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Strasbourg's "First" Astronomical Observatory

André Heck

Strasbourg Astronomical Observatory, France (<http://astro.u-strasbg.fr/~heck>)

Summary

The turret lantern located at the top of Strasbourg Hospital Gate is generally considered as the first astronomical observatory of the city. Such a qualification must however be nuanced. The thesis of this paper is that the idea of a tower-observatory has been brought back by a local erudite, Julius Reichelt (1637-1717), from a trip in Northern Europe around 1666 where he saw the *Rundetårn* (Round Tower) recently completed in Copenhagen. There however, a terrace allowed (and still allows) the full viewing of the sky, and especially of the zenith area where the atmospheric transparency is best. As there is no such terrace in Strasbourg around the Hospital Gate lantern, the zenith there remains unreachable because of the dead angle caused by the turret roof. Reichelt had also visited in Gdańsk Johannes Hevelius who was then developing advanced observational astronomy. Nothing of the kind has been echoed in Strasbourg. According to the motivations recorded in the city archives, the Hospital Gate turret lantern has been built essentially for the prestige of the city and for the notoriety of the university. It has not been retained subsequently by the History of astronomy. As the users of this observing post themselves did not leave any heritage as to the progress of astronomical knowledge, our conclusion is that the top of the Hospital Gate has been used only for rudimentary viewing of bright celestial objects or phenomena, relatively low on the horizon.

Introduction

Strasbourg's Hospital Gate is one of the very few remnants from the old city walls. It houses today a water tank (no more in use) for the adjacent hospital, as well as a small meeting room, a few offices and storage areas for the hospital acquisition and contract services. The tower features at its top a *lanternon* (turret lantern), identified as the first astronomical observatory of the city built in the second half of the 17th century. Local historians and amateur astronomers have been repeating this over and over in all kinds of publications, often quoting each other and without proper historical referencing. We therefore decided to investigate that *lanternon* in the historical context of the time and from the point of view of a professional astronomer, interested in the inventive progress of our science, as opposed to the stand sometimes taken by outside historians more attracted by, say, anecdotal facets of astronomy or by an amateurist perspective. We went back to the original documents in various archive vaults. Those mentioned in this paper are referenced as AVCUS (for the Strasbourg city archives), DK-RA (for the Danish royal archives) and DK-RB (for the Danish royal library), followed by the serial number and/or date of the document.

The historical complex of Strasbourg Hospital Gate, likely built in the first half of the 14th century, has been described by others (see e.g. Waton *et al.* 2000, as well as the references therein). We are interested here only in the inside, higher tower, the only element remaining today. We obtained the authorization to visit the turret several times with the assistance of the hospital security team. It is in a reasonably good shape if we except of layer of pigeon excrements and bodies of a few dead birds. This octagonal turret has a approximate diameter of 265cm, each side offering a rectangular window (twelve squares) of about 75cm × 100cm, with a basis at about 85cm over floor, topped by a half-circular structure in seven glass elements (total height of about 75cm). The roof of the lanternon is an octagonal pyramid with a basis located at about 50cm above the window top (approx. 310cm above floor). From a 1m level at the center

of the octagon¹, this roof induces a dead angle of about 80° around the zenith, reduced by slightly more than half by moving from window to window².

The trap closing the access of rather narrow and steep stairs has now disappeared, but the traces and notches of hinges are still visible. From collected representations (sketches, drawings, photographs), the general aspect of the tower did not change over the centuries. Fig. 1 compares a current view with a 1671 pen-and-ink sketch by Arhardt showing the top of the tower shortly before it be covered with the turret. The structure visible then on the terrace is likely a shelter (watchers? equipment? stairs access?).

Julius Reichelt

Visitors of a recent exhibition set up by the city archives of Strasbourg³ could see quite an interesting document: the obituary⁴ of a local mathematician, Julius Reichelt (1637-1717). This scholar had already called our attention as several sources credited him with the paternity of what was called the first astronomical observatory of the city, located at the top of the Hospital Gate. The main elements of Reichelt's life were provided in the obituary and are available in most local biographical resources. For what is of interest here, let us retain: his birth on 5 January 1637 in Strasbourg; his enrollment as student on 16 October 1644 (*Matricula Scholae Argentoratensis 1621-1721*); his graduation as Doctor of Philosophy on 26 April 1660; his nomination as Professor of Mathematics in 1667⁵; his repeated deanship; and his death in Strasbourg on 19 February 1717 – at the age of eighty, in line with the fact that astronomers and associated scientists have always in general enjoyed a particularly long life (Heck 2008).

Shortly after his graduation, Reichelt lobbied to secure some funding for a study trip in Northern Europe. He attempted to get the academic and city authorities to jointly agree on the financing: the former ones seeing in Reichelt the possible next occupant of a chair of mathematics vacant since the death of Jakob Bartsch (1600-1633) (see *e.g.* AVCUS V44/68); the latter ones evaluating the gain in military expertise (fortifications) the erudite could bring back from such a trip (see *e.g.* AVCUS 1AST426 dated 22 October 1661). Interestingly, on what seems to be a safe conduct (AVCUS V46/53) appear only scientific motivations, possibly to facilitate his passage through the various states crossed.

This duality of approach by scientists for securing some funding has never been exceptional. In the case of Reichelt, it was then appropriate to see whether his trip actually resulted in effective scientific and/or military contributions.

Reichelt's Trip in Northern Europe

Reichelt's obituary is typical of certain times: importance comes from people one had the opportunity to meet (or to listen to). Khun lists a series of high-profile personalities, scientific and military ones, whom Reichelt would have met – an impressive gallery for a recently graduated young man who would have undertaken his first trip abroad. Probably one must see in such an enumeration a stylistic contraction of contacts established (perhaps only claimed or attempted) by Reichelt in the course of his life.

Among others are mentioned the mathematician Jan Hudde (or Huddenius, 1628-1704) from Amsterdam; the astronomer Johannes Hevelius from Gdańsk (see below); the mathematician Andreas Concius (1628-1682) from Königsberg; militaries and specialists in fortifications like Axel Vrop (or Urup,

¹ A reasonable low level for positioning the eye on an astronomical instrument at that time (remember also that people were shorter then).

² The usage of an instrument (quadrant, sextant, optical device) must be forgotten in extreme positions.

³ On the theme "*Les Strasbourgeois et la Mort du Moyen Âge à nos Jours*" (People from Strasbourg and Death, from the Middle Ages till Nowadays), February – June 2009.

⁴ By Johann Kaspar Khun (sometimes spelled Kuhn), Sarrebrück, 1655 – Strasbourg, 1720.

⁵ Berger-Levrault (1892), echoed by several 20th-century sources, mentions 1673, which is incompatible with original documents (*e.g.* AVCUS 1R150 from 12 Aug 1667), confirmed by an anonymous compilation of professors dated 1765 (AVCUS 1AST344/28).

1601-1671), the Hoffmann⁶ brothers, as well as Hendrik Ruse (or Baron Rusenstein, 1637-1679); the cartographer Johannes Meyer (1606-1674); the physician and physicist Rasmus Bartholin (1625-1698) and the Danish astronomer Villum Lange (or Gulielmus Langius, 1624-1682) whom we shall meet again hereafter; the librarian Adam Olearius (1601-1674), attached to the Duchy of Schleswig-Holstein-Gottorp and known for his trips to Persia, and so on.

According to the obituary, the regions visited by Reichelt were Holland, Holstein, Jutland, Denmark and Prussia. Very few documents remain from this trip, but a couple of them can be usefully exploited here. Thus Copenhagen was at the time a city surrounded by walls. Its commandant was keeping a diary of all foreigners entering the town through the four gates. Reichelt was recorded clearing Copenhagen's *toldbod* (customs) on 12 August 1666 together with a few other travellers coming from Gdańsk (Fig. 2).

Copenhagen's *Rundetårn* (Round Tower), built between 1637 and 1642, belongs to the *Trinitatis* complex, designed to provide the students of the time with a church and a university library, together with an astronomical observatory. Used by the University of Copenhagen until 1861, the observatory on top of the Round Tower is the oldest European observatory still operational (nowadays only for non-professional observing). Ole Rømer (1644-1710) has been one of the prestigious users of the Round Tower, but his determination of the speed of light was made during his stay at Paris Observatory between 1672 and 1681.

Reichelt arrived in Copenhagen roughly a quarter of century after the completion of the Round Tower. It was then managed by Villum Lange, assisted by Rasmus Bartholin who was one of Ole Rømer's teachers. Bartholin described the double-refraction phenomenon. He is also known for his observations of the 1665 comet. Fig. 3 juxtaposes a current view of the Round Tower and a representation contemporary of Reichelt's visit in Copenhagen. The observatories located at the top underwent several mutations over the centuries (see for instance Gykdenkerne & Barnes Darnell 1990), but all configurations benefited from the large terrace allowing to observe the whole sky and to accommodate large instruments.

In Copenhagen, Reichelt stayed (at least for some time) with Simon Paulli, the King's physician, as mentioned in letters to Dean Balthasar Scheid⁷ (DK-RB Thott 498-2) in a house since destroyed by fire at 3 Endeløsstraede. Those letters confirm also Reichelt's contact in Gdańsk with Johannes Hevelius (1611-1687).

Excellent observer, Hevelius is seen nowadays as the founder of selenography, but he had many other contributions to the progress of astronomy. Interestingly he *de facto* established standards for the confirmation of discoveries of celestial objects and phenomena. While he preferred non-optical instruments (sextants, etc.) for precise astrometric measurements, Hevelius built refractors for mapping the Moon as well as for other observations. The focal length of those described in his book *Machina Coelestis* (1673) could reach 50m (Fig. 4) and were open to reduce flexing and wind problems. His observatory *Stellaeburgum*, rebuilt several times after destructive fires, was visited by monarchs as well as by famous astronomers (such as Edmund Halley, 1656-1742). Hevelius has been the first Polish member (as of 1661) of the Royal Society. His books include sometimes his correspondence with European astronomers. But no trace of Julius Reichelt ...

Back in Strasbourg

First of all, it should be noted that, as far as Reichelt's teaching is concerned, it could be framed by the following comment from Schang & Livet (1988): "Often, failing an available specialist, the same professor was teaching several matters, even very differing ones. In the 17th century, Reichelt, the author of a treatise of arithmeric in use at the Gymnasium until 1738, gave history courses next to public courses of

⁶ Born in Lubań (Silesia), Gottfried Hoffmann (ca 1631-1687) studied in Leipzig and Strasbourg before entering service for the Danish crown in 1648. He was following an elder brother, Georg who also studied in Leipzig and Strasbourg before entering the royal Danish service in 1643, probably after some experience in fortifying several European cities. He died in 1666. In 1667/68, Reichelt attempted to get Gottfried Hoffmann as military engineer for Strasbourg, but his salarial pretensions were too high (Westerbeek Dahl 1992 and personal comm.; see also AVCUS 4R20 dated 01 May 1668). Strasbourg was counting its pennies as we shall also see hereafter.

⁷ Balthasar Scheid (Strasbourg, 1614-1670) has been Rector in 1655, 1660 and 1670.

mathematics. [...] For the physicist, Aristotle's work was still the starting basis, at least until the 18th century. [...] Geography was not deserving a special teaching: it could be combined with the *mathesis* to which cosmography belong. The teaching of mathematics, in spite of the emphasis given by Dasypodius⁸, was remaining rather elementary, at the level of the four fundamental operators of arithmetic and, as far as geometry was concerned, at the interpretation of Euclid's books. As to cosmography, as we could see from a perusal of school manuals, it was remaining faithful to Ptolemy. Copernicus was suspicious to theologians and Galileo was perspiring heresy." Reichelt's booklet entitled *Elementa Astronomica & Geographica in usum Gymnasii Argentoratensis*⁹ (1688) has a first astronomical part the chapter headers of which are indeed very conservative.

After his return from Northern Europe, Reichelt is seen through the archives as lobbying for establishing a covered observatory on top of one of the city towers. An important document dated from Friday 24 May 1672 (AVCUS 4R24) records deliberations from the city "Small Senate" (*Conseil des XIII*), mentioning a proposal by Reichelt for a *specula astronomica* (astronomical observatory) on one of the towers around St Elizabeth Gate "for the love of studying mathematics", attracting students (with a repeated emphasis on the pennies coming with them), and contributing to the notoriety of the university. Various members of the senate support the proposal, but Stettmeister Bernhold¹⁰ – who apparently burnt his fingers over budgetary excesses related to the edification of the *theatro anatomico* (anatomy amphitheatre) – insists on a limited funding that will be binding.

A fortnight later, on 10 June 1672, the matter goes to the *Conseil des XXI*, the main city council (AVCUS 1R155). The reputation of the city and of the university are the only arguments acted. One insists on a quick decision. The setting of the following episode is another session of the *Conseil des XXI* (AVCUS 1R155), on 1 July 1672. After having considered other towers (Goltersturm, Saint-Elizabeth Gate, both Pulverturm, a tower near the St-Étienne bridge, ...), it is finally decided that the top of the inner tower of the Hospital Gate complex suits best the intended roofing. But the estimated costs are too high. Arguments are exchanged. The considered facilities are scaled down and the *Verordnete Herren* release only 300 Guilders. "Come to terms with the contractors, Dear Professor." This ditty is a familiar one, and obviously already sung at that time. The renown of the city and the reputation of the university will be safe since they will have an observatory. But it will have no terrace and it will be what it is. At no moment, the scientific interest of the observatory has been raised, nor what could be done there, neither what could be its instrumental endowment.

Later on, nothing seems to have been acted about this observatory, except here and there a maintenance indication in the *Bauherren* registers. A list (dated 1719?) of mathematical instruments and machines constituting Reichelt's legacy (AVCUS 1AST334/12) does not include any advanced modern optical instrument. A few decades later, one of Reichelt's successors, Jean-Jérémie Brackenhoffer (1723-1784), produces quite a negative review of the equipment of the observatory including then "a 16-foot focal-length astronomical refractor" virtually useless according to his description (AVCUS AA2647¹¹).

In hindsight, a scientific facility can be valued from its contributions to the progress of knowledge, which can be at its best level only if the users of the facility can take advantage of an *ad hoc* instrumentation. For Strasbourg's *specula astronomica*, the emphasis put on the prestige of city and on the renown of the university, as well as economic considerations, have conditioned an option *a minima*. This observing post did not take part to the spectacular developments of European astronomy of the time and could not position itself for the subsequent phases, as much spectacular.

This is confirmed by the absence of the Hospital Gate in the compilations of astronomical contributions and advances by the reference works of the time. In his books, Lalande seems to rectify an oversight with a brief mention in his Volume 4 (1781): "Strasbourg – M. Brackenhoffer, able professor of mathematics,

⁸ Conrad Dasypodius (1531-1601), mathematician remembered mainly for his design of Strasbourg's famous astronomical clock.

⁹ 57 pages (out of the 142 pages of a 13cm × 21 cm manual).

¹⁰ Philipp Albrecht von Bernhold (or Bernold, Strasbourg 1631-1677) has been several times *Stettmeister*, i.e. the main city magistrate.

¹¹ Document dated from 1773, today unavailable from the archives. A transcription can however be found in Lacroute (1959).

has there an observatory & instruments". For pleasant it seems to be, that mentions is little factual, does not speak of any constructive observations and gives no details on an operational instrumentation.

Conclusions (or the missed opportunities)

After having reviewed, in various archive centers, tens of documents related to Julius Reichelt, it remains difficult to figure out the exact personality of that gentleman who had been an obviously gifted student. The evolution of astronomy and of the instrumentation of his time seem however to have flown well over his head. No significant advance nor inventive initiative in the scientific and military realms seems to be credited to him. He indulged himself in a traditional teaching, not echoing the progress he could witness or hear of. If his aspirations for the lantern turret of the Hospital Gate were frustrated by economic considerations, his argumentation, as acted, seems to be motivated by no scientific interest.

Through its history and its genesis, the top of the Hospital Gate can be considered as a position where astronomical observations have been conducted by local erudites in charge of elementary astronomy teaching¹², and this until the beginning of the 19th century when such activities were transferred onto the attic of the "Academy" building (an "observatory" of which virtually nothing is known). There is however no indication that the top of the Hospital Gate has been the first position for astronomical observing in the city, nor the only one of its time used for that purpose.

The edification of the turret lantern is undoubtedly due to Julius Reichelt following his proposal to the local authorities after his return from Northern Europe. We have seen which inspiration Reichelt could take from the *Rundetårn* (Round Tower) completed a few years before his stay in Copenhagen. On the basis of financial considerations, the Strasbourg magistrates opted for a configuration *a minima*, depriving the installation of a terrace that would have enabled the observation of the whole sky, including the zenith area where the atmospheric transparency is best. The reduced space within the turret and the parcelling of windows were certainly redhibitory for observing extensively a rotating sky, not to forget the limitation of the instrumentation that could be used, far from the telescopes under development that Reichelt has certainly seen or heard of in Gdańsk, for instance. In the numerous archived documents we could peruse, we found no indication that Reichelt ever advocated advanced optical instruments, remaining in line with his traditional teaching.

The History of astronomy in those centuries does not mention anything else for Strasbourg than records of celestial phenomena visible from all (comets, etc.). Strasbourg has not been retained as an astronomical location in reviews of a time when decisive observational advances were taken place in other European cities. Our conclusion is that the top of the Hospital Gate could be used only for rudimentary locating of bright celestial objects or phenomena, relatively low on the horizon. Opportunities were then missed to get an observational astronomy worth its name to blossom in Strasbourg. This will only take place at the end of the 19th century with the edification of the current Wilhelminian observatory (Heck 2005).

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¹² There has been no actual *astronomer* associated with Strasbourg universities before the creation of the current Wilhelminian Observatory at the end of the 19th century (Heck 2005).

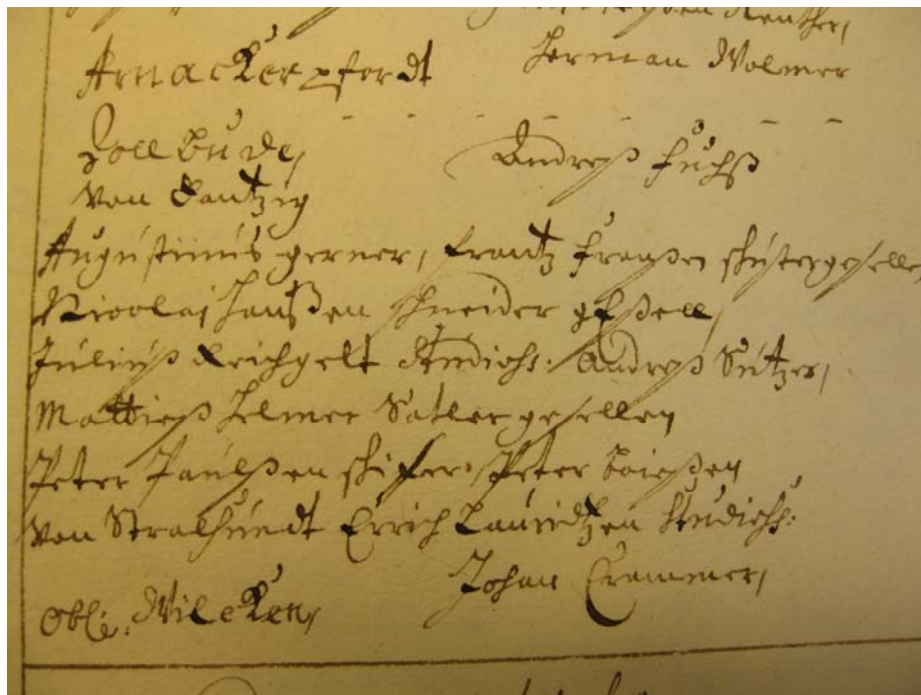
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Illustrations



1. The top of Strasbourg Hospital Gate before its covering by the turret lantern (1671 pen-and-ink sketch by Joh. Jacob Arhardt) and nowadays (© *Cabinet des Estampes*, reproduced with permission, & A. Heck).
The structure visible on the ancient terrace is likely a shelter.



2. Excerpt from Copenhagen's customs register recording the arrival of Julius Reichelt on 12 Aug 1666 coming from Gdańsk (Forsvarets Arkiver, Garnisonsprotokol 1666, p. 642 – © Rigsarkivet, reproduced with permission).



3. The *Rundetårn* (Round Tower) of Copenhagen at the time of Rasmus Bartholin and of Julius Reichelt's visit (1666), and nowadays (© Rigsarkivet, reproduced with permission, & A. Heck). The whole sky can be viewed from the large terrace that can also accommodate large-size instrumentation.



4. Example of the instruments developed by Johannes Hevelius in Gdansk at the time of Julius Reichelt's visit and reproduced in his book *Machina Coelestis* (public domain). Here too the large terraces allowed the observation of the whole sky and the accommodation of large-size instrumentation.

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