

Henry Sully – *REGLE ARTIFICIELLE DU TEM(P)S* – 1714 Vienna, 1717 Paris, 1737 Paris

A comparative analysis, summary and discussion - by Robert St-Louis, Ottawa Canada – May 2021

Translations of original texts by the author.

1. Introduction.

Henry Sully (1679-1728) was an English horologist. Born and raised in a small village in Somerset, he managed to become apprenticed and learn the trade with one of the more prominent clockmakers in London, Charles Gretton. Following the completion of his apprenticeship and tenure as a journeyman, he very briefly practiced the trade as a London clockmaker himself, then moved to the Netherlands where he had four children with his first wife. He earned a living repairing clocks and watches, and lived in the Hague and Leiden for five years.

While living there, he somehow found the time to write (in French!) and publish his first book, *Abregé de quelques Regles pour faire un bon usage des Montres, avec des Reflexions utiles sur la maniere de les bien raccommoder, et sur les abus qui s’y commettent* [Summary of some rules to make a good use of watches, and useful reflections on the way to repair them, and the abuses that can occur.] It seems to have had some success as a second printing was requested by the author in 1711, and a third printing was done in Frankfurt-on-Main the following year. In a “Note to readers and booksellers” on the first page, Sully wrote:

“A few hundred copies of this writing; that I distributed, having been well received by the public, even though I only briefly touched subjects, that are more needed to know by those who want to make good use of their watches, and maybe also, things that are not necessary for those who have some knowledge of horology, I thought it worthwhile to make a second edition, for the use of those who need such help. And to allow those who live too far from the author to be able to address him directly, and also be able to use this text, I advise booksellers of other towns, who may want copies, to address those requests to me, they will have them for the same price as the books that are sold in bookstores.”

Clearly, this small booklet, written quickly by Sully, became popular, necessitating him to augment the text and publish a couple of expanded editions. This publication also served as great advertising to his watch and clock repair services, and no doubt put him in contact with some of the affluent and influential people who owned such timepieces at the time. He must have realized the popularity and importance of such a text, probably never written before, and this led to his writing the broader and more detailed “*Regle artificielle du tems...*”, first published in 1714. A horological writer was born.

After his wife died, Sully lived briefly in Vienna, under the patronage of the Duke of Arenberg¹, and it was there that he wrote (no doubt encouraged and supported financially by his patron) and printed his second book, *Règle artificielle du tems*, in 1714. The book was unlike any previous work on horology: it provided to the reader in clear language a description of the measurement of time by clocks and

¹ Leopold Philippe of Arenberg (1690-1754) was the 4th Duke of Arenberg, an aristocrat and military officer. He fought in the War of Spanish Succession in 1706, and was a field commander on several other European conflicts. He moved to Paris in 1716, and Sully followed him there. Note that the name is often spelled “Arenberg” in contemporary documents.

watches, how these devices functioned, how to regulate and maintain them properly, and much other information of interest and use to any learned person desiring to know more about the timepieces in their possession. *Règle artificielle du tems* was well received by many learned individuals, including the mathematician Leibnitz, who wrote a commentary on the manuscript, that Sully included at the end of the printed book.

In the preface of the book, Sully wrote that he had found only few treatises on horology, and none that could “*serve as instruction to those who have no prior knowledge*” of the discipline. He mentioned William Derham’s *Artificial Clockmaker*, first published in 1696, which he said was a “*useful and very interesting work*” but had been mainly written for people employed in the art, and dealt directly with arithmetic aspect of horology (such as calculating teeth counts for clocks and watches). Sully also mentioned John Smith’s *Horological Disquisitions*, first published in 1694, where astronomical means of ensuring that clocks are telling accurate time are very well laid out. Sully suggests that both these previous books, though very useful regarding their purpose “*don’t go where would be needed, to give instructions aimed at the general public.*” Clearly, he felt there was a need for such a book, and several of his customers and acquaintances likely urged him to share his considerable knowledge by putting it in writing.

Sully is aware that the content of his book may be received differently by various readers, and offers these thoughts in the Preface:

I should warn [the reader] that it’s not enough to read this small treatise purely to satisfy one’s curiosity; this would not suffice to transmit so many rules and instructions which, even for such a small subject, demand constant attention, especially of those who have no prior knowledge of such things. Learned people may discover a few things they had not thought about, yet the author, being someone who has not pursued advanced academic studies, may require their indulgence, as he is well aware of the difficulties to write well, to dare flatter himself of having succeeded.

There may also be those who see a problem with instructions presented to them by an artisan; I don’t say they are completely wrong, since there is so little in common between handling the file and the pen; but even if it would be foolish for a man of the trade to consider himself a “bel esprit” [person of wit], may the reader have the kindness to consider that there are some who work in the trenches, who could well know how to direct field advances, and that any man who is proud to call himself a soldier, does not limit himself to carrying a musket.²

In the end, the Republic of Fine Arts is a free country, and although it would be difficult for one to show oneself in public without becoming assaulted from one side or another, one can, it seems to me, manage well if one has the right intention, by showing that the desire to serve the public has more to do with what one undertakes, than seeking profit or vanity.

Following his move to Paris in 1716, Sully had the book reprinted by the bookseller Grégoire Dupuis the following year. Most of the book’s content was exactly the same as the Vienna edition of a few years

² The reference to the theater of war is interesting, because it has been said that Sully had accompanied his mentor the Duke of Arenberg during some of the latter’s war expeditions, to keep the Duke’s, and other commanders’ watches, running well and accurately, which was an important aspect of coordinating artillery and troop movements and strategies on the battlefield.

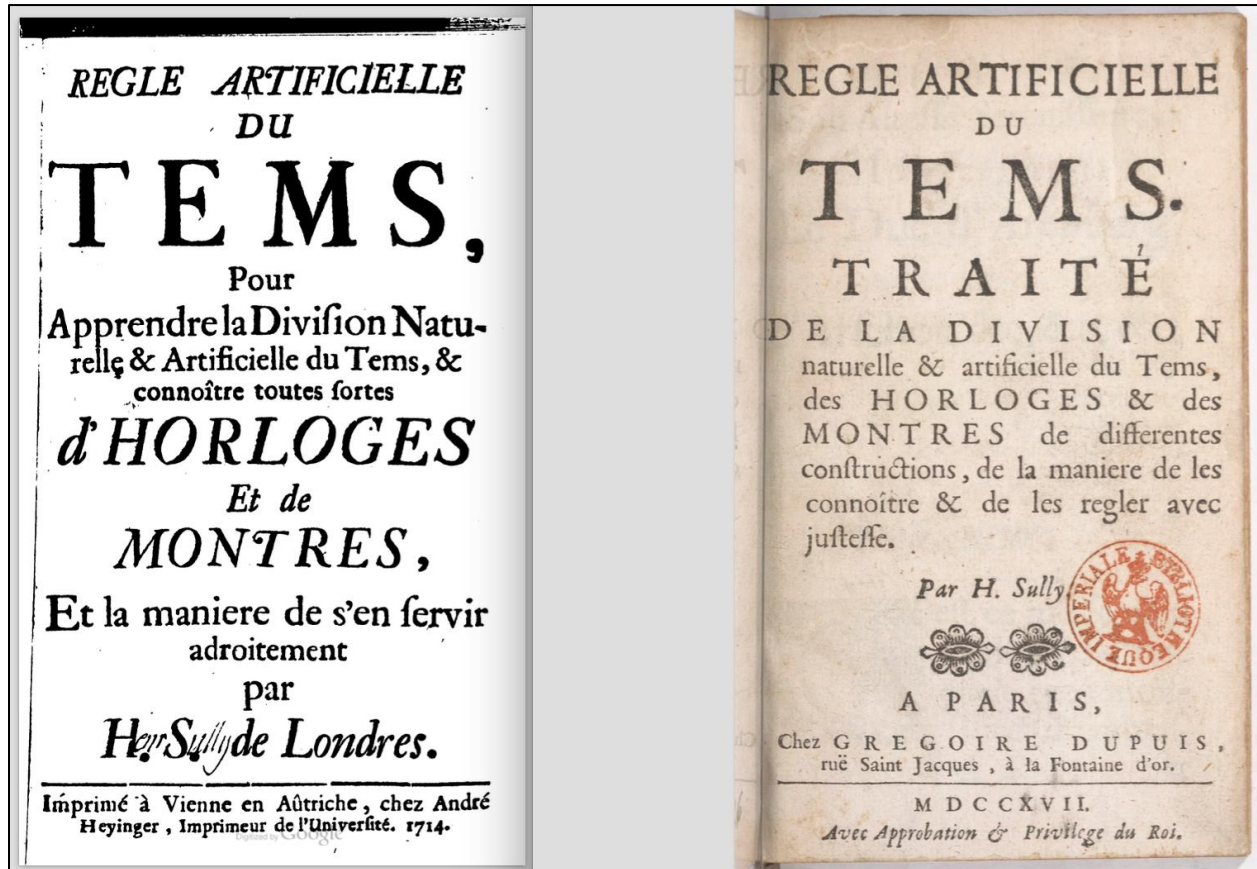
before, with some additional sections provided by the author at the front end, and at the back of the book.

After this, almost 20 years went by, until Dupuis commissioned Sully's friend and past collaborator Julien Le Roy³, a Parisian horologist of great renown, to edit, re-write, and significantly augment the book with some of his own memoirs, in the final edition of the book published in 1737. By that time, Henry Sully had been dead several years, having passed away in Paris in 1728.

This document describes and compares the three editions of this important horological book⁴, which was sadly never translated into English (though it had two German editions).

2. Comparison of the two printings of the first edition of the book (1714 in Vienna, 1717 in Paris).

Cover pages of the 1714 and 1717 editions:



³ Julien LeRoy (1686-1759) was born in Tours and trained by his father who was a clockmaker. He moved to Paris in 1703 and quickly established a reputation as an outstanding worker. Eventually he opened up a workshop and sold clocks and watches for many years in the exclusive Place Dauphine area. He was conferred the title "horloger du Roi" in 1739.

⁴ For a useful and detailed English description of the contents of the three editions, refer to G.H. Baillie's excellent "Clocks & Watches An Historical Bibliography", N.A.G. Press, London 1951, Pages 141, 150-151, 190-191.

There are interesting refinements in language and description in the title, brought upon when the book was published in Paris (1717), three years after its original publication in Vienna (1714).

Vienna Edition:

REGLE ARTIFICIELLE DU TEMS, Pour Apprendre la Division Naturelle & Artificielle du Tems, & connoître toutes sortes d'HORLOGES Et de MONTRES, Et la maniere de s'en servir adroitement par H. S. de Londres. Imprimé à Vienne en Autriche, chez André Heyinger⁵, Imprimeur de l'Université, 1714.

Paris Edition:

REGLE ARTIFICIELLE DU TEMS. TRAITÉ DE LA DIVISION naturelle & artificielle du Tems, des HORLOGES & des MONTRES de différentes constructions, de la maniere de les connoître & de les regler avec justesse. Par H. Sully. A PARIS, Chez GREGOIRE DUPUIS⁶, rue Saint Jacques, à la Fontaine d'or. MDCCXVII. Avec Approbation & Privilège du Roi.

Much of the text (and actual typeset) in the books is identical, in both the 1714 and 1717 editions. The Viennese printer (André Heyinger) may indeed have held on to the type forms for a few years (to produce new printings of the book in his shop to accommodate demand beyond 1714), or may have printed off a stack of several copies of the book's sheets and stored them for future needs, before dismantling the type. Another possibility is an arrangement between the Viennese and Parisian printers, to have a new set of pages printed in Vienna from the original typeset galleys, or have the entire set of galleys sent to Paris so that Dupuis could incorporate it with the typeset of the new pages to print the new edition. Another possibility is that Sully could have used unsold copies of the 1714 edition (especially if they were unbound), added the new title page and material at the front and back end, and then had them bound (or re-bound) for sale as the 1717 edition.⁷

The dedication at the start of the book (*A Son Altesse Serenissime, Monseigneur Le Duc d'Arenberg & d'Arschot, &c.&c.&c.*) is absolutely identical in both editions, printed from the same typeset, and no

⁵ Not much is known about André Heyinger, a printer evidently associated with the University of Vienna. Most publishers working in Vienna at the time were either of Dutch or French origins, the more famous being the Van Ghelen family, and Thomas Trattner.

⁶ Grégoire Dupuis (1672-175.) was a printer and bookseller, son of bookseller Jean Dupuis. Established master in 1696, he declared bankruptcy in 1741, and had left the trade before 1749. He died abroad, before 1755. Source: https://data.bnf.fr/fr/12229441/gregoire_du_puis/ Dupuis published dozens of books in his career, on various religious, philosophical, historical, and literary subjects. Three years before publishing Sully's Règle in 1717, he had published a controversial new translation of Homer's Iliad written by a poet, de la Motte (itself based on a fine translation written in 1711 by Madame Dacier, because unlike her, de la Motte did not know the Greek language).

⁷ In William B. Todd "Bibliography and the Editorial Problem in the Eighteenth Century", published in *Studies in Bibliography* in 1951, is written: "Where the seventeenth-century compositor, with a limited amount of type at his disposal, usually had to break down a setting after every sheet in order to recover sorts for further use, the eighteenth-century compositor, with apparently unlimited quantities of type at hand, could on occasion set as many as 350 pages and allow this enormous aggregate of metal to remain intact for innumerable impressions. Some of these are labeled second and third editions, some are not so dignified. Some appear with substantial textual alterations, some without the alteration of a single comma. [...] For such extensive reimpression as this there is no precedent in the sixteenth and seventeenth century, hitherto no exposition of an expedient means for detecting it in the eighteenth, and consequently, no reliable method for interpreting the complexities in printing which have developed over the years."

differences can be seen in any of the 9 pages. Even the date on the signature is identical (*Vienne ce 30.me Juillet 1714.*).

The same holds true for the 11 page “PREFACE. AU LECTEUR,” that follows, they are identical in both editions. Likewise, the four page “TITRES des Chapitres.” is unchanged.

In the pages that follow, the actual text differs to varying degrees, as explained by a 2-page AVERTISSEMENT [Warning] by Sully to the reader, which precedes the start of chapter 1. The *Avertissement* is paginated iii (not shown) and iv. In it, Sully writes:

Having come to Paris after the printing of my book [1714 edition], and having shown it to some of my friends; an illustrious scholar made me realize that I started too quickly in giving distinct ideas about all sorts of clocks and watches, and that it was necessary that I first provide a better and more detailed understanding of what is a clock and a watch, to allow the mind of my reader to better understand the rest of my text. I found this advice so appropriate that I started to write what presently follows, and which in a future printing will become the first chapter.

Since being in Paris, I had another opportunity to increase my book by adding a Memoir on Horology, that I had the honour to read at the Académie Royale des Sciences in the month of June 1716, and which is found at the end of this work. Although I hope that this memoir will be understandable as presented here, in order to make it more useful for workers, I plan on joining figures that will better explain certain things regarding execution. In this printing, I have thus placed in the text, wherever needed, references to figures, even though they are not yet completed. These figures will be printed shortly, which along with the explanations I will add, will form a supplement to this memoir.

I have also added comments that a scholar of the Jesuit Society made on my book, and that the late M. le B. de Leibnitz, did me the honour of sending to me in Paris in 1715. These comments, along with my response, are at the end of the book.

Following in the 1717 edition is a new 20-page section (starting on page v and ending on page xxiv), providing the “*better and more detailed understanding of what is a clock and a watch*” described by Sully in the 2-page *Avertissement* that precedes it. In this new section, each subject is numbered with a capital roman number (as was the case for the text in the 1714 edition). As he had set himself to do, Sully proceeds to give a thorough introductory description of a clock, and all its parts. He goes on to describe the wheels, how they are constituted, and how they interact with each other in the train of the clock. He then explains how the weights are used to drive the clocks, and how the pendulum and escapement at the other end regulate its operation to allow the device to display time. After he has completed his discussion of clocks, he proceeds to describe their smaller counterparts, the spring-driven watches, along with their distinctive components the *fusée*, the balance wheel and balance spring.

From this point on, the 1717 edition replicates verbatim all the pages from the 1714 edition, in the same type script, pagination and obviously using the original typeset forms.

Coming back to the layout of the 1717 edition, the replicated text starting on Chapter 1 is paginated starting page 1 (like the original edition), and the final chapter X ends on page 114. Therefore, in essence not one character appears to have been changed in pages 1-114, lending weight to the

possibility that Dupuis was working with already printed sheets coming from Heyinger's original print run in Vienna, or had access to the typecase forms themselves.

Following this, both editions feature the same "Avertissement" introducing the remarks of the Baron of Leibnitz, which resulted from Sully sending him a copy of the manuscript of his book. Leibnitz's comments are on the following six pages. The 1714 edition ends at that point. Here are the words with which Leibnitz introduces his comments on Sully's manuscript:

One could strongly wish there were a book on horology, able to convey all the practice of the Art, not only related to its primary purpose, the measurement of time, but also about the accessories to this, which consists of many beautiful inventions developed by the masters of the Art. The author of this discourse, who has joined theory with practice, and who also has the talent to express himself well, would be very well suited to writing this work.

The 1717 edition goes further by adding two new sections following the Leibnitz comments. Firstly, a section paginated 1-26, consisting of excerpts (pages 1-8) of a letter from Father Kresa⁸, written to a M. Williamson (Clockmaker to the cabinet of His Imperial Majesty), dated January 9, 1715. These comments pertain to both Leibnitz's comments, and also on the text of Sully's book itself. In the next pages (9-26) Sully replies to points raised by Kresa, and produces an updated 6-page "equation table" showing the variations of day length throughout the year.

Secondly, Sully introduces into the new edition his "Description of a watch of new construction. Presented to the Royal Academy of Sciences in June 1716. By H. Sully." This last section was quite recent, as Sully's successful presentation to the Academy had only taken place a few months before that.⁹ The 1717 edition comes to a close at this point followed, as was the 1714 edition, by the usual Table of Contents, followed by the paragraph entitled "Approbation" [Approval] signed by the astronomer Cassini in May 1717, where he passes positive judgment on the manuscript that he was given the opportunity to read. Following this is the usual lengthy section found at the back of all French books of that era entitled "Privilege du Roy" [Privilege of the King] which essentially assigns a copyright to the author for twenty years.

What is difficult if not impossible to know is how many copies of the original 1714 edition were printed, and how many print runs were done of that edition. Perhaps it didn't sell that well in Vienna, which may have in part motivated Sully to relocate to Paris and have it printed there. Likewise, it cannot be determined how many copies of the 1717 edition were produced by Grégoire Dupuis in Paris. The book appears to have had some success, and since nothing quite the same existed at the time (nor would for many years) there could have been additional demand for copies of the book beyond 1717, which could not have been accommodated without resetting the type, assuming that the copies from Heninger had run out. Demand for the book is suggested by Dupuis himself, in his introductory note "To the reader" at the front of the 1737 re-edition of the book: *For a long time, the public has demanded a new edition of this book [...] that I couldn't bring myself to print without making corrections.* This suggests that Dupuis likely had to reset the type for a new printing, and given the effort to do so, decided that it was

⁸ Jakub Kresa (1648-1715) was a Czech born diplomat and mathematician.

⁹ For more information on this subject, please see: Robert St-Louis, 1716: 'A watch of new construction' – a meeting of two great horological minds, Antiquarian Horology, Summer 2021.

best to make changes and corrections to the text (which will be described later, in comparing the 1717 and 1737 editions).

3. Comparison between the two Paris editions of the book (1717 and 1737).

Cover pages of the 1717 and 1737 editions:



There is a small change in the title of the book, with the 1737 edition replacing the archaic spelling of time (*tems*) with the more current one (*temps*). This is a small example of the many changes carried out on Sully's original text by Julien Le Roy and the publisher, Grégoire Dupuis, in coming up with the "*Nouvelle Edition corrigée & augmentée de quelques Memoires sur l'Horlogerie, par M. Julien Le Roy, de la même Société*" (New edition corrected and augmented by certain memoirs on horology, by Mr. Julien Le Roy, of the same Society). The Society referenced here, and ascribed to Henry Sully as well as Le Roy, is the Société des Arts, first created around 1718, and re-established in 1728, with both Sully and Le Roy being important founding members.¹⁰

At the beginning of the book, the publisher/bookseller wrote a note to the reader:

¹⁰ For a detailed discussion on the Société des arts [Society of the arts], and the roles that Sully and Le Roy played in it, see Monica Bertucci "Artisanal Enlightenment", Yale Press, 2017.

For a long time, the public has asked for a new edition of this book, in which most sentences are loaded with useless words and make for difficult reading, such that I could not print it without making corrections. After having thought seriously about who should make these changes, and consulting friends on the matter, I asked Julien Le Roy of the Société des Arts, whose knowledge of horology and the relationship he had with the author, made him capable of helping me: convinced by my solicitations, he helped me, without changing anything that was essential, so that one will see everything that the author has said and thought. We have nevertheless removed many paragraphs deemed of little use, which were replaced by a few judicious words inserted into the text.

Thus, a good portion of Sully's original wording from the 1717 edition has been changed or reworded by Le Roy and the publisher. This must have represented a significant amount of work for Julien Le Roy, who ran a busy and prosperous watch/clock-making business at the time. Possibly, he elicited the help of his son Pierre¹¹ in the process. Speaking about the book, Sully himself had written in the Preface:

Regarding the style [of the writing], I have preoccupied myself primarily with clarity, and have preferred repeating myself when dealing with complicated subjects, then using a more proper style at the cost of remaining unclear. Finally, I ask the reader to consider that I wrote in a language that is foreign to me.

Sully was well aware of his limitations as a writer in the French language, but it's nevertheless impressive that, only a few years after landing in the Netherlands, he had written a sizable and influential book on a complicated subject, destined for general readership, in a language that was not his mother tongue. In spite of the critical comments by the publisher to warrant the re-edition of the text, Sully's original words from 1714 are pleasant to read, and often convey an endearing original voice and linguistic "accent" of an Englishman doing his best to write in French, often literally translating English phrases.

The obvious differences between the 1717 and 1737 editions, other than editorial changes on Sully's original text, are twofold.

Firstly, there is a lengthy section (pages 239-272) of an incomplete text by Sully ("found after the death of its author", writes Le Roy on page 274), entitled "Critical history of different kinds of escapements". This is probably an initial attempt by Sully to write a section of his envisioned six-part "Study of Horology" (see discussion section below).

Following this, on pages 275 to 433, are numerous memoirs by Julien Le Roy on horology. Many of had already been read to the *Académie des Arts*, as Le Roy wrote in his preface, where he also says:

I have yielded to the solicitations [of the publisher Dupuis] and the occasion to place [these memoirs] at the end of an excellent book, which deals with the same subject, and to which two of these memoirs relate.

¹¹ Pierre Le Roy (1717 – 1785), the oldest of Julien's four children (all sons), who followed his father in the horological profession, and worked alongside him for many years, taking over the family business after Julien's passing in 1759. Pierre was well-educated and a fine writer, and it's possible he could have assisted his father in updating Sully's book for the 1737 edition.

Arguably the most interesting of Le Roy's sections is the one entitled "*Memoire pour servir à l'histoire de l'horlogerie, depuis 1715 jusqu'en 1729*". [Memoir to serve the history of horology from 1715 to 1729]. In it, Le Roy essentially recalls his long collaboration and friendship with Henry Sully, from the time the latter relocated to Paris in 1715, up to his death in 1728 and just beyond. This text is extremely important to anyone interested in Henry Sully's life and work, as it constitutes one of the only contemporary accounts of this subject, by someone who knew the Englishman very well. The impression one gets in reading Le Roy's preface and this memoir, is that his participation in the revision of Sully's 1717 edition was very much a labour of love, to serve the memory of his deceased friend, and possibly to provide some financial assistance to Sully's widow and children.

At the very end of the 1737 edition, after the usual copyright section entitled "*Privilege du Roy*" [Privilege of the King], is an interesting small paragraph entitled "*Cession du present Privilege*" [Cessation of the present privilege]. It is signed on 22 October 1731 by Henry Sully's widow, Angélique Potel, and basically confers to the publisher Dupuis all rights to the works of her deceased husband, for him to do as he wishes. Probably, this was done to open the door to Dupuis embarking on the re-writing of the book, with the help of Julien Le Roy, culminating in its third and final edition, published in 1737. Quite probably, the widow received some monetary compensation for conferring the rights to Dupuis, and this may have been arranged by Sully's friend Julien Le Roy, who was godfather to Sully's last son, also named Henry, born in 1721.

4. Discussion.

Règle artificielle du tem(p)s was both innovative and influential among horological writing produced in the late eighteenth and nineteenth centuries. As Sully himself indicated in his preface, he was only aware of two previous books, both written in English in the late eighteenth, that offered some similarity of content to his own work. However, Sully's book went much further and much of its content was directed at the owners of clocks and watches, to allow them to better understand what they were purchasing, and how to best use and maintain these timepieces. Undoubtedly, Sully had loved to discuss horology with his colleagues but especially his customers, over the many years that he had repaired clocks and watches, both while employed by Gretton in London, and as his main livelihood since establishing himself and raising a sizable family in the Netherlands. Probably, more than one customer must have said to him at times: "You should put this all in writing some day, many people would love to know more about their watches and clocks". Initially, Sully may have devoted evening time to writing his thoughts and advice on timepiece selection and usage, as a means of generating additional income for a needy family (he had a wife and four children born in quick succession, in the Netherlands).

It's known from Sully himself that "a few hundred copies" of his original booklet from 1711 were initially printed, and there were at least two printings after that. How much profit from this would have wound its way into the family purse cannot be known, but it gave Sully confidence to tackle a more substantial work on horology in the next few years, resulting in the first edition of *Règles* in 1714. Information is not readily available on how many copies of the 1714 edition of the book were printed, and what might have been Sully's revenue from that. Based on the interest in his first booklet, one can assume that a thousand or more copies may have been printed and sold. Likewise, the volume of the 1717 edition printed in Paris is unknown, but likely a few more thousand copies. Certainly, copies of this book found

themselves in the hands of many educated and influential individuals in Europe, and gave a reputation to its author which assisted in opening doors for him during the latter stages of his professional life.

It is noteworthy that Sully authored these books in French, and not his native English. Clearly, he possessed linguistic skills that allowed him to quickly learn Dutch, French, and German languages after relocating from London to the Continent at the start of his horological career. At the time he wrote his book, French was recognized as the predominant universally-read language in Europe, allowing communication of new ideas and knowledge to a wide range of educated readers in various countries. Although some English books (such as the two mentioned by Sully in his Preface) were translated into French and printed on the continent, few French books were similarly translated for dissemination in England.

In part for this reason, Sully's influential book was never translated into English (even though he himself alluded to preparing an English version for print in London, which never materialized). This is indicative of the attention placed on both sides of the Channel upon Sully's contributions as a horologist, for example, his incomplete but important body of work on marine clocks for determination of longitude. Possibly, he was shunned or at least neglected by English because he had turned his back on the English horological heritage by relocating to the Continent and spending the rest of his life there. And he may have also have been somewhat underappreciated by the French, because he was an Englishman in their midst.

Sully's book did have a strong influence on many horological books that were written in France during the eighteenth century, which was a period of intense intellectual activity and writing on many subjects, under the reigns of Louis XIV, XV and XVI. "*Les années lumières*" (the enlightened years) is what that period is usually referred to, and horological writing during that time matched the considerable advancements in watch and clock design and construction that occurred. Much of this writing was done by actual horologists, who described in great detail the intricate aspects of their craft, to inspire other practitioners of the Art. This culminated in the *Encyclopédie* by Diderot and D'Alembert, but there were also inspired books by individual horologists such as Julien Le Roy, Antoine Thiout, Jean-André Lepaute, Ferdinand Berthoud, and others.

Julien Le Roy, Sully's one-time collaborator and lifelong friend, never authored a book himself, preferring to write several memoirs on particular horological subjects over the years (some presented to the *Académie Royale des sciences*, others to the *Société des arts*, of which he as a founding and prominent member). However, his fingers are all over the text of the 1737 edition of *Règle artificielle du temps*, which he assisted the publisher in editing and updating from the old 1717 edition. The 1737 edition also features many of Le Roy's own memoirs in the second half of the book, including one which is the closest we have to a contemporary biographical text on Henry Sully.¹²

In 1734, a Dominican priest called Jacques Allexandre, published in Paris a book entitled "*Traité général des horloges*" [General treatise on clocks]. It is a fine attempt to document the breadth of history of horology from earliest times to the present, primarily on clocks, but with some discussion of watches as well. The book features a most interesting 105-page bibliography of all the books, many quite ancient,

¹² *Mémoire pour servir à l'histoire de l'horlogerie, depuis 1715 jusqu'en 1729* [Memoir to serve the history of horology, from 1715 until 1729], *Règle artificielle du temps*, Paris 1737, pages 381-413.

consulted by Alexandre in writing his book. Sully's *Règle artificielle du tems* is described at length, as Alexandre summarizes the subject of each chapter.

The next one to try his hand at writing a comprehensive horological book is Antoine Thiout¹³, described by G.H.Baillie as "an exhaustive treatise written by a maker of great repute". It features 400 pages of text and over 90 foldout drawings of all aspects of clock and watch design, as well as the tools used in producing them at that time. Until Ferdinand Berthoud's two-volume "essay" on horology in 1763, it would remain the most complete work on this subject ever produced in France, and probably any other country, and is still a very useful reference on eighteenth-century horological practices.

Next up is Jean André Lepaute¹⁴, whose *Traité d'horlogerie* came out in 1755. It is a shorter work than Thiout's (just over 300 pages, 17 foldout diagrams), but is most inspired by Sully's 1717 book, and in some ways could be seen as an expanded update to *Règle artificielle du tems*. The "Historical Preface" of his book features nine pages of biographical information on Sully (largely based on Le Roy's own memoir in the 1737 edition). Lepaute writes:

It was to update the work that Mr. Sully had printed in 1717, entitled "Règle artificielle du tems", that Mr. Julien Le Roi gave a second edition in 1737, augmented by many works of his making.

This second edition having also disappeared in turn, the necessity to come out with a third, made us desire to substitute a more perfect and useful work on its subject and on the current state of horology; in light of this, we have felt best to abandon the work of Mr. Sully, and we have only conserved traces of its initial form, such that one can say that Mr. Sully's book gave us the opportunity rather than the model. Mr. Sully, not ideally suited to the task of a writer, had not been able to provide enough order, style, expression, nor clarity in his work, and his editor [...] preferred augmenting a useful work rather than correct it, and thereby turning it into a pleasing work; thus, after a total metamorphosis, we found ourselves obliged to also regretfully change a title that Mr. Sully and the reputation of Mr. Le Roi had made respectable.

Lepaute went on to write that his treatise was also an update on the great one published some years earlier by Thiout, providing everything novel and interesting that had come out in horology since 1741. Lepaute is certainly critical of Sully's abilities as a writer (not surprising since the Englishman was after all writing in a language that was not his mother tongue), but what is undeniable, in looking at the three subsequent books just described (Alexandre, Thiout, Lepaute), is that Sully had set an example of how horology could be described in its various aspects and details in a book, and that it was a proper thing for a horologist to occupy himself with, as a means of sharing and transmitting knowledge to younger practitioners of the Art.

The writer who came closest to realizing Sully's vision of an all-encompassing horological treatise was the prolific Swiss/French Ferdinand Berthoud¹⁵, with his "*Essai sur l'horlogerie*" [Essay on horology], first

¹³ Antoine Thiout, the elder (1692 – 1767) became master-horologist in Paris in 1724. He was one of the clockmakers who produced pendulum clocks to display real and average time in the 1720's. His 1741 treatise remains one of the great sources of information on horological practices in eighteenth century France.

¹⁴ Jean André Lepaute (1720 – 1789) was an extremely respected and prolific clockmaker who produced timepieces for the most affluent customers of the time. He was married to a brilliant woman, Nicole Reine Étable de la Brière, who was a very intelligent mathematician and astronomer.

¹⁵ Ferdinand Berthoud (1727 – 1807) was born in Plancemont Switzerland, and came to Paris in 1747, becoming master watch-clockmaker there in 1754. He died in Paris a wealthy man. His horological accomplishments are numerous, and he also

published in 1763 (second edition came out in 1786). In Berthoud's two-volume book, the text is lengthier and more finely written than either Thiout's or Lepaute's (Berthoud was a formidable writer) and in his case, the plates and diagrams are in support of the text.¹⁶ In his book, Berthoud makes a brief mention of Sully (on page xiv of Volume I), where he writes: "it's to [him] that we owe *Règle artificielle du temps*, an excellent work that contains a very good memoir on ways to perfect a watch."

It's unfortunate that Berthoud's work was never translated into English, as there was nothing of comparative comprehension being written in England at the time. Actually, content from Berthoud's book, and also Thiout's, found their way into English books that came later (notably Thomas Reid's *Treatise on Clock and Watchmaking*, published in Glasgow in 1826). Berthoud's *Essai* was the finest and most complete book on the subject written to that point anywhere in the world, and certainly in France. His books still offer excellent reference material on the discipline of horology in the nineteenth century.

It should be pointed that near the end of his life, in 1726, Sully had outlined his ambitious plan to write an all-encompassing series of volumes on horology. This was included in his penultimate book entitled "*Description d'une horloge d'une nouvelle invention pour la juste mesure du temps en mer*" [Description of a clock of new invention for accurately measuring time at sea].¹⁷ Near the end of that book (pages 284-290), Sully outlined a plan to write a "*traité*" (treatise) on horology in 6 volumes. The first volume would consist of an augmented version of his 1717 book (*Règle artificielle du temps*), and would stand on its own. The other five books would (in his words) consist of: (2) the history, (3) the description, (4) the theory, and (5) the practice, of horology. The sixth book would consist of letters and critical essays, which would put the other 5 books into proper context ("*donner le juste prix*"), since "only by criticism can we clarify doubtful subjects and excite the mind." Unfortunately, a premature death in 1728 would rob horologists of Sully's full knowledge and vision, and the five last sections in his ambitious plan were never completed.

In the introductory pages of Sully's 1728 book *Méthode pour régler les montres et les pendules*¹⁸ [Method to regulate watches and pendulum clocks], the publisher notes that Sully was also busy preparing other works for publication:

- A translation from English of Oxford astronomy professor Gregory on the usefulness of mathematics and how to study them.
- A new practice to more exactly determine longitude for navigation.
- A second edition of *Règle...*, with additions and figures [a revision of this work would have to wait for the 1737 edition, augmented considerably by material provided by Julien Le Roy].

mastered all aspects of the profession. Having no children, Berthoud could devote most of his evenings and spare time to his prolific horological writing.

¹⁶ That is one way of comparing the works of Thiout and Berthoud, though both have their merits and are fine in their own right. Both works were published in two volumes: Thiout's text totals 400 pages, and there are 91 plates of figures; Berthoud's text has 477 pages in Volume I and 542 pages in Volume II, and there are 7 tables and 38 plates of figures.

¹⁷ Published by Briasson, in Paris, in 1760. This book in part described Sully's attempts to design and build a working marine chronometer, that was tested near Bordeaux that year with some success. Sully realized the clock needed more refinement, but he unfortunately did not have time to further advance his work in this area, and it was left to his friend Julien Le Roy's son Pierre, and the Swiss immigrant Ferdinand Berthoud to build on Sully's work and take French chronometry to the next level.

¹⁸ Published in Paris, this small-format 76-page book was an update to one of the same title that had been published 11 years before. It is Henry Sully's final publication.

These additional planned works, along with the massive horology treatise, never made it to print, because of Sully's untimely death after a sudden illness, in 1728. In Antoine Thiout's 1741 tome, *Traité de l'horlogerie, mécanique et pratique* [Treatise on mechanical and practical horology] is featured a substantial ten-page posthumous article by Sully on the verge escapement, complete with a detailed diagram. This text had never appeared in print before, and may have been one of the sections that Sully had prepared for his ambitious 6 volume *Traité d'horlogerie*, which had survived and found its way to Thiout as he was preparing his book. Sadly, no other similar texts by Sully appear to have survived and come down to us¹⁹, but this one gives us a tantalizing glimpse into the wealth of knowledge and detail that Sully would have been able to impart upon the horological community, had he lived longer.

In *Mémoires de Trévoux* (March 1728 pp. 420-422) was published a review of Sully's last published work, a small booklet entitled "*Méthode pour régler les montres & pendules*" [Method to adjust watches and pendulum clocks]²⁰. In that short document, Sully had also outlined his ambitious plan for a 6 part Study of Horology (outlined above), and the reviewer ends the review with these lines: "There only remains but to wish two things: firstly, that someone as able as Mr. Sully executes this work in its entirety; secondly, that the Scientists and Artists (*Scavants et Artistes*) communicate to him, in good spirit and enthusiasm, everything they deem to be useful to execute such a work, which indeed requires the help of many hands and minds."

In Sully's final book (*Méthode...*) the publisher also added a note that "the author is preparing for printing [...] the second edition of *Règle artificielle du tems*, with many additions and figures". Perhaps the rough manuscript for this was kept and later used in coming up with the 1737 edition, it's difficult to say.

Clearly, as he approached the end of his life, Sully turned to his trusty pen to try to generate income to support his wife and numerous children. All the work and expenses he had spent on his marine timekeepers during the last few years, and which had not culminated in complete success, had no doubt eaten up whatever savings he had. A contemporary account²¹ indicates that "[the death of Sully] left his wife and five children in extreme misery, but Mr. the Curé [of the parish of St-Sulpice] looks after them all."

Unfortunately, Sully died on October 13 after a short illness, and his plan remained unfulfilled. Ten years later, Julien LeRoy helped augment and update Sully's "*Règle artificielle du temps*" but it was still well below the broad scope of Sully's envisioned future work. It would take J.A. Lepaute, almost 30 years after the 1728 piece, to come close to fulfilling Sully's vision of an all-encompassing tome on horology. Sully had set the example and laid out the path, and left it up to other French horologist-writers of the *Années-Lumière* of the 18th century to follow his example and produce formidable, increasingly comprehensive and detailed horological books (Thiout, Lepaute, Berthoud, Diderot's *Encyclopédie*, etc.).

¹⁹ Other than the chapter entitled "*Histoire critique de différentes sortes d'échappemens*" [Critical history of different kinds of escapements], that was inserted by Julien Le Roy and his publisher in the revised 1737 edition of *Règles* (pages 239-272). This was evidently an incomplete draft that had been found in Sully's papers, which he had probably destined for his unrealized *Traité d'horlogerie*.

²⁰ This final booklet bookends Sully's writing career with the very first book he published on the same subject, in Leiden in 1711.

²¹ Angélique Delisle, writing to her brother Joseph-Nicolas Delisle on 17 January 1729, Bibliothèque de l'Assemblée nationale, Paris, Ms 1508, f. 49v

5. Foreign editions.

Règle artificielle du tem(p)s was translated into German by Antoine Charles and published in 1746. One can assume that Charles translated the edited and augmented 1737 version. A second edition of the German translation was published in Lemgo²² in 1754. The German title is: “*Unterricht von der Eintheilung der Zeit und verschiedenen Einrichtungen Grosser und Kleiner Uhren*”. Interestingly, the German edition appears to feature eight plates (the 1737 French edition had only three), and two tables. The book is printed in a larger octavo format and has less pages (264) than the 1737 French edition (433).

No other translations of Sully’s book are known. It is rather odd that no one in England decided to translate this important work by an Englishman. There was certainly nothing like it before in the English language, and for a long time after. Educated Englishmen were often well versed in French, so many who chose to read it could do so in its original language. The horological rivalry between England and France may also have played a part, the fact that Sully was an Englishman who had made his mark working in France for many years.

German editions of some of Sully’s other writings also came out over the years,²³ so they appreciated the importance of his written output.

6. Interesting passages.

This article has already provided translations of parts of the introductory sections of the book written by Sully. Since this book was never translated, translations of some interesting statements that appear in different parts of the book are offered below, to give an idea to an English reader of some of Sully’s views about horological subjects. Many of these passages stem from Sully’s excellent apprenticeship in Gretton’s shop in London, as well as the many years he spent repairing watches of all types and qualities. The source text (and referenced page numbering) is from the final 1737 edition.

The unfortunate thing in our Art is that skillful and honest men are most disadvantaged, while negligent masters and workers, unskillful or of bad faith, very easily do well in their business. The reason is that since there is almost no one who can judge the products of our Art, the choices are generally made on two factors: the external beauty, and the most affordable price. It’s easy to see who profits from these criteria as applied by most customers. Mediocre workers focus on producing something attractive for the eyes, not concerned about the goodness or perfection of their work; they find ways to make them at a cheap price, and sell them in this condition. But a skillful man will place more importance on the internal quality than the external beauty, and when he adds ornaments, he chooses something of good taste and well made, which consequently costs more. Thus, his work finds few customers, and the skillful man finds himself faced with a sad choice: either to satisfy himself with his ability and quality of work,

²² Lemgo is a small university town in the Lippe district of North Rhine-Westphalia, Germany, 25km east of Bielefeld and 70 km west of Hannover. This area is now one of the most important cluster regions for mechanical engineering and industrial electronics in Germany.

²³ See: Tardy, *Bibliographie Générale de la Mesure du Temps*, Paris, 1947 pp. 239-240.

lamenting public ignorance, or to put aside his honour and knowledge, and do like the others, in order to benefit, after much regret, of a better fortune. (Pages 39-40)

Two things are important to use a watch well, and be happy with it: firstly, one must be educated on the principles of its construction, to judge what degree of exactitude it is and is not capable of; secondly is to learn about and apply oneself to using it well, in order to make the movement as accurate as possible. It's through lack of these small facts that many people expect unreasonable and even impossible precision from their watches, and that they sometimes sing their praises in absurd ways, falsely and ridiculously; or conversely, are continually dismayed at either small or large variations observed, that it is up to them to correct. (Pages 44-45)

A long pendulum clock [pendule à seconde] is capable of surprising regularity. Mr. Quare one time assured me, about eight or ten years ago [i.e. 1697-99] that he had so well regulated two pendulum clocks to each other, that at the time he was speaking to me, the clocks had strayed in eight months only twenty seconds from each other. (Page 48)

I will demonstrate that it is impossible to ensure the best and most accurate pocket watch, vary only as much in 24 hours, as a well-adjusted pendulum clock would in an entire year. (Page 49)

Because so few people know how to distinguish a good from a poor watch, there are many brokers, dealers, and even watchmakers who take advantage of the public ignorance or gullibility. If I had to rely either on the "reputation and honour" of a watchmaker, or rely on science and judgment, I know which one I would rely upon [in choosing a good watch]. [...] If money counterfeiters deserve to be hung, must we regard as honest men those who, to fool the public, place on their lesser quality works the names of the most illustrious horologists of Europe? (Page 122)

Three signs of a bad or mediocre watch are: firstly, when a master watchmaker sells at a low price works that feature his own name - only good workers make good watches, and being in low numbers compared to bad ones, are much sought after by the best watchmakers. Such skilled workers would not work for those who only pay them half for their work, when they could be well compensated by a good watchmaker who appreciates their merit. A second sign is when one sees on a watch a bizarre novelty or ridiculous invention that only serves to amuse those who, like children, are drawn to such curiosities. These include: hour numbers that appear to jump in a hole on the dial; watches that show the balance wheel through a hole in the dial and plate; enameled portraits appearing inside a watch, which spoil the movement by encouraging the watch to be opened frequently [causing dust to enter]. Finally, a third sign is when a watch engraved with the name of a renowned master is sold at a low or paltry price. (Page 125-127)

In order to determine if a watch has good regularity, it is important to compare it to a well-adjusted pendulum clock or a sun-dial, and not compare it to public clocks, that are generally not well maintained or adjusted. If such a watch gains or loses a minute per day, that is admirable regularity, and as well as one can expect from a watch. One should not neglect to advance or retard the movement before the daily inaccuracies become too great. (Pages. 139-141)

The irregularities of bad watches are mainly due to: a defective or not well proportioned fusée, which is not well suited to the mainspring in the watch – this is particularly evident during the end of the mainspring, 3-4 hours past 24; inability to maintain regularity when used in different positions (held in a

vest pocket, suspended on a hook, or resting flat on a table) - bad watches will display an irregularity of 4-5 or more minutes per 24 hours in different positions. One must always wind the watch at the same time, and hold it as much as possible in the same position. (Pages 142-143, 173)

A perfect watch coming from a good maker, can easily be made imperfect by a clumsy worker. There is no better way to be assured of the quality of watches and clocks, than to rely entirely on the honour of makers, whose reputation of being knowledgeable and of good faith, is established by indubitable experience. (Pages 152-153)

It is important for all those who own a watch to never open them, unless there is an absolute necessity to adjust the hairspring. If one must open it, one must take care that the powder in hair or wigs, or other dirt, do not fall into the movement. One must conserve a watch like the most precious jewel. (Page 173)

The art of repairing watches is as useful and important to the public as that of making them. There are many people who believe that it doesn't matter to whom they entrust their watch for repair; but if they knew the consequence, they would rather send a watch a hundred miles away to have it repaired by a skillful artisan. (Pages 174-175)

By a good watch, I mean one where the materials are well selected, that the parts are positioned and proportioned with judgment and skill, that it is made with all the care and skill possible. Such a watch must undoubtedly run well. By a bad watch, I mean one that has opposite qualities, whose materials are imperfect and whose essential parts are positioned with neglect and no skill. Such a watch must run badly. Bad watches have such numerous defects that produce innumerable sorts of irregularities, more or less present in each watch. Such watches can be made better by an honest and intelligent artisan, but it will never be as good nor as durable as one that had been well made from the start. (Pages 179-180)

When I consider how few skillful artists there are who can ably repair both good and bad watches, I can only feel sorry for the people who own them, exposed to the trickeries of bad workers who, by getting involved in something they don't understand, only bring doubt and dishonour to such an interesting and useful Art. I am sorry that I cannot deal with this matter in more detail without condemning many people in our Art, which is not my goal. Moreover, there are many honest people in this profession who just lack opportunities and the inclination to learn how to work better. One day I hope to contribute to making them learn to be more useful. In the meantime, I have presented to amateurs of the products of our Art, this little treatise which I hope is intelligible and useful. (Pages 181-183)

Sources:

- **1714 Edition:** Google Books scan of copy at Osterr. Nationalbibliothek (Austria) No. 51.X.16
- **1717 Edition:** Gallica scan of copy at Bibliothèque Impériale (France) No. V2389 – 21726
- **1737 Edition:** Original copy of Robert St-Louis; facsimile reprint by Kessinger Legacy Reprints (ISBN 9781166203511); and Google Books scan of copy at "Bibliothèque Lausan"

Annex I. Tables of contents of the three editions (translated headings)

Pages	1714	1717
A2-A6	Dedication to Patron (Arenberg)	Dedication to Patron (Arenberg)
B-B4	Preface to the reader	Preface to the reader
..B5..	Chapter titles	Chapter titles
	Foldout page of figures	Foldout page of figures
iii-iv	-	Note (<i>Avertissement</i>)
v-xxiv	-	General construction of clocks/watches
1-16	Chap.1 Different types of clocks/watches	Chap.1 Different types of clocks/watches
17-32	Chap.2 Reasons clocks better than watches	Chap.2 Reasons clocks better than watches
33-37	Chap.3 Natural and artificial division of time	Chap.3 Natural and artificial division of time
38-41	Chap.4 Apparent time and how to find it	Chap.4 Apparent time and how to find it
42-50	Chap.5 Equal time and finding it by stars	Chap.5 Equal time and finding it by stars
51-67	Chap.6 Using apparent and real time	Chap.6 Using apparent and real time
68-76	Chap.7 Choosing pocket watches	Chap.7 Choosing pocket watches
77-90	Chap.8 Judging the quality of a watch	Chap.8 Judging the quality of a watch
91-102	Chap.9 Adjusting the balance spring	Chap.9 Adjusting the watch balance spring
103-114	Chap.10 Care & repair of pocket watches	Chap.10 Care & repair of pocket watches
K-K3	Comments by Leibnitz on Sully's manuscript	Comments by Leibnitz on Sully's manuscript
(1)-(8)		Letter from Kresa to Williamson 9 Jan 1715
(9)-(11)		Sully resp. to Kresa comments on his book
(12)-(26)		Sully resp. to Kresa comments on eqn. table
28-60		Description of watch of new construction
		Two page list of printing errors
	1737	
	Foldout page of figures (re-drawn)	
aij-aiij	Bookseller note to the reader	
aiij-	Preface	
1-26	Chap.1 General construction of clock/watch	
27-45	Chap.2 Different types of clocks/watches	
46-68	Chap.3 Reasons clocks better than watches	
68-75	Chap.4 Natural and artificial division of time	
75-80	Chap.5 Apparent time and how to find it	
81-94	Chap.6 Equal time and finding it by stars	
94-118	Chap.7 Using apparent and real time	
	Equation table	
119-131	Chap.8 Choosing pocket watches	
132-153	Chap.9 Judging the quality of a watch	
153-168	Chap.10 Adjusting the watch balance spring	
168-183	Chap.11 Care & repair of pocket watches	
184-192	Comments by Leibnitz on Sully's manuscript	
193-238	Description of watch of new construction	
239-272	Critical history of different escapements	
	Memoirs on horology by Julien Le Roy of the Society of the Arts	
273-278	Preface (<i>anomaly on page numbers</i>)	
275-292	Historical memoir on Sully's watch (<i>of new construction</i>)	
293-304	Description of new horizontal sun-dial	
304-314	Description of new universal portable sun-dial with compass	
315-318	Comments on construction of sundials (called Butterfield)	
318-322	Memoir on new way to correctly mark the hour on sun-dials	
323-331	New and simpler construction of alarm clock mechanism	
332-350	New and simpler construction of turret clocks	
350-356	Second memoir on turret clocks	
357-370	Third memoir on turret clocks	
370-381	New way to place repeating mechanism in clocks	
381-413	History of horology (and Henry Sully) from 1715 to 1729	
414-433	Memoir by Pierre Gaudron on pendulum clock construction	
	Table of chapters	