Salamanca y la medida del tiempo by Ana María Carabias Torres

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Among the numerous names associated with the construction of our present civil calendar, the most noteworthy is perhaps that of Luigi Lilio (or Giglio, 1510–1574/76), a native of Cirò in Calabria. Earning his living as a lecturer in medicine at the University of Perugia, Lilio spent many years working out a plan of how to bring the date of Easter back in line with the astronomical phenomena (vernal equinox and Full Moon) from which it had strayed due to the defects of the ecclesiastical calendar. Aided by the successful lobbying of his brother Antonio, his ideas were posthumously adopted by an expert commission which had been set up by Pope Gregory XIII (1572–1585) for the purpose of reforming this calendar.[1] During the preparation of this reform, one of the commission's members, the theologian and mathematician Pedro Chacón, summarized Lilio's proposal in a *Compendium novae rationis restituendi kalendarium* (1577), which was subsequently sent to rulers and universities throughout Europe in hope of approval and further suggestions. In Chacón's native Spain, such requests reached the universities in Salamanca and Alcalá de Henares as well as the private address of the famed clockmaker Juanelo Turriano.[2] The response from Salamanca, dated to 1578, is still preserved in three manuscript copies. As one would expect, one of these ended up in the Vatican Library (lat. 7049), while another one is kept at the University of Salamanca's Biblioteca General Histórica (ms. 97). Besides expressing agreement with the Lilian proposal, the report in these two manuscripts also attaches an earlier and much longer text, otherwise lost, which the University of Salamanca drew up in 1515. In a situation analogous

1 See most recently Steinmetz 2011.
2 On the latter, see Fernández Collado 1989 and García-Diego and Gonzáles Aboin 1990.

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to the report of 1578, the text of 1515 was written in response to Pope Leo X and Ferdinand II, the king of Spain, who had solicited an expert assessment on a reform proposal that had been produced in the context of the Fifth Lateran Council (1512–1517). No definitive result was achieved at the time but texts such as the Salmantinian report of 1515 still testify to the amount of scientific and literary activity that was sparked by the papal request. The best known case of an astronomer being inspired by the Council's 'call for papers' is doubtlessly Copernicus, who mentions the reform effort in the preface to his *De revolutionibus orbium coelestium* [1543, fol. 4v].

While the immediate steps that lead to the Gregorian reform of 1582, which adopted Lilio's plan with minor modifications, are relatively well known, the wider history (and pre-history) of this reform remains a gigantic map with many blank spaces, which also cover most of the Iberian peninsula. The aforementioned reports from Salamanca are a case in point. Ferdinand Kaltenbrunner, whose studies on the history of calendar reform (published 1876–1880) remain foundational, already knew of the Vatican manuscript but was not allowed to see it due to its badly damaged binding [1880, 34]. His contemporary Joseph Schmid [1882, 394–396] had more luck and was able to summarize the contents of the report of 1578. By contrast, Demetrio Marzi [1896] passed over both documents in silence in his still-indispensable account of the reform proposals made in the wake of the Fifth Lateran Council. Back in Spain, the mathematician and science educator Acisclo Fernández Vallín [1893, 220–222] felt induced to include a transcription of the report of 1578 in his *Cultura científica de España en el siglo XVI* but with unsatisfactory results.

In a new monograph, *Salamanca y la medida del tiempo*, Ana María Carabias Torres, professor of modern history at the University of Salamanca, sets out to rectify this situation of relative neglect by offering a proper edition of the two reports (based on the Vatican and Salamanca manuscripts), augmented by a comprehensive study of their history, authorship, and institutional contexts, as well as an assessment of their role in the development of the Gregorian calendar. Her edition [260–318], which also includes a Castilian translation, is supplemented by a facsimile reproduction of the aforementioned ms. 97 from Salamanca. Readers interested in the original Latin will greatly appreciate this addition, for although Carabias Torres is quite outspoken about the obvious flaws of Fernández Vallín's previous edition [38], faulty transcriptions and other typographical errors abound in her own rendering of the text.

In contextualizing the document, the author decided to cast her net widely. Her generous introduction ('El problema del tiempo en la historia y en la historiografía') reviews past work on the history of calendar reform and various related subjects, whilst lamenting that historians of Iberian science have failed to appreciate the importance of time-reckoning for their field [21–60]. Another 70 pages [60–133] are spent on the historical circumstances of the reports of 1515 and 1578, with a particular focus on the study of astronomy at the University of Salamanca and its elevated status during the decades before and after 1500 as illustrated by the towering figure of Abraham Zacuto. Fascinating as this material may be, it is not always clear how the many names, books, and ideas that Carabias Torres mentions relate to the reform of the calendar, which was an undertaking focussed on a relatively narrow sector of astronomy concerned with no more than the length of the solar year and the calculation of the lunar phases.

That said, both these and other sections are worth reading for their copious references to literature relevant to the history of science on the Iberian peninsula, some of it rarely accessed by scholars outside the Hispanosphere. For the history of calendar reform, Carabias Torres manages to cite a number of little-known early modern books by Spanish authors such as Pedro Ciruelo [157]. She also discusses new manuscript material, including a report on the calendar by the University of Alcalá [221] and two explications of the Gregorian reform [230–234] written respectively by the Toledan archbishop García de Loaysa y Girón (1534–1599) and the Salmantinian music theorist Francisco Salinas (1513–1590). Among the sources that she has missed is a *Disputatio de anno in quo possimus dicere dominum fuisse passum et de quibusdam erratis in kalendario*, composed in 1468 by Pedro Martínez de Osma, professor of theology at Salamanca, whose ideas might have shed additional light on the calendrical texts produced at the same university during the 16th century.[3] One case in point is Martínez de Osma's interest in the Jewish calendar, also evident in the report of 1515, to which was appended a set of explanatory canons. These outlined the principles of Jewish lunisolar

[3] See now Nothaft 2013 and the edition by Labajos Alonso [2010, 354–383], with a Castilian translation by Pablo García Castillo.

reckoning and showed how to convert the resulting dates into the Christian calendar, based on a set of tables that has not been preserved [309–315].

Unfortunately, this exotic annex is only one of several salient aspects that receive little attention in Carabias Torres' analysis of the assessments of 1515 and 1578. Most of her coverage of these texts [133–237] is indeed not so much concerned with their technical content as with their historical and institutional background as well as with the biographies of the scholars involved. In the case of the report of 1578, Carabias Torres argues that its astronomical and mathematical substance was mostly contributed by Miguel Francés, an Arts master originally from Zaragoza whose other collaborators included the famous poet and theologian Luis de León [194–217, 253–254]. The identity of the members of the commission set up in 1515 is much more difficult to establish and must remain a matter of speculation, although two professors of natural philosophy, Juan de Oria and Juan de Ortega (different from the mathematician of the same name), are among the more likely candidates [158–169]. In outlining their arguments, Carabias Torres' main concern is to show that the Salmantinian experts produced an absolutely exceptional document in the history of attempts to reform the calendar. As she proudly writes [235], her university

> *inventó en 1515 un procedimiento matemático que permitía enlazar en un cómputo convergente el distinto ritmo del Sol y de la Luna; y...lo hizo de forma tan exitosa como para haber sido este procedimiento el que finalmente ratificaron los expertos vaticanos y el propio pontífice como base de la reforma gregoriana del calendario.*
>
> invented in 1515 a mathematical procedure that permitted to fit together the distinct rhythm of the Sun and the Moon in a convergent calculation; and...it did this in a successful enough manner for this procedure to become the one that the Vatican experts and the pope himself ultimately approved as the basis for the Gregorian reform of the calendar.

thus demonstrating

> *la excepcionalidad de los conocimientos matemáticos y astronómicos existentes en el seno de la Universidad de Salamanca en torno al año 1515.* [236]
>
> the exceptionality of the mathematical and astronomical knowledge that existed within the University of Salamanca around the year 1515.

In fact, she sees so many similarities between the proposal of 1515 and the final version of the Gregorian reform as to necessitate a re-evaluation of Luigi Lilio's historical role. Far from being the 'father' of the present calendar, Carabias Torres claims that the man from Calabria copied most of his ideas from his Salmantinian predecessors. Aside from the perceived affinities between both reform proposals, the evidence that she adduces for this claim is flimsy at best. Luigi Lilio's brother Antonio, she points out, was a member of Pope Gregory's reform commission and would thus have had access to the report of 1515 in the papal archives. If the original manuscript is no longer extant in the Vatican Library, this may be explicable by Lilio's use of said report, which he may have kept among his records at the time of his death, leading to its displacement [218, 236].

I shall leave the problematic chronology of this hypothesis—it is quite likely that Luigi Lilio's reform plan predates the institution of the papal calendar commission or Antonio's admittance to the same[4]—on one side and instead focus on the question whether the suggestions that were sent by the University of Salamanca to Rome in 1515 really prefigure the later calendar reform in a way that would justify the author's revisionist account. A summary of these suggestions is slightly impeded by the fact that the Salmantinian experts discuss a number of parallel scenarios in a somewhat non-committal and disorganized manner, trusting that the report's addressees would be able to pick out the ideas they liked best. One major problem to be faced was the receding vernal equinox, which, due to the over-estimation of the length of the solar year in the Julian calendar, had moved away from its traditional seat on 21 March and was presently found on 10/11 March. Here, the two basic options were:

(1) to leave the date of the equinox as it is and simply make adjustments to prevent its further drift towards the beginning of the year or
(2) to restore the equinox to a particular date, preferably 21 March, to where it had been assigned by the late antique founders of the Christian Easter *computus*, by dropping a certain number of days from the calendar year either *en bloc* or in installments.

[4] For the pertinent details, see now Mezzi and Vizza 2010, who also argue that Luigi had already died in 1574.

On balance, the report of 1515 recommends the omission of 11 days from the year 1519 to get the equinox back from 10 to 21 March [295–296]. Here there is indeed a parallel to the Gregorian reform, where 10 (rather than 11) days were dropped from October 1582. Such radical excisions, however, were by no means a new idea in 1515, as can be seen from a reform decree drafted at the Council of Basel (1437), which, had it taken effect, would have ordered the omission of a whole week from the calendar [Kaltenbrunner 1876, 412–414].

As is well known, the Gregorian reform commission sought to prevent a further drift of the vernal equinox by modifying the leap-year rule of the Julian calendar: every leap-year evenly divisible by 100, but not by 4 (e.g., 1700, 1800, 1900, but not 2000) loses its bissextile day. By thus omitting three days over the course of 400 years, the Gregorian calendar effectively subtracts 0.0075d from the Julian year (365.25d), leading to an average length of 365.2425d. As Noel Swerdlow [1974] pointed out many years ago, this is the length of the solar year found both in the Alfonsine tables, Copernicus' *De revolutionibus*, and the Prutenic tables, if stated in sexagesimal notation and rounded down to 365;14,33d. The reform was, hence, in harmony with the best science of the day. Ignoring for the moment that a lot of the material relevant to the history of calendar reform remains unstudied or has yet to be discovered, we find that the Alfonsine length of the tropical year (365d 5h 49m 16s = 365.242546...d), with its implied error rate of 1d in 134y, was already relied upon by John of Murs and Firmin of Beauval in their *Epistola super reformatione antiqui kalendarii* (1345) and an attached treatise addressed to Pope Clement VI. That the equinoxes recede at this rate and that the defect can be cured by dropping a day every 134 years was subsequently argued by cardinal Pierre d'Ailly, whose *Exhortatio* of 1411 became an often-cited 'classic' in the literature on calendar reform.[5]

From this it should be clear that the only innovation the University of Salamanca could possibly lay claim to would have to concern the intercalation scheme of the Julian calendar, modified so as to reflect the more accurate year-length. Far from staying close to the Gregorian $^{3d}/_{400y}$ or the Alfonsine $^{1d}/_{134y}$, however, the report of 1515 suggests an omission of a bissextile day in every 152nd year [300]. The decision to add 18 years to previous proposals was evidently motivated by the parallel necessity of reforming the ecclesias-

[5] Both these facts are duly mentioned in Carabias Torres' own account [147–148].

tical lunar calendar [see below], whose error had since medieval times been gauged at ≈ $^{1d}/_{304y}$, i.e., exactly twice the aforementioned number of years. The length of the solar year implied by this correction is 365.243421...d. In order to re-align the calendar with the Alfonsine value in the long run, the Salmantinian doctors signal that further leap-days could be dropped after 1,212 and 15,804 years [304–305]. Since Carabias Torres does not address this part of the proposal, I shall briefly spell out the implied value:

$$365.25 - \frac{1}{152} - \frac{1}{1212} - \frac{1}{15804} = 365.242532...d$$

—not identical with the Alfonsine year length, but close enough. In any case, it should be clear that there are considerable differences between the Gregorian solution and the one implied in the Salmantinian document. It is, therefore, not reasonable to point to the latter as the specific template for Lilio's proposal. Neither is it particularly precise to write that the Gregorian omission of three bissextile days in 400 years was

> *equivalente a la anulación extraordinaria de la intercalación bisextil cada 1000 años propuesta por los salmantinos.* [192]

> equivalent to the extraordinary cancellation of the bissextile intercalation every 1,000 years, proposed by the Salmantinians.

Having dealt with the solar year, we can now turn to the calendrical tracking of the lunar phases for the purposes of reckoning Easter, which today remains a lesser-known aspect of the Gregorian reform, although it was deemed just as important at the time and turned out to be technically more demanding. As a matter of fact, Luigi Lilio's greatest contribution to this reform is his invention of a scheme of 'epacts', which made it possible to retain a cyclical lunar calendar without losing track of the observable New and Full Moons. Carabias Torres claims that such a 'tabla de epactas' was

> *ya propuesta por la Universidad de Salamanca; tabla que no había presentado Salamanca a León X en su informe de 1515 porque, según expresaron,* bastaría el trabajo de 15 días de un mediano calculador astrológico *para elaborarlas. Lilio fue, pues, ese* mediano calculador astrológico *del que hablaron los salmantinos.* [192]

> already proposed by the University of Salamanca; a table which Salamanca did not present to Leo X in its report of 1515, because, as they expressed it, *15 days of work from an average astrological calculator would suffice* to draw them up.

>]Lilio was, then, that *average astrological calculator* whom the Salmantinians spoke of.

Was Lilio just an 'average calculator' who carried out an idea first formulated by the University of Salamanca in 1515? A look at the contents of the Salmantinian report does not bear this out in the slightest. In the passage that Carabias Torres refers to, the anonymous authors discuss the possibility of abandoning the old 19-year lunisolar cycle used by the Church in favour of a calculation based on astronomical tables. This way, the date of the Paschal Full Moon (on which the date of Easter depends) could remain unaffected by the Julian calendar and its modified leap-year rhythm. Solutions of this kind are also found in other reform treatises submitted in the wake of the Fifth Lateran Council, such as the one written by Andreas Stiborius and Georg Tannstetter (who appears as 'Stannstefter' in the present book [152, 176]) on behalf of the University of Vienna. As Carabias Torres correctly notes [152, 236], Stiborius and Tannstetter wanted the Church to base the calculation of Easter on the true positions of Sun and Moon, whereas the Salmantinian doctors remained content with mean values. Without going into great specifics, they envisioned an advance tabulation of the date of the Paschal Full Moon for several millennia, to be inserted into the breviaries so that parish priests could simply look up the date of Easter on a year-to-year basis. To construct such a list, they confidently write, would take even an

> average astrological calculator just half a month's worth of work.
>
> *Quibus tabellis constituendis mediocris etiam astrologici supputatoris semestris industria sufficeret.* [292]

Carabias Torres' claim that this suggestion anticipated the Gregorian reform might be an idea worth discussing, provided that Lilio had actually drawn up a list of the times of Full Moon of the kind mentioned in the report. In reality, his 'epact' system is a calendrical not an astronomical device, an artful modification of the traditional 19-year lunar cycle which keeps the New and Full Moons in line with the phenomena whilst responding adequately to the changed leap-year rule of the solar calendar.

It should be stressed that nothing resembling the 'Lilian epact', where every day of the year can become the seat of the New Moon according to a complicated predetermined sequence (a cycle that effectively lasts 300,000 years!), appears in the document of 1515. What we do find, in addition to the aforementioned 'astronomical solution', are various suggestions of how to reset the traditional 19-year cycle and make it useable again by bringing the 'Golden Number' back in line with the actual day of conjunction. The downside of such a solution was that a number of additional adjustments became necessary, not only to prevent the New Moons from receding farther and farther (at the aforementioned rate of $^{1d}/_{304y}$) but also to account for subsequent corrections of the solar year. According to the Salmantinian scheme already mentioned, there would have been a suppression of a bissextile day in every 152nd year, which meant that twice as many days would have been dropped than was adequate for the lunar cycle. In order to counteract this over-compensation, the 'Golden Number' had to be reset by one day after every 304 years. Further adjustment would have become necessary in case the additional omission of leap-days after 1,212 and 15,804 years had been implemented.

Ironically, this is much closer to the spirit of Lilio's solution than the astronomical tables referred to by Carabias Torres. In stark contrast to the Italian scholar, however, whose 'epact' system makes precise provisions to balance out the solar and lunar corrections, the Salmantinian doctors only vaguely hint at the required steps, leaving it to the papal commission to work out the details. Moreover, Lilio's principle of increasing the lunar epacts by eight one-unit steps over 2500 years in order to keep the calendar aligned with the lunar phases implied an error rate of $^{1d}/_{312.5y}$, which was a significant departure from the traditional $^{1d}/_{304y}$ used in the report of 1515. Since the basic ideas discussed here—modifying the 19-year cycle *versus* a purely astronomical approach—can be found in numerous other reform treatises submitted in the wake of the Fifth Lateran Council as well as in earlier proposals,[6] there is little merit in the suggestion that the Gregorian reform has specifically Salmantinian roots. In light of the rather half-hearted and meandering way in which both reform solutions are offered in the document of 1515, it is in fact startling to read statements like the following:

> *El razonamiento es impecable y su propuesta coincide con la opción ratificada finalmente por Gregorio XIII bastantes años después, en la que sólo se añadió un algoritmo corrector en la celebración del año bisiesto.* [182]
>
> The argument is faultless and their proposal coincides with the option ultimately approved by Gregory XIII a number of years later, in that he only added a corrective algorithm to the celebration of the bissextile year.

[6] For details, see Kaltenbrunner 1876 and Marzi 1896.

Why, in spite of all the differences just mentioned, does Carabias Torres show herself so impressed with the Salmantinian report and its supposed proximity to the Gregorian reform? The answer to this question, it must unfortunately be said, marks out the present book as a cautionary tale for any historian who intends to study the history of a scientific subject without commanding the necessary technical background. In the case of the history of calendar reform, this background is in fact relatively modest. All it takes is a basic grasp of concepts such as the tropical year and the mean synodic month, a reasonable overview of the history of Christian Easter computations, and some awareness of the astronomical parameters that were known and used at a particular point in time (as well as, perhaps, the ability to wield an electronic calculator). Unfortunately, Prof. Carabias Torres' arguments give the impression that she did not immerse herself in the subject to an appropriate degree. This impression is reinforced by the disconcerting number of errors—some small, some hair-raising—that appear in her book whenever technical issues are addressed. One of the most startling examples is found on page 144, where we read:

> *Los propios padres de Nicea tenían que conocer de antemano que el contenido de sus decretos sobre la Pascua eran necesariamente una solución temporal debido a la presunta precesión de los equinoccios...este movimiento lento del eje de rotación de la Tierra, que se creía la causa de las diferentes longitudes de los años sideral y trópico.*
>
> The fathers of Nicaea themselves had to know beforehand that the content of their decree on Easter was necessarily a temporary solution, owing to the presumed precession of the equinoxes...this slow movement of the rotational axis of the Earth, which was believed to be the cause of the differing lengths of the sidereal and tropical years.

Not only is there no source attesting to any awareness of precession among the Nicaean bishops but the phenomenon described is utterly unrelated to the calendrical issues that were discussed in 325 and 1582. While one might conceivably talk about a 'precession' of the equinoxes in the Julian calendar, this precession would be no more than a simple change of the respective dates owing to the fact that a Julian year of 365.25d is roughly 11 minutes longer than a mean tropical year of 365.2422d. As a result of this discrepancy, the equinox will fall one day earlier every 128 years. Yet Carabias Torres seems to think somehow that the cause for this calendrical shift is the astronomical precession discovered by Hipparchus, which, as she goes on to mention, was conceptualized by medieval cosmologists as a movement of the eighth sphere (where the fixed stars reside) relative to the equinoctial points. Indeed, she explicitly writes that

> *debido a esta circunstancia, en el siglo XVI el equinoccio no tenía lugar el día 21 de marzo, como se había fijado en Nicea, sino varios días antes.* [144]
>
> owing to this circumstance, the equinox in the sixteenth century did not take place on the 21st day of March, as it had been fixed in Nicaea, but several days before.

Several further examples for this kind of mishandling of basic astronomy could be adduced. To mention but a few: at the beginning of the report of 1515, the Salmantinian experts correctly cite the Ptolemaic estimate of the tropical solar year as $365.25 - \frac{1}{300}$ d (= 365.2466...d). Carabias Torres misunderstands this to mean

> *que los comisionados opinan que Ptolomeo se equivocó en 4,8 minutos, o 288 segundos, en esta estimación, cuando hoy sabemos que su error era de 11 minutos y 12 segundos.* [170]
>
> that the committee members thought that Ptolemy was wrong by 4.8 minutes, or 288 seconds, with this estimate, whereas we know today that his error was 11 minutes and 12 seconds.

Clearly, the error under discussion is that of Julius Caesar and his advisor Sosigenes, not Ptolemy. On page 182, she makes another elementary mistake when claiming that the commission suggested a removal of 11 days from the calendar,

> *como el año solar sobrepasaba un poco más de 10 minutos y 4 segundos al año eclesiástico.*
>
> since the solar year surpassed the ecclesiastical year by a little more than 10 minutes and 4 seconds.

This might have been correct the other way around. On page 139, she claims that there is a difference of one year between 'el calendario juliano proléptico' and 'el calendario gregoriano proléptico' as far as the beginning of the Jewish calendar is concerned (3760 *versus* 3761 BC), which is pure fiction.

Yet other blunders are historical: on page 24, she confuses the mythical age of Romulus with the heyday of the Roman republic when she states that the Roman year before the introduction of the Julian calendar consisted of only 10 months or 304d. On page 142,

> *un computista romano desconocido llamado el Pseudo-Cipriano*
>
> an unknown Roman computist called pseudo-Cyprian

is said to have introduced in the third century a new 84-year cycle called the *Laterculus*. In reality, scholars locate pseudo-Cyprian in North Africa, while the *Laterculus* is everywhere attributed to his compatriot Augustalis. Historians of astronomy will be surprised when reading on page 35 that Kepler's planetary laws were first published in the *Mysterium cosmographicum*. What is disconcerting about such slips is that the handbooks and studies which Carabias Torres duly cites at many places in her work would have contained all the information necessary to forestall them. Her sloppy reading of the relevant literature is particularly conspicuous on pages 25 and 204, where she twice attributes a quote to Juanelo Turriano that in the referenced source is clearly marked as coming from a metrical epitaph on Turriano by Pierleone Casella. Elsewhere, Joseph Scaliger's famous Julian period is described as comprising 7,980:

> *años sidéreos...prescindiendo del año bisiesto y de los cálculos medios, que habían sido usados en las tablas alfonsíes.* [31]
>
> sidereal years...ignoring the bissextile years and the mean calculations that had been used in the Alfonsine Tables.

As the very name should alert us, the Julian period was plainly and simply based on the Julian year.

In mentioning these mistakes, it is not my intention to depreciate Carabias Torres or her merits as an early modernist. Clearly, there is no shame in being out of one's depth in a technical field such as astronomy or chronology. What is problematic, however, is that she did not try harder to make up for her lack of competence in this area, e.g., by having her text proofread by an experienced historian of astronomy.[7] This would have been a prerequisite for accurately assessing the contents and 'originality' of the Salmantinian reform proposals and, hence, for determining their role in the history of time-reckoning. In the present form, her case for Salamanca as the birth place of the Gregorian calendar is fundamentally flawed, both technically and historically. On the technical side, there are serious differences between the suggestions made in the assessment of 1515 and the rules that govern the Gregorian

[7] On page 258, the author states that she approached a professor of theoretical physics, who seemed initially willing but eventually withdrew from the project.

calendar, which should have been properly acknowledged in the present book but are instead glossed over. Historically, one can find such a wide range of other possible 'precedents' for the Lilian reform plan that Carabias Torres' claims of Salmantinian anteriority turn out to be weakly motivated. One suspects that her tendency to treat the report of 1515 as an exceptional document is in part owed to an insufficient acquaintance with the literature on calendar reform produced during the 12th to 16th centuries, where similar ideas crop up time and again. As a result, Carabias Torres shows herself greatly impressed by the fact that the Salmantinian experts would mention al-Battānī as an authority on the length of the solar year. In her view, this demonstrates the astronomical expertise of the members of this commission, who were able to read and understand such complicated and technical material [181]. Yet surely, the cited tidbit of information, according to which al-Battānī's year-length implied an error of $^{1d}/_{106y}$ [306], cannot be enough to prove first-hand acquaintance with his works, given that it also appears in other medieval and early modern texts on astronomy and calendar reform.[8]

With all points taken into consideration, it becomes clear that Carabias Torres has no ground to stand on when she avers that Luigi Lilio was dependent specifically on the report from Salamanca as the model for his reform plan. In postulating such a connection, she evidently relied on a claim found in the letter addressed to Pope Gregory XIII that accompanied the report of 1578. Speaking about Lilio's proposal, which their university had been asked to assess, the *salmantinos* state that it corresponded 'marvelously' (*mirifice*) with the assessment drawn up by their predecessors in 1515 [218, 236, 318]. Needless to say, this is an exaggeration on the part of the authors, who sought to highlight the contribution of their university to the reform's advancement. Carabias Torres' willingness to jump uncritically on a statement of this sort seems to betray similar motivations. It should be mentioned that *Salamanca y la medida del tiempo* opens with no less than three laudatory prefaces written by dignitaries of the Salmantinian academy: Manuel Carlos Palomeque López, Cirilo Flórez Miguel, and Ramon Aznar i García. All of them have rather nice things to say about the author and the importance of the volume, which, they insinuate, sheds new light on the exceptionally

8 To cite just two examples, one early, the other contemporary to the report: *Compotus Constabularii* (1175), ed. Moreton 1999, 81; Giovanni Maria Tolosani, *De correctione calendarii* (1515), ed. Marzi 1896, 252.

advanced state of Salamanca's astronomical school in the 16th century. This unusual degree of attention has to do with the fact that the present volume belongs to a book series specially created for the buildup to the eighth centenary of the University of Salamanca, which will be officially commemorated in 2018. In line with this prestigious setting, the book was ceremoniously launched in November 2012 and received a good deal of coverage in the local news media. It is anyone's guess whether this kind of fanfare would have been reserved for a work that presented the same kind of dry and technical material but without the implied paean to Castilian glory. Viewed from this angle, her book may be even counted as a success, provided it was the author's objective to simply produce a crowd-pleaser adequate for the local patriotism of her environment. In this case, she will surely forgive a foreigner for being a little less sanguine about the result.

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