became a Professor in Porto.

Which one is the correct one?

It's possible that all of them contributed to this transfer (maybe in different levels of importance but all of them, due to its impact and relevance, must have been under consideration by GT when he decided to move to the city of Porto)



CONCLUSIONS

Maybe it will be difficult to find a definitive answer to this question; why?

GT prepared carefully the memory that he would leave for the future (recall that GT was also a historian of mathematics...):

- GT prepared himself all the historical documentation that he left to posterity; He offered the majority of his documentation, during his lifetime, to University of Coimbra and Royal Academy of Sciences of Lisbon
- The GT letters that are in the Archive of the University of Coimbra were chosen and numerated by himself; we use until today his description of the letters; we certainly know that other letters existed although they cannot be found within this archive;
- He prepared, in advance, its own funeral (the death didn't caught him unprepared...);

GT and Wenceslau de Lima met several times during the years 1883 and 1884 (for example, in the parliament); which may justify the fact that we don't find any letters between the two during this period.





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