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**Behind the Façade:
Elias Holl and the Italian Influence
on Building Techniques in Augsburg**

Simona Valeriani

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Department of Economic History
London School of Economics

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Series Editor:

Dr. Jon Adams
Department of Economic History
London School of Economics
Houghton Street
London, WC2A 2AE

Tel: +44 (0) 20 7955 6727
Fax: +44 (0) 20 7955 7730

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Introduction

The question of how Italian Renaissance architecture was taken up in other European countries has been the subject of numerous studies. One interesting example is the building activity in south Germany at the beginning of the 17th century. Major cities like Stuttgart and Augsburg implemented plans for the renewal of significant public buildings in the new style. Figures like Heinrich Schickhardt and Elias Holl have been considered as representative of the spirit of the time, one of the key elements being their familiarity – to different degrees – with Italian architecture and Italy itself. This paper addresses the topic from a point of view so far mostly neglected: which elements are to be found *behind* the façade (in the less eye-catching, more functional parts of the building) that can be traced back to the Italian building practice? Looking from this perspective can help to better understand the way in which the master builders and architects experienced, perceived, and understood Italian architecture. Moreover, asking how far and under which conditions these techniques could be transferred in an environment characterized by different building traditions will deliver some clues about the interplay between the direct experience of the building process and the knowledge acquired through written sources.

The case

In 1607 the city of Augsburg asked Joseph Heintz to produce a design for a new building to be built on the Perlach Platz on the spot where the old *Metzg* was standing. This was going to host public ceremonies for which the medieval town hall seemed to have become

inappropriate.¹ At that point in time, the idea was to modernise the medieval town hall and build a new façade, leaving there all the offices and administration. To this end, in 1609 Elias Holl – surveyor of the city works – measured the medieval ensemble and drew a project for its modernisation.

The present paper will analyse particularly what appears to be the *second* design for the proposed representative building, the so called “Italian loggia.” The latter was never actually built, as the council decided to entirely replace the old building with a new one where all the functions could find appropriate spaces under the same roof. Nevertheless, we have a clear idea of what was proposed thanks to quite detailed contemporary three-dimensional wooden maquettes. The first of these was produced in 1607 by the joiner Georg Gabler, probably following a design by Joseph Heintz. In 1609, a new maquette was built, possibly again following a design by Heintz.² This second maquette has less detailed decorative elements but presents more technical particulars: both the roof structure and the structure for the ceiling are worked out in full detail [fig. 1]. The paternity of the design, at least of these parts of the building, has been established with certainty thanks to a pair of drawings signed and dated by Elias Holl in 1607, now held in the Herzog Anton Ulrich Museum in Braunschweig [figs. 2 and 3].³

¹ The history of the designs for the loggia has been discussed for a long time. A good synthesis of the debate can be found in Baer, Wolfram/ Kruft, Hanno-Walter/ Roeck, Bernd, 1985 p. 328-330, although Lepik erroneously relates Holl’s roof design to the first model.

² The literature has been discussing the authorship of these projects extensively in the last decades. A summary of the different positions can be found in Baer, Wolfram / Kruft, Hanno-Walter/ Roeck, Bernd, pp. 328-330. For a detailed description of the different arguments about the authorship of important buildings in Augsburg in Holl’s time see Roeck 1983 and Roeck 1985.

³The drawings were dispersed until the beginning of the 20th century. They were first published in 1922 (Steinacker 1922).

Beyond the façade: what technical solutions lie behind the Italian elements in the “Loggia” design?

After having served in his father's building company, Elias Holl achieved his master qualification in 1596. He was 23 years of age. Following this, he worked for the rich Augsburg merchant Anton Grab – who, in 1600, invited him to join his party heading to Venice. They set off from Augsburg on November 18, 1600 and returned January 31, 1601. Contrary to what happened with several master builders and architects at the time,⁴ Holl most probably didn't use the opportunity for visiting interesting architectural sites that would have been on his route, such as Vicenza or Padua. Instead, according to his autobiography, he spent most of his time in Venice. The experience gained on the journey was expressly the key point made by the council when – shortly after his return – it offered him the job of surveyor of the city works (*Werkmeister der Stadt Augsburg*).

The question of if and how Holl's work was influenced by his experience abroad has been the subject of many studies. In a very interesting paper, published in the catalogue of the Exhibition “Elias Holl und das Augsburger Rathaus,” Leonello Puppi addresses specifically the topic “Holl and Italy.” He argues that Holl “was more interested in the implementation of the form canon of classical antiquity than in adopting in their entirety those rules and principles that capture the reality of the building in its inner structure. They are style elements that stay on the surface and don't capture the reality of the whole building.”⁵ At the same time, he rightly underlines that the experience of seeing the Venician *protomagistri* at work, mastering traditional building practices,

⁴ On the travel routes German architects in Italy at the time see Jokanski 1993.

⁵ “Der deutsche Baumeister ... eher bedacht war, den äußeren Formenkanon der antiken Klassik umzusetzen als diejenigen regeln und Richtlinien in ihrer Ganzheit sich zu Eigen zu machen, die die Realität des Bauwerks in seiner inneren Struktur erfassen. Es sind Stilelemente, die er an der Oberfläche bleiben und nicht die umfassende Realität des Gesamtbauwerks erfassen.” Puppi 1985, p. 31

was surely invaluable to Holl.⁶ This seems to be a missing perspective in the debate about Holl's "Italianism." It is in fact quite remarkable that the critics so far concentrated on finding sources exclusively for Holl's façade designs tracing them back to (amongst others) Palladio, Serlio, Bramante, and Sansovino.⁷ But in the case of his structural designs, the idea that he took hints from Italian building practices was not considered at all.

As an example, we can consider an article by Bernd Vollmar entirely dedicated to the description and analysis of the design for the roof of the so called "loggia."⁸ It describes the maquette and the related drawings and notices an unusual "double" floor structure and "anomalies" at different places in the roof structure compared with the techniques common in Augsburg at the time. It therefore concludes that the drawings are not to be understood as working drawings for the carpenter, but only as designs for the maquette – because they appear "realistic but not in the technical details."⁹ The present paper looks in more detail at this question, and suggests that the drawings were intended for the real "Italian" carpentry so as to be coherent with the proposed "Italian loggia."

Analysing the drawings and the maquette, and keeping in mind the Italian carpentry of the time, we notice striking similarities both in the general form adopted and in the details of the joints used. The usual roof structure we would expect in a building of the early 17th century in Augsburg and South Germany would be a so called "liegender Stuhl" (truss with truncated principals) like the one designed by Holl for the town hall [fig. 4] or for the *Gieshaus*.¹⁰ The carpentry of the loggia –a

⁶ Puppi 1985, p. 35.

⁷ See for example Krufft 1985, Albrecht 1937-38 and Heilbronner 1938.

⁸ Vollmar 1985.

⁹ Vollmar 1985, p. 71.

¹⁰ As opposed to what can be said about the carpentry design for the Italian loggia, the roof of the *Gieshaus* is to be seen as largely in line with the Augsburger building practice of the time, the analogy between the two proposed by Pfister (Pfister 1937/38) and not contradicted by

sort of queen post truss – was not common in South Germany at the time but is the kind of structure that had been used in the Italian peninsula since the late Middle Ages (or even late antiquity).¹¹ The unusual technical details shown in the drawings and the maquette are also in line with the Italian carpentry tradition: the use of metal elements (straps and nails) and of tenon and mortice joints instead of the “German” half joints. It has been argued that the latter details hinted that the drawings referred only to the maquette and not to a real structure. But even if we wanted to maintain this explanation for the locally unusual solution we still couldn’t account for the metal elements. While these have been a characterising feature of roof and ceiling structures in Italy since Roman times, the German carpentry of the middle ages and early modern period didn’t make use of metal elements that were seen as a threat to the durability of the timber. If we look this up in the standard German carpentry treatise of the time, Wilhelm’s *Architectura Civilis*, we indeed find two structures with screws, metal straps, and nails – but the accompanying text makes it clear that this is considered to be bad practice:

Die 5. und 6. Figur sind ein Muster eines Dachstuhls/
so zu schlechten Gebäuden gebraucht mag werden/
welcher zugleich mit seinen Hängewerken und
Häng=säulen/ auch eisernen Schlüssen und Nägeln
gefasst ist.¹²

Wilhelm was surveyor in Frankfurt and although carpentry tends to build up very local traditions, the above does reflect a generalised opinion that his colleague Elias Holl would have been aware of. In fact, we have clear evidence showing that Holl was knowledgeable in technical matters and in carpentry to the point that he could directly instruct the

Vollmar (Vollmar 1985, p. 68) needs critical revision. Compare also the still existing roof of the Reichstaedt. Kaufhaus, Augsburg, depicted in Vollmar 1985, fig. 1.

¹¹ Valeriani 2006, p. 121-126, and Valeriani in print.

¹² Wilhelm 1668, commentary to fig. 5 and 6. Mortice and tenon joints are featured in Wilhelm’s work but only occasionally and always in conjunction with wooden pins.

carpenters. In the case of complicated or unusual structures he provided them with the drawings, as clearly stated in his memoirs: “Habe auch das Dachzimmer am Werkhof mit eigener Hand angerissen und geordnet, dann die Zimmerleut konnten nicht wohl mit diesem Circul umgehen”.¹³ He normally didn’t use metal elements in his wooden structures, and the decision to go against the “rules” (also in terms of the kind of structure and of joints) seems to have been an intentional one aimed at imitating or “quoting” the Italian building practice. We can be even more precise: for while it is the case that Italian historic carpentry (in general) uses queen and king post trusses, we do find regional differences. Rome and the neighbouring regions tend, for example, to build quite elastic structures where the vertical elements (posts) are not touching the horizontal ones (tie beams and collars), but connect to them only through metal straps. In contrast, the East and North East of the country tend to have stiffer structures where vertical and horizontal elements are connected with tenon and mortice joints. Moreover we do find in these areas structures with composite rafters, interrupted by the posts [figs. 5 & 6] very similar to the trusses shown in the maquette. The latter differs from the drawings in this detail as it has “simple” rafters not doubled in the lower part of the structure. It is difficult to say if this was a simplification due to the difficulties of building the maquette (that is very accurate also in tiny details) or a different version of the design more in line with the Venetian models. In both cases this is clearly the carpentry tradition Holl was thinking of when designing his roof for the loggia.

The comparison between Holl’s design and those characterising buildings he is likely to have been made familiar with during his stay in Venice is revealing. The most prominent example is the roof of the Ducal Palace. In 1577, a fire had badly damaged the construction,

¹³Meyer 1910, p. 71. See also the statement in his self biography (Meyer 1910, p. 63), where Holl clearly describes the carpenters building following his designs.

leaving the council with the question whether to rebuild or to repair, and in this latter case how to go about it. Famously, to solve the problem, a series of international experts – among them Andrea Palladio – were invited to express their opinion. By 1580, the council was able to meet again in the restored palace. The new roof (spanning over 24 m [fig. 5]) was produced using largely well established technical solutions (documented from at least the 13th century) but a further improvement of the assembly technology, especially of the elements in traction, and a particular accuracy in the execution, can be noticed. This general trend, which one can observe in the structures realized in Venice in the late 16th and the 17th centuries, resulted in the possibility of covering larger spans such as the one of the *Sala del Maggior Consiglio* in the Ducal Palace.¹⁴ When Holl visited Venice this was surely an engineering achievement that was still being discussed in architectural and building circles. Of course, historians have often considered the Ducal Palace to be the model for many European city halls of the 17th century, and in particular for the one in Augsburg, but only in terms of general design and decoration – not for the building techniques (which is the case being made here).¹⁵

A second prominent example that Holl was connected to in his visit was the *Fondaco dei Tedeschi*, the headquarters of the German merchants in Venice, where Holl was hosted during his stay. This building was at that point relatively new and most probably the result of a cooperation between a German master builder named Gerolamo Tedesco and two local colleagues appointed by the city: Giorgio Spavento, *proto* of the procurators of San Marco, and Scarpagnino, *proto alle fabriche de Rialto*.¹⁶ The roof structure [fig. 6] presents strong

¹⁴ See also the Church S. Lorenzo a Castello (almost 32 m). Piana 1989, p. 636.

¹⁵ Michalski 1997; Bushart 1993.

¹⁶ Antonio di Pietro Abbondi detto lo Scarpagnino (Milan 1465/70 - Venice 1549).

similarities with the designs later proposed by Holl for the Augsburger Loggia.¹⁷

These are only two examples, but we can assume that Holl was interested in and had opportunities to visit building sites active at the time in Venice and become familiar with the local building practices.

Surely the structure designed by Holl also presents “German” aspects and is no mere copy of the Italian examples. This is particularly evident in the longitudinal view [fig. 3]. Because of the very different covering systems used in the two regions (the Italian one being very complex, stiff, and heavy), in the German case there is a greater need for longitudinal elements to help stiffen the roof structure in the whole. Note, for example, the Andrew’s crosses and the longitudinal elements marked A and D in figures 2 & 3: we would not expect to see these in an Italian structure. The doubling of the collar beam, and the use of a second pair of oblique elements in the upper part of the structure, are to be seen as Holl’s additions as well, and surely relate to his apprehension about the solidity of the structure and its ability to carry significant loads.¹⁸

Both the drawings and the maquette present another noteworthy structure: the one supporting the ceiling. Neither the surviving German buildings nor contemporary German written sources present anything similar. On the contrary, this kind of structure is in line with the preoccupations expressed in most Italian writings of the time (both manuscript and printed) about the so called “travi armate” (specially shaped beams or proto-reticular structures intended for carrying great loads or covering large spans).¹⁹ Moreover, similar shaped mechanisms were very common in Italian roofs where a ceiling needed to be

¹⁷ On the importance of the *Fondaco* for the German artists visiting Venice in the Renaissance see the section “Deutsche Künstler in Venedig und der Fondaco dei Tedeschi” in Roeck/ Bergoldt/ Martin 1993, p. 21-52.

¹⁸ In this case his preoccupation doesn’t seem to be justified as the roof was not intended to carry particular loads and also the span is not unusual. The addition of these elements was therefore unnecessary and reflects the unease in handling an unusual structure.

¹⁹ See Valeriani 2005, p. 899-900 and bibliography therein.

supported from above, as with wooden vaults in churches. This kind of structure was used alongside the trusses as a separate system, the latter making up the roof and carrying its covering, the former taking up the load from the ceiling [fig. 7].²⁰ While the trusses proposed by Holl for the roof of the Italian loggia were never built, the ceiling structure was adopted in the new town hall [fig. 4]. Here it's used for solving a problem the German building tradition was unfamiliar with: the construction of a roof terrace. In fact, the span is not particularly wide and wouldn't call for a "special" solution. The version of the ceiling structure adopted in the new town hall is slightly different from the one in the Braunschweig drawings (it doesn't use posts) and seems to represent the only realised structural element deriving from Holl's Italian experience.

We can say – as an answer to the question "What lies behind the façade?" – that the structural designs by Holl for the so-called Italian Loggia present solutions (both for the roof and for the ceiling) deriving from the Italian building tradition. These were adapted by Holl to the local conditions. Particularly in the case of the roof, he took account of the different covering systems and the need to insert longitudinal stiffening elements. Moreover, the designs reflect Holl's insecurity with an unfamiliar structure, that he therefore oversizes. In the end, the only "Italian" structure that was really built was the ceiling structure, to be seen – with small differences – both in the Loggia and in the new town hall.

Between direct experience and written sources

It has been already noted in the literature that Holl's relatively short stay in Venice can hardly have enabled the German master builder to learn all that he seems to have known about the new architectural trends. It has therefore been suggested that, despite the fact that he is not known to have had an extensive library, we must

²⁰ Similar proto-reticular structures were also to be seen in bridge designs.

assume that he had access to relevant publications. While it is reasonable to think that his first hand experience of Venetian technical solutions could have been sufficient to enable Holl to design a roof in the “*welsche manier*” (Italian fashion), it is still worth following up the bibliographical trail.

At the turn to the 17th century, Augsburg was extraordinary rich in private libraries put together by influential members of the city elite, while the city itself had an extensive collection. The passion for books that characterised, for example, the Welser family – who famously ran a publishing business – is well known, and we can assume that Holl had access to these sources. That he had a good relationship to the Welsers is documented (amongst other things) by the fact that Matthäus Welser – *Baumeister*²¹ between 1584 and 1614 – was responsible for recommending him as the new *Stadtwerkmeister* (surveyor) in 1602.

What kind of books – relevant for our topic – were available in these collections? In his famous library, Konrad Peutinger had for example at least two Vitruv editions,²² and a copy of Alberti’s *De re aedificatoria* – both annotated by him.²³ Paulus Welser had 947 volumes in 1614 when he became bankrupt; amongst them a Vitruv edition later bought by the city. His brother Anton even had two Vitruv editions (1521-1522 and 1567), together with the treatises by Palladio, Lo Mazzo (1584) and De l’Orme (1568).²⁴ More importantly for the problem of possible sources for Holl’s carpentry designs, Paulus’ library also featured the 1600 edition of Serlio’s work.²⁵ This includes the

²¹ Head of the city council’s building commission, see Völkel 1985, p. 127 and Lieb 1955 p. 230. This office was held by three members of the city elite that (despite what the name suggests) were responsible for all the economic matters of the city and therefore also for the building activities. They were the *Werkmeister*’s direct superiors and had to report to the “small council” (*Kleiner Rat*), see Roeck 1985, p. 39.

²² One was the edition by Giovanni Giocondo (Venice, 1511), the other is not described in detail in the historic catalogue of Peutinger’s books (see Künast/ Zaeh 2003: 292, 395.2, 584.1).

²³ Künast/ Zaeh 2003, p. 344, 373.1.

²⁴ “*Catalogus Bibliothecae Antoni Velieri*”, Augsburg 1619, p. 141, 237, 264 f., 260, 271 f., 275-79, 308, 310), as in Völkel 1985, p. 128.

²⁵ Serlio 1600.

otherwise less common seventh book in which, amongst other things, designs for trusses are shown and explained [fig. 8]. The analogies between Holl's design for the Italian Loggia and the drawings in *I sette libri dell'architettura* are striking.²⁶

Serlio's seventh book was also among the possessions of the Fugger family, who had considerable interest in Serlio's writings and dealt at different points in time with a manuscript of his 8th book, the drawings for his 6th book, and an edition of his 7th book.²⁷ At least two copies of this source were therefore available to our *Werkmeister* in Augsburg.²⁸

It has been suggested that Serlio's seventh book could have been an inspiration for Holl in another matter as well.²⁹ In his note to the readers, Serlio announces that he will be dealing with the problem of the "ristoramenti di cose vecchie" (restoration of old buildings) and particularly will demonstrate how to restore an untidy façade to unity: "Dimostrero alcune vie da riformare la faccia d'una casa disordinata, & a ridurla a corrispondenza e a parità."³⁰ Holl was facing a similar problem when dealing with the modernisation of the medieval town hall. Nevertheless, it needs to be underlined that no direct and specific correspondence between the Augsburger project and the book seven can be seen. Holl's design even fails to comply with two of the major points made by Serlio: the importance of having a central entrance and the opportunity of straightening the façade³¹

²⁶ The serlian influence on Holl's work (from a stylistic point of view) has been underlined by Puppi: „Tatsache ist, dass Elemente der Architektonischen Formsprache Serlios in Holls Werken gerade nach seiner Rückkehr aus Venedig in Erscheinung treten und dort einen festen Bestandteil bilden; ja, dass auch die vagen Reminiszenzen an in Venedig Gesehenes..., die wir seit 1602 in den Werken des Baumeisters aufspüren können, den Filter der Bücher Serlios passiert zu haben scheinen“. Puppi 1985, p. 31.

²⁷ Puppi 1985, p. 31, see also M. N. Rosenfeld 1978, p. 26-28.

²⁸ On the possibility that Holl knew Serlio's work see Puppi 1985, p. 31. Also Krufft (Krufft 1985, p. 22), for example, assumes that Holl knew Serlio's book VII.

²⁹ Forssman 1985, p. 18.

³⁰ Serlio 1575, p.1 ("A gli lettori").

³¹ Serlio 1575, p. 170.

Another link between Serlio and Holl is given by Holl's writings on geometry and measurement (*Geometrie und Messbuch*), a text he never completed but seemingly intended to be a handbook containing useful professional advice for his children and progeny.³² It is not clear if the original intention was to write just on geometry or if he was planning to compile a proper treatise on architecture, of which this would have been the beginning. In line with the Vitruvian tradition, it was customary to start architectural treatises with a book on geometry, and indeed, analogies between the structure and some random details of Holl's text and Serlio's first book have been noticed.³³ Others have argued that the sources for Holl's *Geometrie und Messbuch* can be found in Walter Hermann Ryff's *Architectur* (Nuremberg, 1547) and Albrecht Durer's *Underweysung der Messung* (Nuremberg, 1525).³⁴ At least Durer's and Serlio's work were available to Holl through different libraries in Augsburg.³⁵

The above analysis of the architectural books available to Holl in Augsburg shows that he could have accessed several relevant publications, particularly through the private libraries.³⁶ So it can be stated that alongside the firsthand experience of Venetian building practices, Holl's design process of his "Italian" structures would also have been supported by written sources – notably Serlio's seventh

³² See Kruff 1985, p. 2.

³³ Dirr 1903, p. 50, see also Kruff / Lepik 1985.

³⁴ Kruff / Lepik 1985.

³⁵ Durer was to be found in the Stadtsbibliothek (see Ehinger 1633, col. 687) as well as in Peutingen's Library (see Künast / Zaeh, 584.2). For Serlio's seventh book see above Paulus Welser's library.

³⁶ The holdings of Augsburg's civic library were less architectural. They included two editions of Vitruv's work: Strassbourg 1543 and Venice 1567, edited by Daniele Barbaro (Ehinger 1633, column 807 and 407). Interestingly one of them is listed under "books on Mathematics" and the other one under "Philological books". The other architectural texts are a couple of books on fortifications: "LXXXVI. Alberti *Dureri opera Teutsch* (?), 1604 *Arnheim*." „Etliche unterricht zur Besfestigung der Staett/ Scoesser ...", *Arnheim*, 1603." (Ehinger 1633, column 687), and "Fuenff Buecher von festung bawen" by Theodori de Bry, Frankfurt 1607 (Ehinger 1633, column 686, LXXXII). More over following books, previously belonging to the Welser, are listed: Vasari's *Lives* (Ehinger 1663, column 883 and 884); Lomazzo's *Trattato dell'arte e della pittura*, from 1585, (Ehinger 1663, column 890) and Rusconi's *Architettura* from 1590 (Ehinger 1663, column 923). Geometry was instead very well represented. An in-depth analysis of the volumes available and the possible link with Holl would take us too far in this context.

book, which was available in Augsburg. The latter had already been mentioned in the literature – not always conclusively – as a possible inspiration for the Augsburger meister in the context of the restoration of the medieval town hall and as a source for his writings on geometry. Even in this case however, the literature has not taken account of the technical aspects behind the façade.

Conclusions

It seems reasonable that Holl used the opportunity given by his journey to Venice not only to study the proportions, the architectural designs and decorative principles of the local architecture but that he also followed his technical interests and gained an insight in local building practices. When asked to build an Italian loggia he not only adopted the appropriate architectural vocabulary,³⁷ but designed and tried to build something that was Italian “under the skin” as well. In this sense Puppi’s judgement (quoted at length earlier in this paper) needs to be revised. The project for the roof of the Italian loggia shows Holl’s technical erudition and his ability to “capture the reality of the building in its inner structure.” He didn’t copy one-to-one what he had seen, but used it in the light of his locally grounded experience, ending up with an Italian roof with a German accent. The antithesis often presented in the literature describing Holl either as a practitioner solving “only” technical problems or as an artist doing valuable cultural work, is therefore misleading.

We can conclude that “facts” about building techniques are travelling through Elias Holl from Italy to Augsburg. The vehicle of the travelling in this case is the architect-craftsman looking at the objects and practices in the place of origin. Moreover, the firsthand knowledge is probably strengthened by written sources that were available to him,

³⁷ The question about his inputs in the facade design, most probably mainly a work by Heintz, is still open.

such as Serlio's seventh book. Surely Holl's distinctive interest in the technical problems related to architecture facilitated the spread of facts about building techniques that are often not transmitted as easily as other, more decorative, architectural features.

In the process of travelling, these "facts" are slightly transformed and adapted to the local building tradition. This seems to be dependent not so much on the skills and expectations of the workmen – in this case the carpenters – but more on the judgement of Holl himself. His roof design undoubtedly imitates the Italian structures but also incorporates what we could call "elements of cautiousness" that would allow the German master to feel confident about the reliability of the structure. We could therefore argue that the technical facts are travelling quite well, being still recognisable but also fitting well in the new environment. Nevertheless, it must be underlined that the "transplanted techniques" are not fecund. They are used only as an episode, as a "quote" in the case of the construction of an explicitly Italian building (the so called "Italian loggia") or to solve a specific and unique problem related to "Italian" features (the roof terraces) of the new Town Hall.

Figures and Illustrations

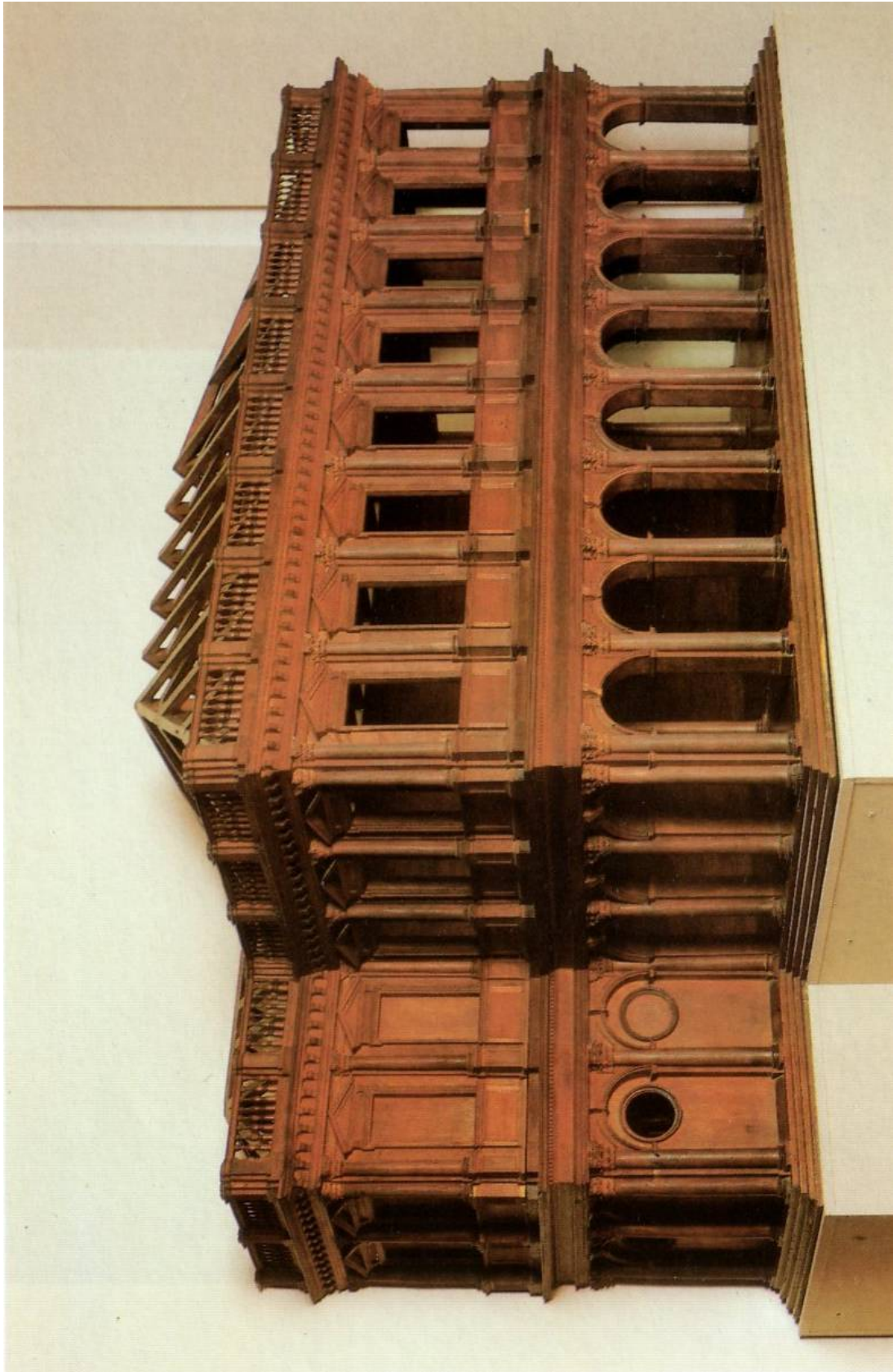


Fig. 1: Maquette of the so-called “Italian Loggia,” 1609. (Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p. 207.)

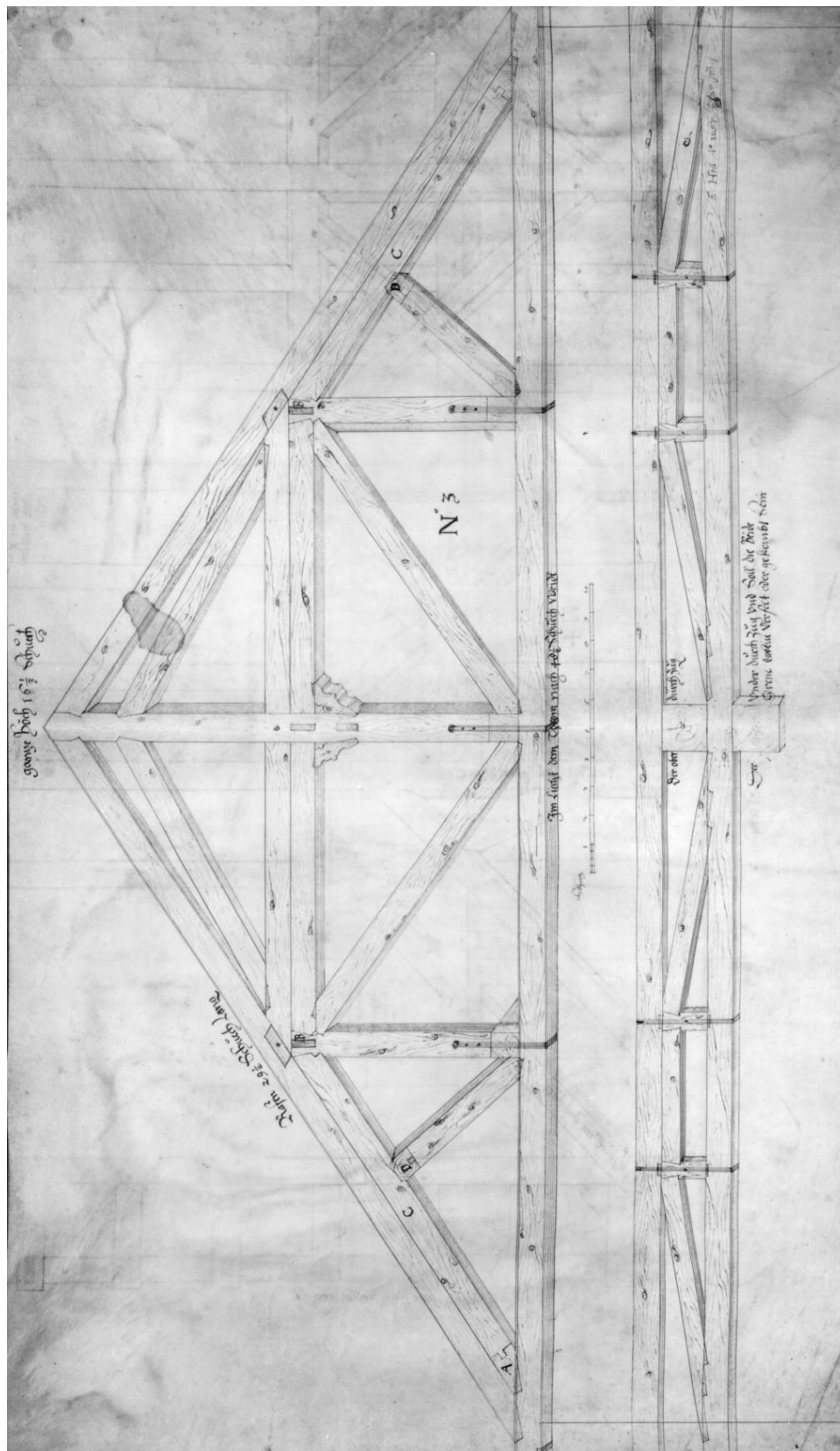


Fig. 2: Design for the roof and ceiling structure of the so-called “Italian Loggia,” cross section (Elias Holl, 1607; Herzog Anton Ulrich-Museum, Braunschweig, Inv. Nr. 138VS).

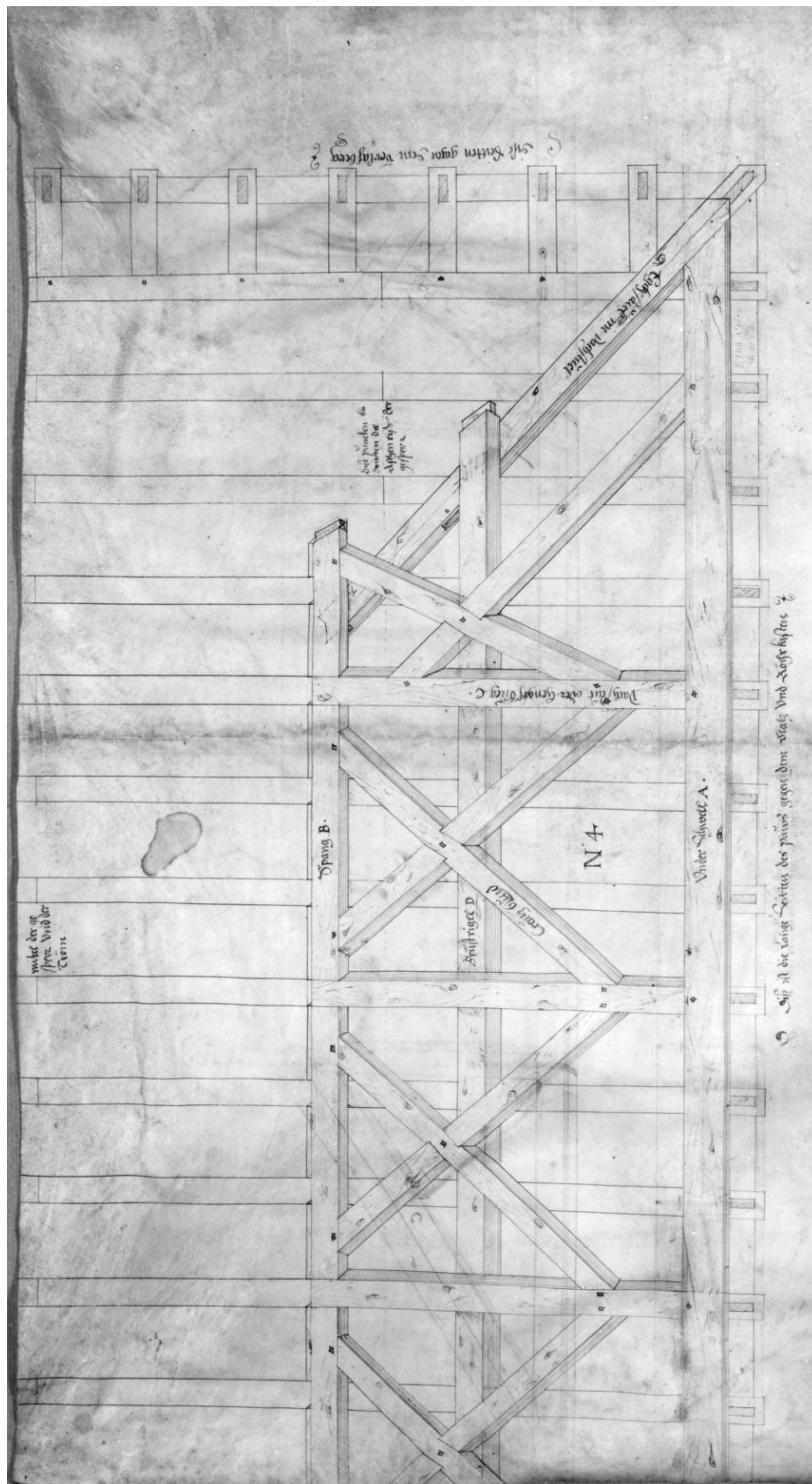


Fig. 3: Design for the roof structure of the so-called “Italian Loggia,” longitudinal view (Elias Holl, 1607; Herzog Anton Ulrich-Museum, Braunschweig, Inv. Nr. 138RS).

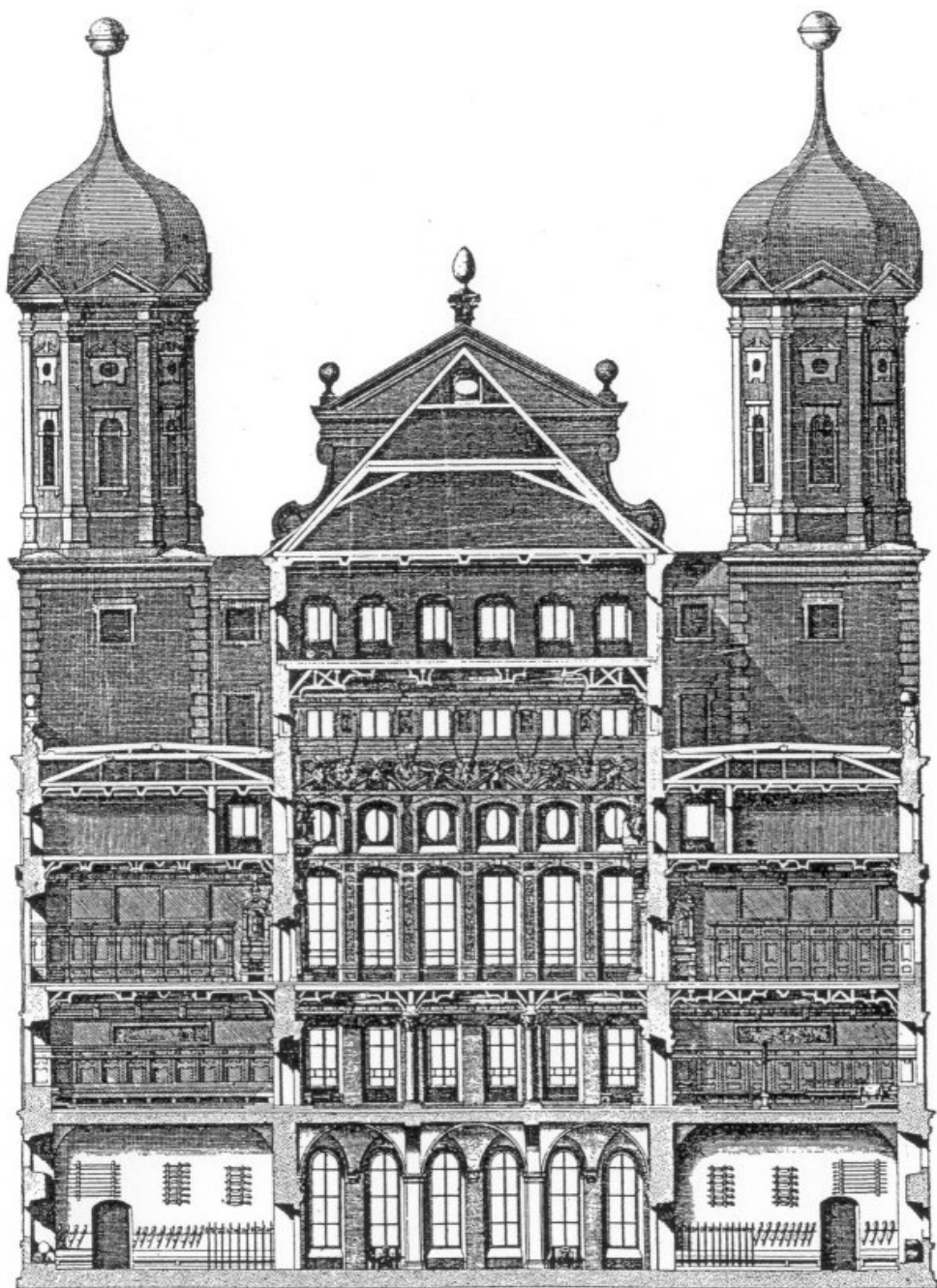


Fig. 4: Augsburg Town Hall: cross section with roof and ceiling structure (after the engraving by Salomon Kleiner, 1733; Baum 1908, Tav. VIII, Fig. 11, Detail).

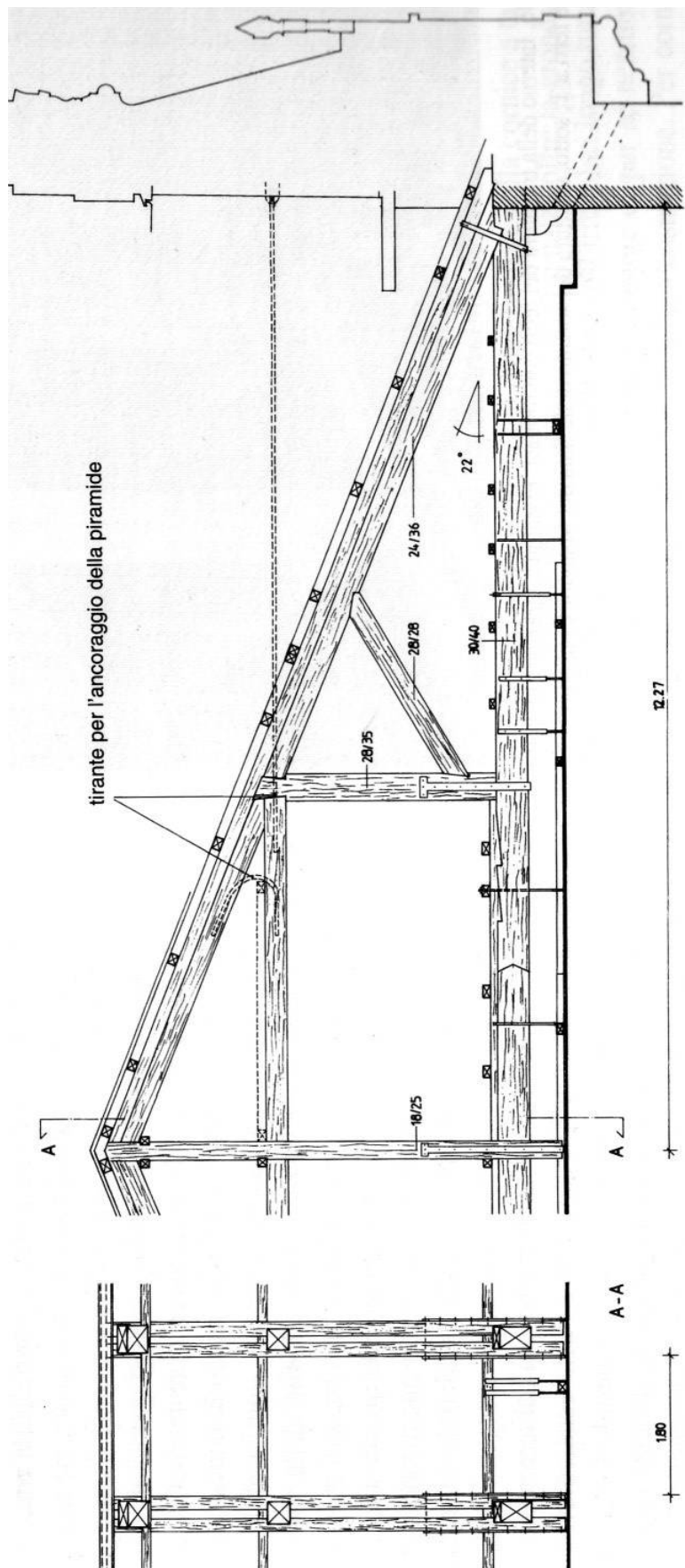


Fig. 5: Venice, Ducal Palace: Detail of the roof structure. (Schuller 2000, p. 383)

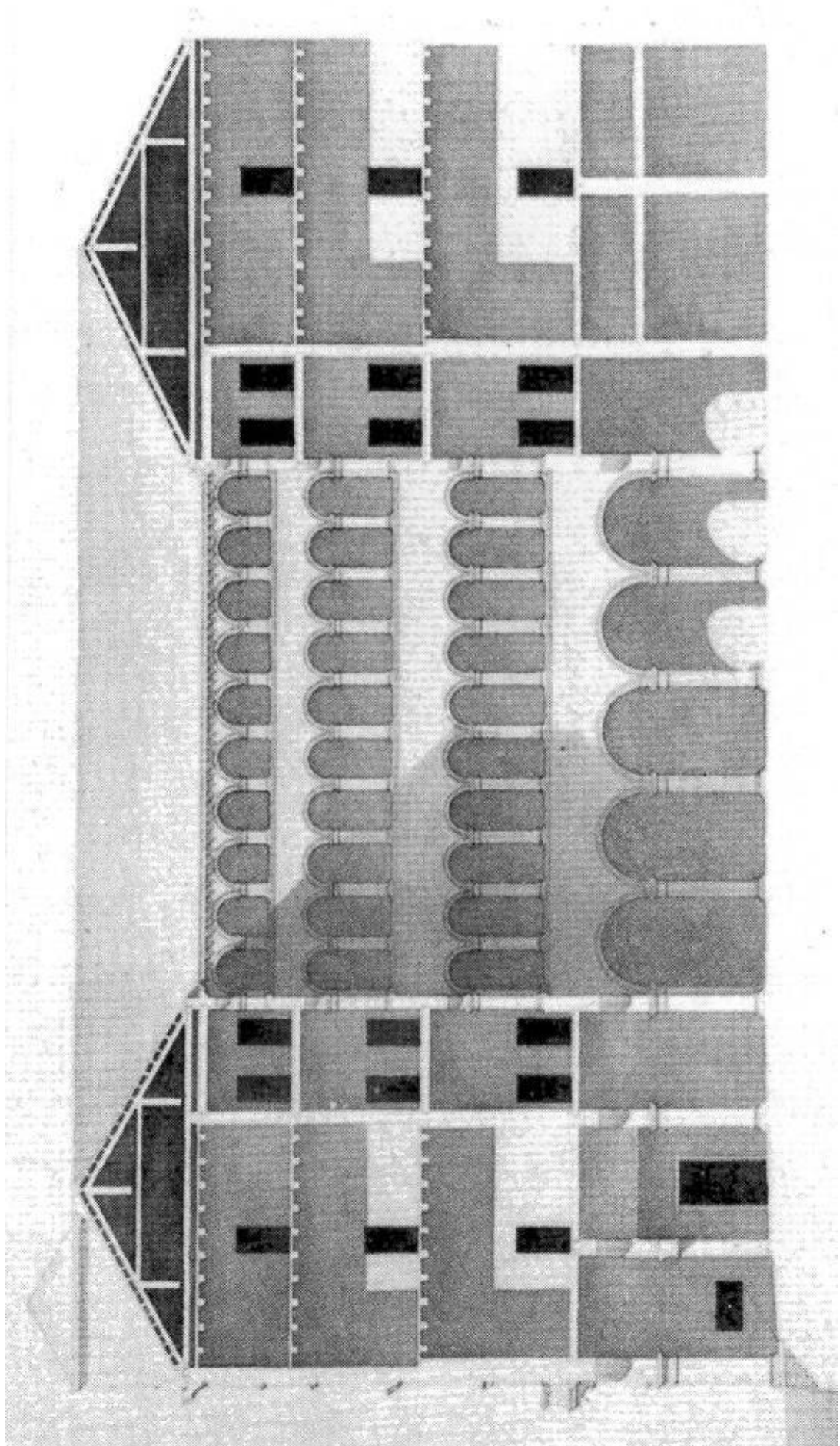


Fig. 6: Venice, Fondaco dei Tedeschi. (Concina 1998, p. 152)

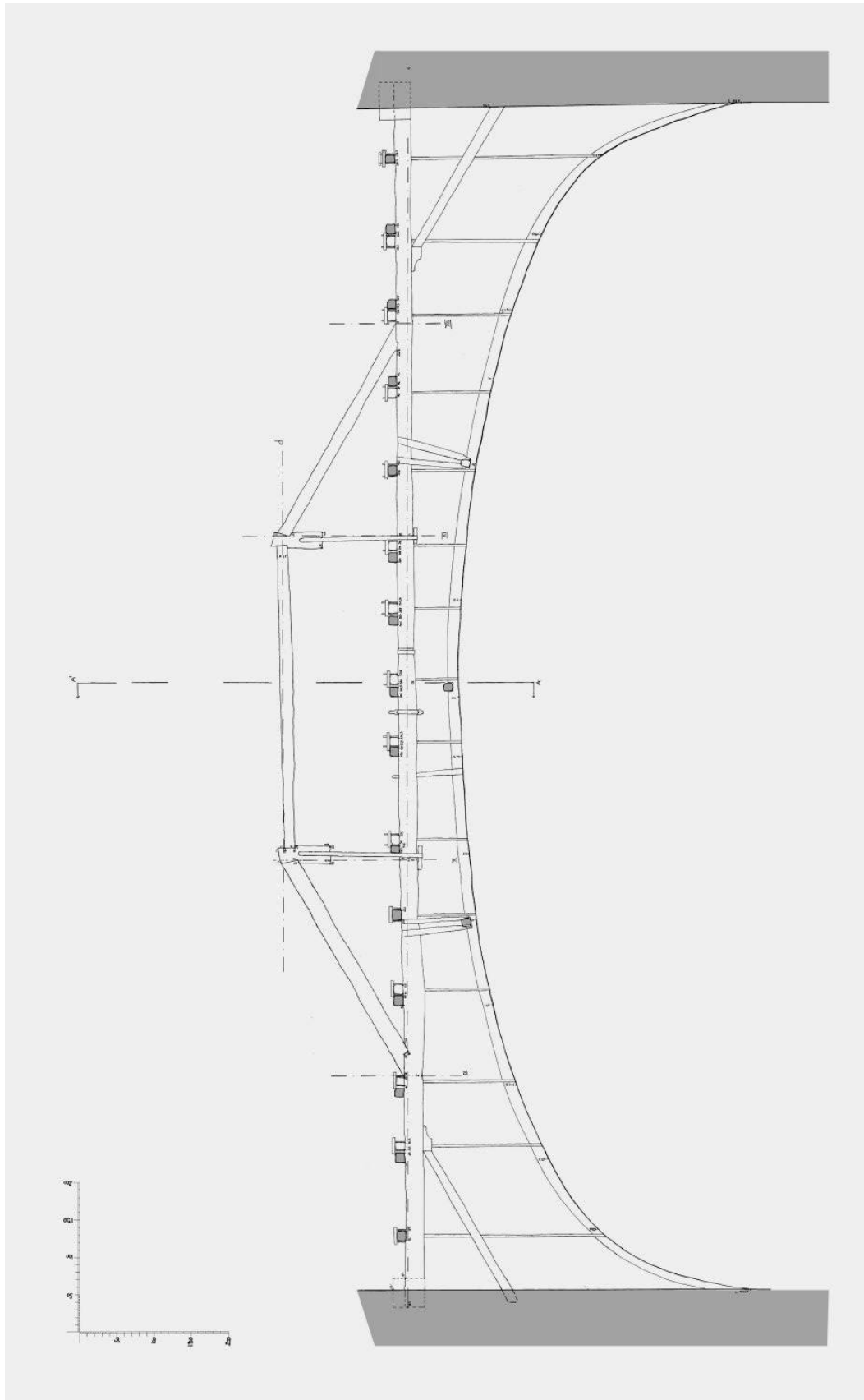


Fig. 7: Rome, S. Pietro in vincoli: detail of the structure holding the wooden vaults. (Drawing by the author.)

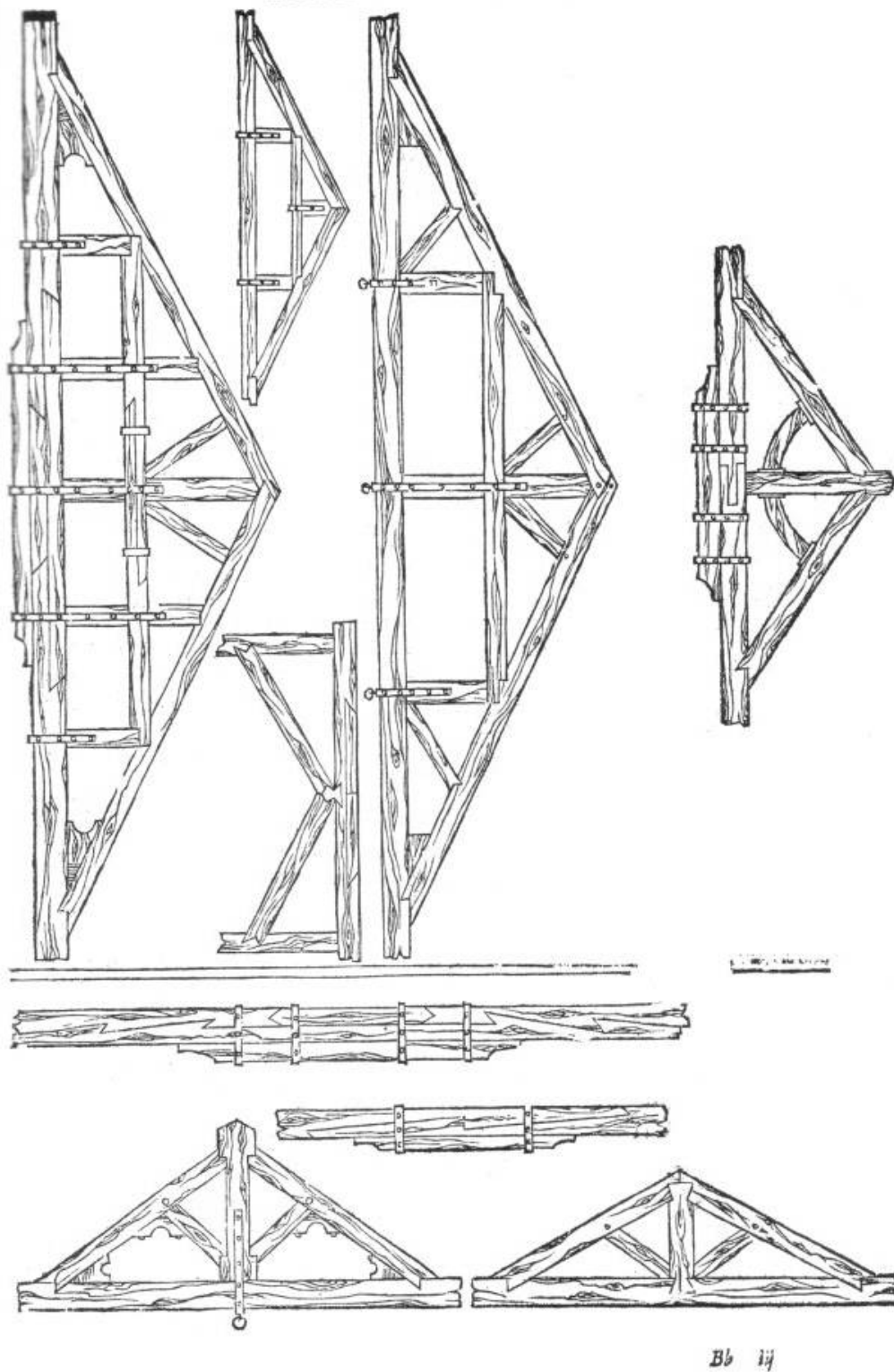


Fig. 8: Roof structures after Sebastiano Serlio (1575). (Serlio 1575, p. 197)

Bibliography

- Albrecht, Ingeborg: *Elias Holl. Stil und Werk des "Maurmeisters" und der Augsburger Malerarchitekten Heinz und Kager*, in „Münchner Jahrbuch der bildenden Kunst“, XII 1937-38, p. 101-136.
- Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985.
- Bushart, Bruno: *Das Augsburger Rathaus und seine venezianischen Vorbilder*, in Bernd Roeck, Klaus Bergdolt, Andrew John Martin (eds.): *Venedig und Oberdeutschland. Beziehungen zwischen Kunst und Wirtschaft*, Jan Thorbecke Verlag, Sigmaringen 1993, p. 223-230.
- Dirr, Pius: *Handschriften und Zeichnungen Elias Holls*, in: „Zeitschrift des historischen Vereins für Schwaben und Neuburg“, 1903, pp. 43-62.
- Ehinger, Elias: *Catalogus Bibliothecae Amplissimae Reipublicae Augustanae*, Augsburg 1633.
- Forssman, Erik: *Architekturtheorie im Zeitalter Elias Holls*, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p. 7-19.
- Heilbronner, Paolo: *Il Municipio di Augusta, di Elia Holl, e i suoi rapporti con il Barocco Italiano*, in „Palladio“, 2, 1938, p. 45-54.
- Keßler, Daniel: *Der Dillinger Baumeister Hans Alberthal*, in: „Jahrbuch des Historischen Vereins Dillingen an der Donau“, Vol. 51, 1945-1949.
- Kruft, Hanno-Walter; Lepik, Andres-René: *Das Geometrie- und Meßbuch von Elias Holl*, in: „architectura“, 1985, Sonderdr.
- Kruft, Hanno Walter: *Vorbilder für die Architektur von Elias Holl*, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985; p. 20-27.

- Künast, Hans-Jörg / Zäh, Helmut: *Die Bibliothek Konrad Peutingers. Edition der historischen Kataloge und Rekonstruktion der Bestände*, Studia Augustana. Augsburger Forschungen zur Europäischen Kulturgeschichte im Auftrag des Instituts für Europäische Kulturgeschichte, Max Niemeyer, Tübingen 2003.
- Jokanski, Dirk: Oberdeutsche Baumeister in Venedig. Reiserouten und Besichtigungsprogramme, in Roeck, Bernd/ Bergoldt, Klaus/ Martin, Andrew John: *Venedig und Oberdeutschland in der Renaissance. Beziehungen zwischen Kunst und Wirtschaft*, Jan Thorbecke Verlag, Sigmaringen 1993, p.31-40.
- Meyer, Christian: Die Hauschronik der Familie Holl (1487-1646). Insbesondere die Lebensaufzeichnungen des Elias Holl, Baumeisters der Stadt Augsburg, München 1910.
- Michalski *Der Dogenpalast und die Rathäuser in Augsburg und Mitteleuropa um 1600*, in Klaus Bergoldt/ Jochen Bruening (eds.): *Kunst und ihre Auftraggeber im 16. Jahrhundert: Venedig und Augsburg im Vergleich*, Akademie Verlag, Berlin 1997, p. 83-94.
- Pfister, Rudolf: *Die Augsburger Rathaus-Modelle des Elias Holl*, in „Münchner Jahrbuch der bildenden Kunst“, XII 1937/38, p. 85-100.
- Piana, Mario: *Tecniche edificatorie cinquecentesche in laguna*, in Jean-Claude Maire Vigueur (ed.) *D'une ville à l'autre: structures matérielles et organisation de l'espace dans les villes européennes (XVIII-XVI siècle)*, Proceedings of the conference organised by the École Française de Rome, École Française de Rome, Rome 1989, p. 631-639.
- Puppi, Lionello: *Elias Holl und Italien*, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p. 28-36.
- Roeck, Bernd: *Anmerkungen zum Werk des Elias Holl. Über den Entstehungsprozess von Architektur im frühen 17. Jahrhundert*, in

- „Pantheon“, 41, Issue 3, July/August/September 1983, p. 221-234.
- Roeck, Bernd: *Kollektiv und Individuum beim Entstehungsprozess der Augsburger Architektur im ersten Drittel des 17. Jahrhunderts*, in: Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p. 37-54.
- Roeck, Bernd/ Bergoldt, Klaus/ Martin, Andrew John: *Venedig und Oberdeutschland in der Renaissance. Beziehungen zwischen Kunst und Wirtschaft*, Jan Thorbecke Verlag, Sigmaringen 1993.
- Rosenfeld, Myra Nan: *Sebastiano Serlio on domestic architecture*, New York/Cambridge, Mass./ London 1978.
- Serlio, Sebastiano: *Il settimo libro d'Architettura di Sebastiano Serlio. Sebastiani Servii... Architecturae liber septimus*, Jacopo Strada, Frankfurt am Main, 1575.
- Serlio, Sebastiano: *Tutte l'opere d'Architettura et Prrospetiva (sic) di Sebastiano Serlio*, Eredi Francesco de' Franceschi, Venice 1600.
- Steinacker, Karl: *Fünf bisher unbekannte Bauzeichnungen Elias Holls*, in: „Die Denkmalpflege“, 1922 (24), p. 41-43.
- Tafuri, Manfredo: *Politica, scienza, architettura nella Venezia del '500*. in: Vittore Branca/ Carlo Ossola, *Cultura e Società nel Rinascimento tra Riforme e Manierismi*, Firenze 1984, p. 97-135.
- Valeriani, Simona: *La trasmissione delle conoscenze nell'Europa del XVII e XVIII sec.: il caso delle strutture di copertura*, in: Proceedings of the international seminar Theory and practice about construction: knowledge, instruments, models, Ravenna, 27-29 October 2005, p. 895-903 (vol. 2).
- Valeriani, Simona: *Kirchendächer in Rom –Zimmermannskunst und Kirchenbau von der Spätantike bis zur Barockzeit. Capriate ecclesiae – Contributi di archeologia dell'architettura per lo studio delle chiese di Roma*, Imhof Verlag, Petersberg 2006.

- Valeriani, Simona: *Die Quadratur des Dreieckes. – Spätantike und frühneuzeitliche Dächer zwischen Ikonographie und Baubefund*, in: Proceedings of the conference „Ancient Wooden Constructions“, TU Munich, 30.3-1.4.2007, in print.
- Völkel, Markus: Markus Welser und die Augsburger Baukunst der Holzzeit. Einige skeptische Anmerkungen, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p.126-134.
- Vollmar, Bernd: *Die Dachwerkkonstruktionen des Elias Holl*, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus*, Pustet, Regensburg 1985, p.67-72.
- Wilhelm, Johann: *Architectura civilis, oder Beschreibung und Vorreissung vieler vornehmer Dachwerck...*, Paul Fuersten (Wittib und Erben), Nürnberg 1668.
- Zimmer, Jürgen: *Joseph Heintz der Ältere als Maler (1564-1609)*, Dissertation, University of Heidelberg, 1967.
- Zimmer, Jürgen: *Joseph Heintz als Architekt*, in Wolfram Baer/ Hanno-Walter Kruft/ Bernd Roeck (eds.): *Elias Holl und das Augsburger Rathaus* Pustet Regensburg 1985, p. 98-117.

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