

# Die Architekturtheorie des Francesco di Giorgio

*Einblick in die Dissertation ›Experimente der Wissensvermittlung in der Architektur des Quattrocento‹*

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**ABSTRACT:** Die ausgestellte Arbeit gibt Einblick in die Forschung von Frau Dott.ssa Sophie Elaine Wolf zur Antikenrezeption, den Methoden zeichnerischer Darstellung und der Bildkompetenz in den Werken der Architekturtheoretiker des italienische Quattrocento anhand der Werke des Francesco di Giorgio. Mit originalen Quellen, d. h. Handschriften und Zeichnungssammlungen aus dem 15. Jahrhundert, arbeitend analysiert sie die Entwicklung einer innovativen Methode, technisches und architektonisches Wissen zu vermitteln. Indem Francesco di Giorgio in seinen Schriften das geschriebene Wort und die Handzeichnung als gleichberechtigte Instrumente der Wissensvermittlung betrachtet und zugleich antike wie zeitgenössische Quellen rezipierte, schuf er eines der ersten illustrierten Architekturtraktate der Renaissance.

Experimente der Wissensvermittlung in der Architektur des Quattrocento

Es war die Handzeichnung, die dem Architekten im Humanismus zum Durchbruch verhalf. Im Austausch von Wissen, der im 15. und 16. Jahrhundert soziale Schichten und Disziplinen verbindende Qualitäten gewann, ist die Visualisierung einer architektonischen Vorstellung, einer Idee, das herausragende Kommunikationsinstrument. Zugleich gehört die Zeichnung - als Werkzeug - zum Entwurfsprozess und Denken in der Architektur. Als Instrument zugleich der Praxis und der Theorie wird die Zeichnung zu einem verschiedene Rezipienten vereinigenden

Kommunikationsmedium und im Humanismus zum Katalysator für die Herausbildung einer interdisziplinären Wissensgemeinschaft.

Die Schriften des Francesco di Giorgio (1439-1501) sind die idealen Dokumente, diese experimentelle Phase der Architekturtheorie nachzuvollziehen: Als Künstler, Ingenieur und Architekt in Siena, Urbino und Neapel tätig, forschte er zur Architektur und ihrer Theorie und suchte als Praktiker unermüdlich nach anwendbaren Lösungen. Es ist ein Unikum, dass die von ihm erhaltenen Schriften einen Zeitraum von knapp vierzig Jahren überspannen. Dies ermöglicht, die Entwicklung von Darstellungsmethoden und Interaktion von Text und Zeichnung systematisch zu verfolgen: Von dem über mehrere Jahrzehnte genutzten *Skizzenbuch* angefangen, über das Bilderbuch zur Architektur, bis hin zu den zwei theoretischen Schriften, dem *Handbuch zur Architektur* und dem *Traktat zur Architektur*, wird untersucht, welche Darstellungsmethoden Francesco verwendet und weiterentwickelt.

Die Studie fokussiert auf die Analyse der Handschriften des *Handbuches* (1480er Jahre) und jener des *Traktates* (1490er Jahre) und zeigt so den großen Fortschritt in der Erarbeitung ausgefeilter Darstellungsmethoden auf. Von im Rand beigegebenen zahlreichen Handzeichnungen im *Handbuch* findet Francesco den Weg hin zu der Gegenüberstellung von Text- und Bildseiten im *Traktat*, welche das erfolgreiche Layout von Architekturtraktaten des Cinquecento vorwegnimmt. Dabei erfüllt die Handzeichnung verschiedene Funktionen: Sie dient als visuelle Illustration narrativer Exkurse oder bietet schematische Aufrisse von Architekturelementen. Besonders interessant sind die Visualisierungen von Maschinen, mit mehrschichtigen Verbindungen technischer Elemente und jene Zeichnungen, die visuelle Überzeugungsarbeit leisten wollen, etwa wenn die Herleitung der Architekturelemente aus den Proportionen des menschlichen Körpers demonstriert werden soll. Kombiniert wird die synchron differenzierte Untersuchung der verschiedenen Methoden mit der diachronen Betrachtung der Evolution der Darstellungsformen. Die Vorstufen vieler Zeichnungen lassen sich auf das *Codicetto* (ab 1465 ca.) zurückverfolgen und die häufig sehr detailliert nachweisbare Arbeit an den Darstellungen ermöglicht es, Aussagen über die wandelnden Anforderungen von Francesco an die Handzeichnungen und seine sukzessive Entwicklung der Darstellungsmethoden zu gewinnen. Die thematische Vielfalt der behandelten Disziplinen erfordert, dass für jeden Bereich Quellen und weitere Autoren in die Betrachtung eingebunden werden. Anhand fallweiser Betrachtungen wird auch nachgewiesen, welche Neuerungen bei Francesco zu finden sind.

Es wird so ersichtlich, dass Francesco di Giorgio eine große Bandbreite an Quellen nutzte und dabei sorgfältig zwischen den verschiedenen als Modellen genutzten Aspekte unterschied. Seine innovative Vielfalt an Darstellungsmethoden geht dabei einher mit der Herausbildung einer Theorie der Architektur und ihrer Vermittlung: Diese spiegelt sich prägnant in dem deutlichen Bedeutungswandel, welche die Visualisierung innerhalb der Architekturtheorie von Francesco vollzieht, wie auch in der Präsentationsform, in welcher sich das *Handbuch*, das eine enge Praxisbindung vermittelt, deutlich von dem späteren *Traktat*, in dem die Einbindung in die humanistische Wissensgemeinschaft der Neuzeit deutlich hervortritt, unterscheidet.

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### **English Version of the text in the exhibited ›manuscript‹**

This exhibit provides an insight into the dissertation of Dott.ssa Sophie Elaine Wolf. In her research, she deals with the significance of the reception of antiquity, methods of graphic representation of architecture and pictorial competence in the works of architectural theorists of the Italian Quattrocento, in particular on the basis of the figure of Francesco di Giorgio. In doing so, she primarily goes back to the original sources, i.e. manuscripts and collections of drawings from the 15th century, and analyses them with regard to Francesco d. G.'s aim of developing an innovative method of conveying technical and architectural knowledge. By considering the written word and the hand drawing as equal instruments of knowledge transfer in his writings and at the same time taking ancient as well as contemporary sources, Francesco d. G. created one of the first illustrated architectural treatises of the Renaissance.

The dissertation is presented here in excerpts on the basis of two points: First, a brief description of the thesis question is given. Subsequently, the central themes of Francesco d. G.'s writings are addressed and a visual insight into the pictorial apparatus of these works is offered by means of tracings. The drawings are thus primarily copies from those three manuscripts that transmit the various theoretical works of Francesco d. G. in their entirety in word and image. These are preserved today in Italian archives (Florence, Siena, Turin). The exhibited work was deliberately executed as a ›manuscript‹ in order to give the reader and viewer a sense, even if only approximate, of the sources with which work was done for the present research.

#### **The Architectural Theory of Francesco di Giorgio**

Francesco di Giorgio (Siena 1439-Siena 1501) began his career in his native Siena as a painter, sculptor and engineer. In the second half of the 1470s he entered the service of Federico di Montelfeltro, Duke of Urbino. Francesco d. G. built several fortresses for him and was also active as a war engineer. In the last decade of his life, he travelled to various Italian cities as a renowned architect and war engineer and was particularly active in Naples and Siena. Francesco d. G.'s theoretical preoccupation with architecture and engineering spanned a period of almost four decades and is well documented in written documents and numerous extensive sources - collections of drawings, sketchbooks and manuscripts. Francesco d. G.'s engagement with ancient architecture and theory – in particular with Vitruvius' ›Ten Books on Architecture‹ – as well as the methods he used in the process characterise him as a representative of his time: on the one hand, he was bound to a long building tradition and trained as a craftsman; on the other, he strove to establish a scientific foundation for architecture and, in tandem with this, strove for increasing recognition of the architect in his social function. Francesco d. G. is thus in line with architects such as Filippo

Brunelleschi, architectural theorists such as Leon Battista Alberti and Antonio Averlino, called Filarete, and personalities such as Leonardo da Vinci. However, what distinguishes Francesco d. G.'s theoretical work, written in contemporary Italian, from all other writings on architecture of his time is the extensive use of technical and therefore didactic drawings. In his writings, word and image are equal in their communicative significance and are used in a complementary manner.

This aspect represents the point of departure for the dissertation project, which analyses the method of communicating knowledge in words and images that Francesco the Great refined over the years. All written documents as well as all drawings, sketchbooks and pattern books in which Francesco d. G. gathered his research and inventions in the fields of mechanical engineering, fortress construction and architecture – including the study of antiquities – were examined. The focus, however, laid on four extensive manuscripts, which, as copies differing from one another, show the development of two independent works. Previous research interpreted these as two successive phases of the same architectural treatise.

In the dissertation project, however, these works are being viewed in a new and, for the first time, holistic way, i.e. beyond the selective view from the perspectives of architectural, military or technical history. The content, layout and nature of the manuscripts are thus analysed and the author comes to the conclusion that these are two clearly independent works, which differ in terms of their function and their potential audience.

She suggests that the early work, written around 1480-1482, should be interpreted as a ›Manual on Architecture‹ in which the tradition of a building craft and the innovation of architectural theory and antiquity research meet.

The later work, dating from around 1497, on the other hand, presents itself as a theoretical ›Treatise on Architecture‹, which, based on a sound knowledge of ancient architecture, formulates a comprehensive concept for a contemporary and socially relevant architecture.

The exhibited ›manuscript‹ presents briefly all central themes dealt with in both works by Francesco d. G. Each topic is also accompanied by drawings redrawn from the originals in order to give a visual impression of Francesco d. G.'s work.

### Hydraulic engineering

Early in his career, Francesco d. G. spent several years in Siena in charge of the city's water supply, which included overseeing the care and maintenance of the water pipes. It was during this time that Francesco d. G. acquired his basic technical skills, which he would steadily expand over the years. He also dealt extensively with man-made conduit systems and the uses and potential dangers of rivers as a source of energy and a means of transport.

The first drawing is copied from the ›Manual‹ and uses a rather traditional method of representation to convey the necessary components for a lock system that was to make it possible for ships to navigate a watercourse in both directions. The central elements for the discussion, the lock gates, are shown proportionally larger to improve the drawings ›readability‹.

### Mechanics

The discussion of machines, hydraulic pumps, mills, waterworks as well as cranes and hoists occupies a large space in the ›Manual‹. Many case studies are described with detailed drawings. Only through these visual representations, Francesco d. G. explains, is it at least approximately possible to convey the complexity of machines and their composition from many individual parts. In the ›Treatise‹ Francesco d. G. synthesises the discussion drastically and explains only one or two models per type of machine. On the basis of these, he describes the general mechanism and possible areas of application. The drawings are shown in large format in the ›Treatise‹ so that the viewer can easily understand all the elements and their interaction.

The two drawings in the exhibit stem from two different phases of Francesco d. G.'s work.

The first is taken from the so-called ›Codicetto‹, a sketchbook which Francesco d. G. used for many years and to which many of his machine models can be traced. The example shows a water pump operated by a man.

The second drawing, on the other hand, is taken from the ›Treatise‹ and gives an insight into the changed method of representation: on the basis of an overall drawing and two detailed drawings, Francesco d. G. conveys very efficiently which variations of the same lifting machine are possible for heavy objects.

### Ancient architecture

As was the case for all Renaissance architects, Francesco d. G.'s engagement with the ancient building tradition was fundamental. The theory of architecture that he developed in the course of his career was based on this tradition. The study of ancient written sources was accompanied by careful field studies and building surveys of ancient ruins. It was precisely the comparison of written and archaeological sources that became the starting point for the development of a contemporary architectural language, as expressed in particular in Francesco d. G.'s treatise.

The two drawings in the exhibit represent two different ways of this study of antiquity.

The first drawing is a combination of a section and a view of the Colosseum in Rome.

The second drawing, on the other hand, is a reconstruction of the ancient sweat bath, based primarily on the description in Vitruvius' 'Ten Books'.

### The ancient theory of columns

The ancient orders of columns, as conveyed by Vitruvius in his work, provided a basic framework for the architectural theory of proportions: in the ›Manual‹ there are many passages that Francesco d. G. himself translated from Vitruvius. In these, the columns and their various elements are explained, accompanied by numerous drawings.

In the ›Treatise‹ Francesco d. G. reduced his direct reception of Vitruvius' concepts and strived to apply some of the ancient principles to contemporary building tasks.

The drawing in the exhibit is copied from the ›Treatise‹ and combines view and section. Thus it conveys how Francesco d. G. tried to explain the tapering of the column shaft with the help of a schematic drawing.

### Public and private buildings

Francesco d. G. discusses in both the ›Manual‹ and the ›Treatise‹ the public and private buildings in which representational function and private use are intertwined. For these buildings, Francesco d. G. establishes a hierarchical typology that differentiates on the basis of the users.

He devotes the greatest attention to the city palaces of princes and dukes and the public buildings of republics.

The two drawings in the exhibit show two palace models from the ›Treatise‹. Schematic floor plans with labelling for the essential room functions allow to follow the internal organisation.

### Sacred buildings

Sacred buildings are given great attention in both works. In the ›Treatise‹ in particular, Francesco d. G. systematically deals with two main typologies, namely three-aisled basilicas and central buildings. For both, he discusses floor plan schemes as well as rules for the construction of the elevation. In his construction instructions, Francesco d. G. uses a reference system of letters. This enables him to clearly designate specific points in the corresponding drawings.

The drawing in the exhibit is taken from the ›Treatise‹, illustrated there in large format, shows a scheme for a basilica in elevation with a dome positioned over the crossing.

### Fortification

In the ›Manual‹, the construction of fortresses is still discussed in a very straightforward manner, but in the ›Treatise‹ it becomes one of the central topics. Francesco d. G. discusses in general terms the construction and function of fortresses. In addition, he describes the fortresses he built for the Duke

of Urbino. The chapter is provided with large-format drawings: Ground plans occur as well as bird's-eye views embedded in the landscape. This can be attributed to the fact that the shape of the fortresses was in direct relation to the geographical conditions.

The drawing in the exhibit is taken from the ›Treatise‹ and shows an example of the large-format drawings of fortresses in bird's-eye view.

## CV

Dott.ssa Sophie Elaine Wolf studied art and architectural history in Dresden, Milan and Pisa. In 2013-2018 she was a research assistant in the Department of Architectural History and Preservation of Monuments at the LFU Innsbruck, and since 2018 she has been working on a research project on appropriation strategies in South Tyrol and Trentino after the First World War.

In her dissertation on the beginnings of the architectural treatise in the Italian Quattrocento, which she is writing under Prof. Bruno Klein (TU Dresden), she focuses on the significance of the reception of antiquity and image competence of early architectural theorists, in particular using the figure of Francesco di Giorgio.

She has participated in numerous international conferences and workshops and has published in several languages (German/Italian/English), including peer-reviewed, on her research topic.

Further information can be found at <https://www.baugeschichte.eu/univ-assistentin-sophie-elaine-wolf/personen/info/>.