



A contribution to the history of the restoration of mathematical teaching in Portuguese Jesuit Colleges in the 18th century, and the Jesuit mission in China

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The Problem

The Jesuit mission of China was historically the territorial and institutional extension of the Jesuit *Provincia Lusitana*, and inscribed in the sphere of the *padroado*. This situation had dramatic consequences for the recruitment of candidates for the China mission, especially since its exponential growth from the mid-17th century onwards. First, there was a demographic insufficiency, as Portugal could not answer to the high numerical exigencies of the mission on its own, and – qualitatively speaking – the *Indipetae* who presented themselves did not have the necessary profile. Indeed, there were high-standard mathematical (astronomical) expectations towards the new recruits, as since Matteo Ricci, an authority in the field of mathematics, especially on the practical level of astronomy and later on also in engineering, was the key to approaching the Chinese *literati*, who were eager to learn more details about the Western knowledge of the celestial sky, fascinated and challenging alike. It was precisely this aspect, which unfortunately was not well prepared in the Jesuit colleges of the Portuguese province. Therefore, since the mid-17th century, for both reasons, firstly, the insufficient

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number of candidates, and, secondly, their «low» mathematical level, the authorities of the Jesuit *Provincia Lusitana* received, and when possible, held «foreign», non-Portuguese Jesuits passing time in Jesuit colleges, while waiting for the yearly fleet to the Far East, in order to teach more advanced mathematics to local students.

In the historiography of the mission, this situation was well known and described, especially since Domingos Mauricio (1935) first listed the «foreigners» temporarily teaching in Portuguese colleges, either in a more or less curricular way as regular teachers in the college's program, or in a kind of a parallel circuit, not mentioned in the catalogues. Later I had the opportunity to add some more names and more substance to this teaching, always as «exceptional» courses, while a prosopography as complete as possible of maths teachers in Evora, Lisbon, and Coimbra was made by Ugo Baldini.

By the end of the 17th century, this situation was found to be largely unsatisfactory and thus criticized by the Jesuit authorities in Rome, certainly under the influence of frequent complaints from China, urgently asking for more missionaries with an appropriate mathematical background. Some of these letters, such as the extensive *Epistola ad socios Europae* (15 August 1678) of Ferdinand Verbiest, arrived in Europe in 1681 and circulated broadly through all the European colleges.¹ Already in 1684, General Charles de Noyelle (1615–1686) reacted to Verbiest's urgent requests to send «modern» medical books and medically trained Jesuits to China, despite the institutional objections. In 1684 De Noyelle organized an international «search for books» from Rome. One year later, on 4 July 1685, the same General sent a letter (*Lus.* 34, f.° 168r.) to the Provincial of Portugal with the urgent request to take measures to improve and upgrade the level of the mathematical education in the Portuguese colleges. In view of this, De Noyelle ordered that two Jesuit students be selected each year to study mathematics, a condition that was apparently fulfilled in 1686/1687, as Provincial Antonio Vaz reported in 1687. Yet, there are no indications in the *Catalogi* of the subsequent years proving that this indeed happened, and the Portuguese province appeared rather incompetent or unable to answer his order. This became particularly clear when, at the death of Verbiest in

¹ For the text and the contents of this important encyclical letter, see now the edition of the correspondence of Ferdinand Verbiest (Golvers 2017b).

January 1688, no competent Portuguese Jesuit successor could be found for the position of (Acting) Director of the *Qintianjian* / Bureau of Astronomy in Peking, a strategic Jesuit post since 1644 ensuring the continuity of the mission itself. This, and the immediate challenge of mathematically trained French Jesuits, who arrived in the same year 1687/1688 in Peking, was the external incitement to «force» a mathematical reform in the Portuguese assistance. Therefore, in 1691 and the following years, the new General Tirso González (1624–1705) prepared an entire series of documents and letters, sent to Lisbon in order to launch the reform. As this whole procedure of González has been described in detail by Ugo Baldini (2004), it will not be repeated here.² For the same reason, neither a resume of the history of mathematics in Portugal in the 17th and 18th century, nor a complete overview of this process is provided here. Rather, some «snapshots» from materials so far overlooked illustrate this process for both Evora and Lisbon, postponing similar research for Coimbra to a later occasion.

Parallel to González's (compulsory) prescriptions with regard to the organization of mathematical teaching inside the colleges, at least in the first years, appeal was made to the «old» solution, namely, to hire «foreign» Jesuits as (temporary) teachers. This happened in Evora, Lisbon and Coimbra.

Evora and its *Colégio do Espírito Santo*

The English Jesuit John Hildred (born 1657; entered the Society of Jesus in 1678) arrived in Evora in 1692 to teach mathematics for the next four years, i.e. 1692–1693 to 1695–1696.³ It remains unknown where he had acquired his mathematical knowledge, but as he had been a student at English colleges in Belgium and Northern France, i.e. the *Provincia Gallo-Belgica* (St. Omer; Liège), it was probably at the college of the English Jesuits in Liège, founded in 1616, where some advanced mathematical culture existed, as it was witnessed by Francis Line (1595–15 November 1675) and George Keynes (1630–1659). At the end of his studies of philosophy in Liège in

² For mathematics in Portugal at the end of the 17th cent., see also Cunha 1941: 238–263; Rodrigues 1944: 198 ff.

³ Cf. Lus. 46, f° 329v., Triennial Catalogue (1678–1696). First mentioned in the Catalogus Prov[inciae] Lusitanae of 1693, s.v. Coll. Eborensis, p. 22 n° 273 (on f° 242): «Magister Mathematicae»; in 46a (1700!?) s.v. Coll. Eborensis n° 272: «P[ater] Johannes Hildret, Anglicanus, natus an[no] 1657, ing[ressus] Societ[at]em an[no] 1678, viribus bonis; magister mathematicae». For a biographical note, see Holt 1984: 118; Baldini 2004: 403, note 200 and 207.

1692, John Hildred arrived in Evora, and was proposed to teach mathematics. After his first year as teacher in Evora, he sent a report letter to General González.⁴ In another letter of the following year (1693 – 1694), dated Evora, 21 August 1694, also addressed to González, he informed the General on the progress he made with his mathematical course, and of the number of his students («*deputati ad mathesim*»), giving an overview of the examinations and of the theses («*theses*»; «*propositiones*») defended.⁵

From this «annual report» covering the academic year 1693–1694, we learn that the program started during the Philosophy courses of the students of the 2nd or 3rd year (as prescribed in the *Ratio*), and they were called «*deputati 1i / 2di anni*»; the course consisted of two years. As there are, to my knowledge, no course texts of Hildred preserved, only guesses can be made about the contents and the level. It included at least courses on geometry based on Euclid, but also on astronomy. Hildred assessed his students' level «average» («*ad mediocritatem*»), with some exceptions: he especially mentions Luis Gonzaga, rated «*multum superavit mediocritatem*», Antonio Simões (born 1671), described as «*perfecte scivit geometriae 6 libris geometriae*» and as a very promising young fellow («*magnae spei iuvenis*»), and Luis Alvarez, assessed «*abunde satisfecit*», as also João Garção. These names reappear as teachers in the other Jesuit schools during the following years. We could therefore say that Hildred's program constituted an entire new generation of mathematicians, above all, Luis Gonzaga in Coimbra, Luis Mendez in Evora (before 1711), and Garção in Evora (1725/26–1733/4). Also, Antonio Simões, – in spite of his excellent results during the *deputatura* and to everybody's astonishment originally appointed to an «ordinary» school («*obtinuit scholam nullius momenti a P(atre) Vice-Provinciali cum aliqua omnium admiratione*»⁶) – became a teacher in Evora later on. Other students were apparently less talented, and were qualified as having reached «almost» (quasi) an average level, thanks to their efforts acc. to their (limited) measures» («*pro suo modulo*»).

The academic year was concluded with the defense of the mathematical theses. These defenses were a public event attended by local authorities, ecclesiastical and political alike, which illustrates the social prestige the discipline tried to acquire through the interest and moral support from these

⁴ Cf. *Lus.*, 34, f° 329v. – 330r., Epistles (1679–1699).

⁵ Cf. *Lus.*, 75, f° 253r./v., Epistles (1656–1699).

⁶ Cf. *Lus.* 46, f° 192r., Epistles (1656–1699).

authorities. Of these «theses» only one seems to be preserved, namely the seven pages *Propositiones Mathematicae* from Antonio Simões.⁷ More comprehensive were the Theses of Luis Gonzaga, which included questions on astronomy, practical geometry and *architectura militaris*; these seem to be lost now. Another thesis, «*De Globo terrestri et Coelesti*,» is mentioned in a letter of 1 Aug. 1693 by General González,⁸ but its public defense was apparently forbidden by the local Rector (cf. Baldini 2004: 403-404, note 200). All in all, as the result of this year, in which Hildred did not spare any effort, there were only two students who were able to calculate eclipses («*duos eclipseos computistas*»); unfortunately – as this whole program was organized in view of the China mission – they did not apply for the Indies («*sed nunc Indias non expetunt*»)

When Hildred left Evora at the end of the academic year 1695–1696, the Sicilian Jesuit Giovanni Francesco Musarra took the charge of the mathematical courses. Born in 1649 near Catania, he entered the Jesuit Society in 1664 and followed a «normal» *cursus studiorum*, after which he was engaged in teaching humanities, philosophy, moral theology, and mathematics at the Jesuit colleges in the *Provincia Sicula*,⁹ among others seven years at the Jesuit college of Palermo. Further details on his curriculum in the thirty years between 1664 and 1696, before he arrived in Portugal, or details on his mathematical education are unknown so far, except probably his presentation before 1689 in the Academy of Christina of Sweden in Rome, the later *Accademia degli Arcadi*, on Democritus and Heraclitus (cf. Baldini 2004: 407, note 212). His first request for being sent to the Indian missions already dates back to 16 November 1666; and was followed by other letters of 24 September 1671; 27 May 1694; 8 August 1694; 6 November 1694, 1 March 1695 and 7 September 1695.¹⁰ Anyway, when the Portuguese King Pedro II asked the General for some competent Jesuits to teach mathematics in the colleges of the *Provincia Lusitana*, Musarra was indicated as the appropriate candidate. A likely first stop on his route was Genoa, in September 1696,¹¹ from where he wrote a letter to the General on 8 September

⁷ Now in Lisboa, in the *Biblioteca Central de Marinha*, n° 3224; I had not yet the occasion to see it.

⁸ *Epistolae Nostorum*. 22, f° 143; 144r./v.

⁹ The most extensive biographical note on Musarra is that of Lo Nardo 2018.

¹⁰ All to be found in *Fondo Gesuitico*, 15 and 17. I thank Dr. Lo Nardo (Palermo) for this information.

¹¹ See his letter of 8 September 1696 in ARSI, Jap.Sin, 166, f° 144r./v. Epistles (1694–1699).

1696. This letter shows how he had already prepared astronomical texts, for which he tried to get the permission to publish them in Portugal from the Portuguese Provincial, Father S. de Magalhães while still in Genoa:

Prima di partire supplico V[estra] P[aternità] [= the General] che scrivesse al P[atre] Provincial di Portogallo per darmi la licenza... se sia approvata, d'ivi stamparsi la dottrina de'computi dell'eclisse e degli aspetti di Pianeti, di cui, ciascun anno si presenta all'Imperatore della Cina il catalogo over'effemeridi.

A little further, in the same letter, he also expresses his intention to add to it «*le tavole in compendio*». As far as we know, this permission was not given; the work has not been printed, in the same way as it had happened twenty years before with the «*Rota astronomica*» of Aigenler or Antoine Thomas's *Synopsis Mathematica*.¹² The same letter also gives a short report on his «sea route» via Cadix / Gades and Gibraltar. Apparently, Musarra suffered a lot during this journey, and therefore it was decided not to send him to Goa to teach mathematics in a projected new «Mathematical Academy» – as was the original intention, but to send a substitute, either Giacinto Serra (whom Musarra had met in Genoa) or Ignazio Palmeri (?–1698), the latter a Sicilian fellow, friar and fervent *Indipetae*,¹³ Musarra's own preference (12 March 1697¹⁴), and to keep Musarra in Portugal to teach mathematics in Evora. After arriving in Lisbon on 1 December 1696 («*pridie Kal. Decemb., 12° scilicet abhinc die*»¹⁵), Musarra left Lisbon for Evora shortly later,¹⁶ arriving in Evora before February 1697, i.e. just in time to start the summer semester of that academic year 1696–1697, as described in his letter of 8 February 1697.¹⁷ As his predecessor Hildred had left Evora at the end of the former academic year, during winter semester there had apparently not been any maths teacher. Musarra left Evora again before Sept. 1698, as we know from

¹² For the former, see my note: Golvers 2018a; and for the latter my article Golvers 2017a.

¹³ See his *Litterae Indipetae* dated 19 April 1689; 18 November 1690, 11 September 1691; 8 September 1692; 17 February 1693; 21 February 1693; 26 December 1693; 7 and 22 March 1695; 18 October 1695; 11 December 1697.

¹⁴ Cf. ARSI, Jap.Sin, 166 f° 183r./v., Epistles (1694–1699).

¹⁵ Cf. ARSI, Jap.Sin, 166, f° 156r./v., Epistles (1694–1699).

¹⁶ After 12 December 1696, according to his afore mentioned letter of that date, written from Lisbon («*Eborum mox proficiscar, ubi mathesim edoceam*»).

¹⁷ Cf. ARSI, Jap.Sin, 166, f° 174r./v., Epistles (1694–1699).

a note of the Provincial Antonio Cardoso.¹⁸ His teaching in Evora, therefore, spanned a rather short period, namely the 2nd semester of the academic year 1696–1697, and two semesters of 1697. During this period, he wrote several report letters to the General,¹⁹ which give a detailed view on the process and the results of his courses, summarized here «in a nutshell».

On 5 April 1697, Musarra eulogizes Antonio Simões – a pupil already praised by his predecessor Hildred as a «very promising boy». Musarra proposes him to start his (4th year) theology studies, simultaneously teaching mathematics, the same way L. Gonzaga – another former student of Hildred – did in Coimbra.²⁰ In the rest of this long letter, Musarra gives a synopsis about the students he educated during these few months (February–March 1697). From the various categories of students, there were two «*deputati ad mathesim*», that is from the Philosophy students. He was especially happy with João Garção, while he considered Veríssimo de Carvalho (born 1673) as too negligent, as detailed in a moment.

Musarra suggests only two new candidates from the *scholastici*, namely Aloysius de Sanctis and Ignatius Correa, as all other students appeared to be incompetent or «hated» mathematics. In general, Musarra rather appreciates his students' «*propensio*», i.e. their positive inclination, than their «*ingenium*».

Of the *artistae* among his students he mentions Domingos de Britto, Gaspar Simões, and Francisco de Vasconcellos, all three with the ambition to go to China, which gave them an internal «drive» for their study of mathematics («*interno mathesim stimulo affectant*»). The latter student, de Vasconcellos, had already discussed a «*problema de cursu solis*» in such a splendid way, that Musarra feared that he would be kept in Portugal. Further on, among the Theology students, there was only one candidate for his courses, namely Pedro Almeida, also an «*Indipeta*», for whom he expected – for the same reason – good results: «*divino mathesim motivo prosequens ediscet feliciter*».

¹⁸ Cf. *Lus.* 34, I-II, f° 388, Epistles (1679–1699), 6 September 1698, Ulyssipone – P. Antonio Cardoso Prov[incial]: De Collegio Eborensis: «Cum P[ater] Johannes Franciscus Musarra profectus sit in Italiam, oportet sciat R[everentia] V[est]ra velle me ut Provincialis Lusitaniae, cui inservivit, expensas solvet pro eiusdem regressu: id enim postulat inopia V[ice]Prov[incij]ae Sinensis».

¹⁹ Cf. ARSI, Jap. Sin. 166, Epistles (1694–1699).

²⁰ Cf. ARSI, Jap. Sin. 166, f° 192r-193r., Epistles (1694–1699).

As for the other students (it remains unclear which group this may be) he has only «average» («*mediocria*») expectations or did not expect anything («*a cetera turba nihil*»), as they presented themselves for the examination very negligently, without preparation: «*perfunctorie*».

However, why should they be concerned with mathematics, Musarra further on asks as a rhetorical question, looking at this aversion's deeper reasons, which he describes as «discomfort». He cites two reasons for the lack of enthusiasm among his students. First, the students of mathematics received no «*praemia*» (prizes) for this discipline, contrary to what was written in the *Ordinationes*, and contrary to what happened in the «human studies»: «*Quid curent...cum nulla Matheseos ratio habeatur*!?!». Secondly, mathematical training – even a particularly good one – did not give the slightest advantage or priority regarding the assignment of «good» classes in the schools, as the (Vice-)Provincial did not take any of these extra competences into consideration. Therefore, despite General González's strong and precise recommendations, the position of mathematics in the Province had apparently barely improved, and as in the past, the most motivated candidates were those students who wanted to go to the China mission. To change this situation, Musarra proposed to offer a «prize» to A. Vasconcellos for his «beautiful» dispute. He also proposed to withhold the «*votum*» for all candidates who did not even know the first book of Euclid, so that they had to repeat the same year: «*Medicamen est arduum*», he concludes, but it was the only way to stimulate their study of mathematics.

In a post scriptum destined to the General only («*soli*»), two particular points are discussed. First, a rather amusing anecdote about Musarra's disgust of wearing the prescribed «*pileus*» («hat», known in Spanish as a *borla*) during the public disputations. Second, there is a comment on a regulation for philosophy students of philosophy not following the extra-mathematical course, who were «unemployed» during these parallel courses.

His letter written one month later, on 11 of May 1697 gives some more details on the debates of João Garção who, as expected, got the «*laurea*», while Verissimo de Carvalho behaved very improperly: although he had followed less than 12 lessons – maybe the 12 lessons of which the course of the summer semester consisted of – he intended to intervene during the public presentation of his fellow student. This was prevented by Musarra, who gave «free podium» to two theology students who had prepared them-

selves well.²¹ The sessions were organized in the *schola theologica* and not in the University aula, in order to avoid the obligation to wear a *borla*, which, according to Musarra, would hurt the feelings of an Italian, who did not like such rituals when unnecessary (*«quia sunt contra nostrum morem in re non necessaria»*).

After Musarra left the college, the course was continued by the much-honored António Simões (1699–1701) and João Garção (1701–1703) during subsequent years, both former students of Hildred and Musarra. Yet, on 29 July 1701, three years after Musarra's return to Italy, Domingos Fernández sent a report to General González, with new proposals to organize and «streamline» the mathematical courses, suggesting that the previous measures had not produced clearly evident, sufficient results. His letter to González, entitled *«De studio mathesis promovendo»*, now in *Lus.* 76, f° 21 (Epistles, 1700–1756), suggests the following measures:

- Every week, three lectures should be organized; one on *secunda*, one on *tertia*, and one on *sexta feria*, i.e. on Monday, Tuesday and Friday;
- as, in fact, in some weeks only two or only one, or even no lesson at all was given, Fernandez suggests to the General to order that these three lessons were indeed taught, and that, if someone for one reason or another, had to skip a lesson, he should «repeat» it on another occasion, thereby guaranteeing three lessons per week for everyone;
- the end of term should be the end of July for both the mathematical and philosophical courses alike.

In addition, Fernández proposes to organize a public debate at the end of every month, though leaving the decision about this to the General. During the period 1734–1737 the mathematical classroom was even provided with didactical *azulejos*.²² Among the teachers were talents such as Manuel de Campos (1710–1711 and probably afterwards).

Cutting short the discussion of mathematical teaching at the Evora College at this point, the discussion now turns to the question in how far attempts to improve the mathematical training of future *Indipetae* had some effect on the China mission. In this context, relevant persons are André

²¹ Cf. ARSI, Jap. Sin. 166, f° 195r., Epistles (1694–1699).

²² See on these *azulejos*, different according to the «Aula» and the discipline taught on the spot (Mendeiros 2002).

Pereira, a student from 1713–1714 who left for China in March 1716 (cf. Wicki 1967, 252–450, nr. 1606) and Domingos Pinheiro, who studied in Evora from 1711–1713, then left for Lisbon in 1722 and for China in 1725. They both played important roles in the institutional infrastructure of the Chinese Vice-Province, as reported in a contribution published in *Orientis Aura* (cf. Golvers 2018b). For an unclear reason, the Portuguese Jesuit authorities engaged only Pereira in the Peking astronomical Bureau, while Pinheiro, who had a much stronger mathematical profile (2 years study; 5 years teaching), was not recruited for this office.

Lisbon and the Colégio de Santo Antão (Novo)

Since its foundation in 1590 the *Aula da Esfera* of the Colégio de Santo Antão in Lisbon was the main center for navigational and astronomical knowledge and for research on the Far East. A synoptic view on the instruction offered at this institution is provided by Henrique Leitão (2007). Leitão describes the courses taught at the College, which are mostly preserved in the Biblioteca Nacional de Portugal (BNP), in his *Sphaera Mundi: a ciência na aula da esfera: manuscritos científicos do Colégio de Santo Antão nas colecções da BNP* (2008). These courses offer a close view on this instruction, both regarding details on the didactical approach and contents, even if divergences between the course prepared by the teacher – as a kind of «ideal course» – and the actual lesson probably existed. There is no information on the practical organization and the material circumstances. Therefore, this contribution narrows down the subject to one particular moment in the College's history, which seems almost completely overlooked and which informs us on this aspect. It concerns the proposals of Antonio Manso, S.J., once an excellent mathematical student of Hildred in Evora (1693–1694)²³ – who restores the continuity with the former phases – and who was the Portuguese provincial in that academic year. His proposals are contained in Manso's letter to General Franz Retz, from 23 July 1734, now in *Lus.* 76, f° 204–205 (Epistles, 1700–1756), entitled «*De promovendo studio mathematico*».

The letter starts from the conclusion that mathematics was almost in oblivion within the curriculum offered by the college, which the author ascribes to the material conditions of the college. Namely, it only offered an

²³ See his letter of 21 August 1694 to González: «*Ex omnibus vero excelluit Fr. Antonius Manso, in Mathesi et Philosophia multum praestans*» (*Lus.*, 75, f° 253 r./v., Epistles, 1656–1699).

awkward («*inconcininitas*») room too small («*angusta*») for the mathematical trainees which could barely accommodate 20 students. In order to counter this situation and to raise the attractiveness of the courses, Manso looked to one of the two rooms which were recently (shortly before 1732) constructed on top of the college's entrance, destined to receive noble visitors, which were physically separated from the rest of the college's «body».²⁴ For this purpose, Manso proposed to the College's Pro-Rector Valentim de Novaes to look for an arrangement in this sense, in accordance with the consultants and teachers. During the meeting with 9 + 1 attendees, eight of them did not agree with this solution²⁵ for arguments of «internal order», which they listed in a letter dated 2 March 1734, quoted by Manso to General Retz as follows:

- it would separate the mathematical studies from the rest of the studies, which was against the intention of the College's founder (King Sebastião);
- the main entrance of the College would always be open during the time of the course, which was against the 13th rule of the porter, which says that the door should always be closed;
- in this way, various inconveniences would arise which should be avoided, mainly with regard to the «*mores*», because the College's entrance and staircases had so many shelters («*latibula*»);
- By doing so, the doors to the rooms should always be open, which would incite to many talks and much loss of time, and it would become difficult to keep the entrance neat («*mundus et politus*»).

In view of this situation, Manso ordered Manuel de Campos, appointed mathematical teacher in Lisbon for one year, to give his opinion. De Campos (born 1681; entered the SJ in 1698) had been a student of Evora, where he had followed a 2-year course of mathematics and had taught mathematics as a theology student (1710–1711, and probably later).²⁶ In 1720-21 he

²⁴ Strangely enough, Martins, who in his thesis (1994) collected all relevant documentary evidence on the construction and maintenance works at the *Colégio*, does not mention this aspect.

²⁵ The names of the counter-voters are given as Henrique de Carvalho, Sebastião Henriques, Simão Estevão, Anchieta; Inacio Ribeiro; João de Amorim; Marcello Leitão; João de Seixas; the positive vote was apparently the one from José de Araujo.

²⁶ Cf. ARSI, Lus. 47, f^o 131v., Triennial Catalogue (1700–1726).

lectured in Lisbon, went to Rome after that, was appointed mathematical teacher in the *Collegio Imperial* in Madrid and since 1733, i.e. since one year before Manso's request, lectured in the *Aula da Esfera* of the *Colégio de Santo Antão*.²⁷ This background and his reputation of being «*grande talento e excelente gênio*» (De Sarmento) were the reason for Manso's request, to which De Campos answered with a long argumentation, in five points. His arguments ran as follows:

1. The Mathematical Course in the *Colégio de Santo Antão* was a religious and «pious» foundation of King Sebastião (1554–1578); its revenues («*redditus*») were huge and paid by the Royal Ministers of the *Caza da India*, and because the King of that time (João V) highly esteemed mathematics, the course should be kept in honor, also because it can be brought to great splendor and results with small expenses, to the greater Glory of the King and the Society of Jesus;
2. (f° 204v.) The current «*schola*» or academy and its infrastructure is indeed insufficient («*inconcinna*»; «*angusta*»), also because of a shortage («*penuria*») of instruments, which – in case they would be present – could barely be preserved / protected well in the current room. Among these instruments De Campos mentions «*globi, mappae, sphaera armillaris; astrolabium, etc.*» («globes, maps, an armillary sphere, an astrolabe»), all rather fragile instruments. The instruments mentioned here probably as a desideratum, clearly had didactic functions. Implicitly, the list of instruments also reflects the type of courses given in this mathematical class, namely not (only) «pure» mathematics, but especially practical mathematics, focused on geography, navigation, and military architecture.
3. He repeats four «anti-arguments» from those who considered the separation of the mathematical study from the rest of the courses «*singolare et insolens*»;
4. In addition, he lists the «positive» arguments for the location of the mathematical classes in one of these two new rooms, separating them from the rest of the building. The arguments for this positive assessment were:
 - 4.1. The students of the mathematical course are all either soldiers or grantees of the Royal military and nautical academy («*stipendiarii*

²⁷ The most complete biographical note is the one of Baldini 2004: 418-419.

aularum regiarum fortificationis et nauticae»), as well as some theologians and academicians from Coimbra, so they all were adults (*«iuvenes grandiores»*), who should be kept apart from the younger students.

- 4.2. Mathematics were highly esteemed in Lisbon at this period (referring to the interest of João V and his counselor, the Italian ex-*Indipeta* Giovanni Battista Carbone²⁸), especially among noble people, who would like to come to the college if they would find an appropriate room. In case they were invited to the weekly or monthly «conferences», a more capacious and agreeable was needed, equipped with maps, chronological tables, an armillary sphere, all requiring a more spacious room and protection against the younger students, who destroy (*«corrumpunt»*) everything. This can only be warranted in one of these two new rooms;
- 4.3. As the present King (João V) is much dedicated (*«addictissimus»*) to mathematics and attentively looks at «our» academy (*«scholam»*), often insinuating he was not very satisfied, he will understand from this transition of the mathematical class to a particular room we are zealous about this matter, and that potential shortcomings are not due to our negligence, but due to the *«incuria»* («negligence») of the scholastics, as it has happened in the past (*«quae fuit magna anteactis temporibus»*), when barely one or two students dedicated themselves to mathematics. In addition, it is not improbable that the same King, in his well-known generosity, on seeing «our» zeal, will donate, funds for buying new instruments, privileges and *«stipendia»* for young students with weak financial background but great intelligence (*«ingenium»*).
5. The objections mentioned sub three are rejected one by one, namely:
 - 5.1. It is preferable to separate the young children from the students.
 - 5.2. In Italy, the *«scholae»* are inside the walls of cloisters, without giving troubles to the monks, as both spaces of monks and students are separated, either by the college's structure or by a wooden lattice. Even when one teaches in the *Colégio de Santo Antão* «general studies» (*«studia generalia»*) and such separation was provided in the beginning in the *«ratio»* of the college when it would be com-

²⁸ Cf. especially the doctoral thesis of Tirapicos 2017.

pleted, now, in its incomplete condition, the mathematical courses are given «*ad interim*» in a (semi-) underground room. Also in the *Academia* of Evora, now completed («*absolutum et regulare*»), the schools for the children still learning to read and write, are outside the common «*atrium*», at an exterior part of the building, as the «*ratio*» prescribed to separate the children from the scholastics, and the scholars from the soldiers. De Campos also refers here to the *Colegio Imperial* in Madrid where he had taught several years in the 1720s, where the Mathematical school is separated from the rest of the college's structure, and has a separate entrance, as this school has several instruments [to protect them], and is visited by many students from outside the body of students («*gremium scholasticorum*»):

- 5.3. These rooms can be used for the visits of «laic outsiders» («*saeculares*») as well, as it is a more «noble» and decent room, and when it is occupied during two hours on the days of lessons («*diebus lectivis*», with an apparent Latin neologism «*lectivus*»), there is a second, similar room available next to it as a substitute.
- 5.4. With regard to the common entrance, it is sufficient to have one «servant» («*famulus*»), in all probability a «*coadjutor temporalis*», to open – if necessary – the lattice or the gate on the upper floor.
6. Finally, the conclusive opinion of M. de Campos of the mathematical course is that – as all fathers consulted agree – that the current situation was not good and that a more spacious and capacious room should be sought, and it appeared most convenient («*congruentius*») to assign one of the rooms on top of the entrance to the mathematical class, as there is no other appropriate room in the College and there are no funds to build a new room.

On the basis of this written judgment of M. de Campos, on 23 July 1734, the Provincial Antonio Manso communicated his decision to assign the room in question to the mathematical class to General Retz, after ratification by all counselors but one, namely his secretary («*socius*»).

It remains unknown whether this project was actually realized; if so, it was only for a short time, as in the 1740s a new room was prepared, and beautifully decorated with didactical *azulejos*, still preserved until today in what is now the *Salão nobre do Hospital de São José*.²⁹

Also, under Manso's responsibility the long projected *Noviciado das (Missões das) Índias* was opened on 6 May 1734. The first measures aiming at its foundation already date back to 1705, but the institute only opened its doors in 1734. It aimed at the training of nine future missionaries, three for the Provinces of Goa, Malabar, and China-Japan respectively, with the necessary personal support (cf. Rodrigues 1950: 159-168). Although this Institute was relatively short lived (it was closed some 25 years later, in 1758), it had educated at least one promising young candidate for China, Bartolomeu de Azevedo (born 1718, Viana, who entered in 1736). He left Lisbon in 1745 and was welcomed by Policarpo de Souza, alumnus of Coimbra and in the meantime bishop of Peking, «*por ser insigne matematico, alem de outras mais e boas prendas e felicissimo ingenho*». ³⁰ In addition, Ignatius Kögler, the German head of the *Qintianjian* and a professional astronomer, praised de Azevedo's illustrated mathematical «*conclusões*» defended in Coimbra and comprising «*toda a matematica*», the reason why he (Kögler) recommended their publication in a Chinese translation.³¹ It could not be verified whether this translation actually happened or not. Its realization was probably thwarted by the untimely death of de Azevedo on 29 October 1755.

Conclusion

To summarize this evidence, the following aspects should be highlighted, first with regard to the *Colégio* in Lisbon:

- With regard on the students: a) In the last years before 1734 their numbers were very low (1 to 2), which is in line with earlier remarks about the low enthusiasm for these matters in the college, b) They were either military men, «*stipendiarii*» of the Royal school of Navigation and that

²⁹ Cf. Leitão 2007: 85 referring Veloso 1996.

³⁰ See his letter of 8 June 1746, published by Viegas 1921: 253.

³¹ Cf. «*Das conclusões figuradas, que defendeu em Coimbra disse o P(adr)e Kegel com admiração: que tinham toda a matematica e que fasia hua grande, util e digna obra se algum dia as vertesse em China e desse a luz*» (Viegas 1921: 253). These theses seem to be lost now.

of Fortification, or theology students from Coimbra. The latter group is very special, as there was a course organized simultaneously in Coimbra itself.

- Regarding the classroom at disposal, it was too small for a larger group and not well equipped with instruments and the request for the move was apparently inspired by the wish to «extend» and upgrade the course, profiting from the active interest of the reigning King.
- Regarding the frequency of mathematical classes, there were three «*dies lectivi*» per week, which were part of a general calendar. On these days, the courses lasted two (consecutive) hours, obviously inspired by one of the prescriptions of the «*Ratio studiorum*» which, in the *Regulae scholasticorum nostrae Societatis* n.º 11 (443) prescribed periods of study of 2 hours, followed by an *intermezzo*; the course was extended with weekly or monthly «*conferentiae*», to be visited by external authorities.
- Regarding material equipment, didactical instruments were rare in 1734 and needed to be multiplied and better protected; the instruments listed in the text point to courses of applied mathematics related to geography, navigation and astronomy.

What was the effect of all these «measures» taken in Evora and Lisbon on the mathematical level of the «*Indipetae*», the original purpose of this whole enterprise? It is too early to answer this question, as long as not all careers of Portuguese Jesuits have yet been investigated, and Coimbra still has to be included.³² Therefore, the following conclusions, or assessments, are only preliminary:

Firstly, after about 1700, the mathematical education in Portuguese colleges was entirely a matter of Portuguese Jesuits who were either directly or indirectly students of Hildred and Musarra. The only exception was Giovanni Baptista Carbone who taught for a short while in the 1740s in the college.

After this date, there was a kind of «estafette-succession» with – in the most cases of short-term duration, limited to a small number of years, with some rare exceptions: Jesuit teachers, after having acquired a special mathematical «training» of two years (the «*biennium*» of the *Catalogi*) often only had a «career» in «teaching» mathematics for a few years (1 to 6). This

³² Starting from the «national» lists in Dehergne 1973.

certainly did not stimulate the professional «specialization» of the teachers, who lacked the time for deepening their mathematical competences and for reading due to the frequent changes of positions and responsibilities.

It becomes clear that not everybody was convinced about the improvement of the level of Portuguese candidates who arrived in China: candidates with a «good» profile (1 to 2 years) were either not engaged (Pinheiro), applied as a lifelong «assessor» (Pereira to Kögler) or they were more or less ridiculed as «hopeless», such as Felix da Rocha and José d'Espinha by Augustin von Hallerstein to the General (1753).³³ In addition, the same Jesuit distrust the Portuguese Assistant (provincial?) of sending as many Portuguese as possible, regardless of their competences, for solely strategic reasons, to occupy these positions as a way to prevent German and other nationalities from obtaining them. This picture needs further critical consideration, for a better understanding of the position of Portugal in the China mission.

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³³ See Hallerstein's letter of 6 December 1752 to General Visconti: «Sunt acta [sic] Pekini ex ViceProvincia duo [homines], titulo mathematicorum: P[ater] Felix da Rocha et P[ater] Josephus Espinha, quorum tamen iste [= Da Rocha] iam nullam, hic [d'Espinha] exiguam etiamnum spem facit ut in mathematicum evadat talem, qualies hic necessarij sunt. Certe peritiores habemus in Tribunali Mathematico huius scientiae homines Tartaros et Sina, quam uterque sit, etc.» (ARSI, Jap.Sin. 181, f° 252v.-253v., Epistles, 1718–1720).

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