GIOVANNI SCALA, *Diffinitioni bellissime di geometria* (Beautiful Definitions of Geometry)
In Italian, illustrated manuscript on paper
Italy (Rome), 1585 (dated)

34 folios on paper, three watermarks: "deux clefs en sautoir inscrites dans un écu" (similar to Briquet 1158, Lucca 1584-5, var. Rome 1591-2), "fleur-de-lis inscrite dans un écu surmontée d'une étoile," and "un homme inscrit dans un cercle surmonté d'une étoile," modern foliation in pencil, 1-34, complete (collation i^8 ii^9 [the last leaf a singleton] iii^6 [the first leaf is a singleton] iv^6 v^2 vi^1 [the conjoint leaf of f. 34 is the pastedown), no ruling visible, written in brown ink in a very fine Italian hand in a single column up to 23 lines, smaller script for text in captions to graphs and calculations as well as the marginal commentary, SEVERAL GEOMETRICAL AND TECHNICAL DRAWINGS ON EVERY PAGE, f. 27, WORKING VOLVELLE, minor stains and signs of use throughout, in overall good condition. Bound in a contemporary limp vellum binding, spine reinforced with lighter vellum at a later period, cockled and stained, but in overall good condition. Dimensions 291 x 215 mm.

Scientific and mathematical manuscripts are not common, especially illustrated ones. This previously unknown volume contains a geometrical treatise by Giovanni Scala, an Italian mathematician who worked in Rome and enjoyed the support of important patrons in France, including King Henri IV (1589-1610). Only one other manuscript of this work is known outside Italy. Our early copy – either an autograph or a copy by a close associate – is based on Scala's lectures in Rome; it predates his later presentation manuscripts and published editions on military engineering. Illustrated throughout with very fine geometrical, technical, and architectural drawings, it includes a working volvelle on f. 27.

PROVENANCE

1.   The manuscript is localized and dated Rome in 1585 on f. 2. The title states that the work is composed by Giovanni Scala, and no other name is given throughout the manuscript.

     Another manuscript of this text with an identical title was copied in Rome in December 1585 by a French student of the d'Hostun de Claveyson family (who held a seigneurie in Drôme in southeastern France); the location of this manuscript is unknown, but it was in turn copied by his brother, Charles d'Hostun de Claveyson, and this later copy survives as Paris, Bibliothèque de l'Arsenal, MS 3536 (see below). More research is needed to establish whether our manuscript is another student copy or an autograph manuscript by Scala.

2.   Private collection.

TEXT
f. 1, incipit, "Della Geometria et prima della radice Quadrata. Volendo la radice quadra di 2342…"; [f. 1v, geometrical drawings];

ff. 2-34v, incipit, "Diffinitione bellissime di geometria; composte da Giovanni Scala Mattematico di tutte le scientie mattematiche professore. In Roma l'Anno. 1585 [followed by a list of subjects to be covered about the point, line, angle, "termine", area, figure, and field] ….; [f. 6], Propositione prima. Sopra une linea retta descrivere una perpendicular ….; [f. 9v], Come se descrira una figura de cinque lati equali ….; [f. 10], Come si divida il triangolo equilatero in doi triangoli ortogonii ….; [f. 15], Dell'ordinae del misurare di Prattica ….; [f. 18], Della Geometria, et prima della Radice Quadrata ….; [f. 18v, blank]; [f. 19], Della proportione che li lati delli triangoli ortogonii ouero rettangoli, hanno, fra di loro ….; [f. 19v], Dell'ordine di trouare la superficie ….; [f. 20], Dell'ordine di misurare figure Irregolari ….; [f. 21v], Modo Generale di misurare tutti li Corpi irregolari ….; [f. 27, working volvelle; f. 27v, blank; ff. 28-31 geometrical drawings]; [ff. 31v-34, notes accompanied by architectural drawings], Notatione. Nel accomodare il quadro … specchio …, Ma per trovare la distantia che e' fra la prima positione … , Si deve avertire che la radice quadrata …, Per mesurare un triangolo, come in questa figura si monstra … che uno quartengate"; [f. 34v, blank].

Giovanni Scala, *Diffinitioni bellissime di geometria*. This is a very rare manuscript of an important treatise on geometry by Giovanni Scala (1547-1600) with several geometrical and technical drawings on every page. Giuseppe Costantini recorded manuscript copies of texts by Scala (possibly this text?) in Bologna, Milan, Florence, Turin, and Paris, but we have only been able to verify the copies in Paris (cf. Costantini, 1904 and *Dizionario Biografico dei Friulani* in Online resources). Not much is known about Scala, but in a manuscript dated 1593 he informs that he is from Friuli (Friuli-Venezia Giulia in northwestern Italy) and that he is working in Rome (Costantini, 1904).

Three manuscripts with works attributed to Scala are held in Paris. Only one of them includes the same work on geometry as our manuscript: Paris, Bibliothèque de l'Arsenal, MS 3536, a copy made by Charles d'Hostun de Claveyson (or Claveson) (1547- after 1621). Claveyson copied Scala's work from a manuscript made by his brother, Pierre, François or Jean d'Hostun de Claveyson, monsieur de La Motte, completed on 18 December 1585 in Rome (the location of this manuscript is unknown). The Arsenal manuscript is entitled "Diffinitioni bellissime di geometria, composte da Giovanni Schala, mathematico, di tutte le scienze mathematice professore. In Roma, l'anno 1585, mensis decemb. die XVIII" and includes the note, "Cecy est retiré et copié du livre de monsieur de La Motte, mon frère." (cf. the BNF catalogue description, Online resources). It would seem that d'Hostun de Claveyson was Scala's student in Rome in December 1585.

Two other manuscripts of Scala's work are in the Bibliothèque nationale in Paris. One is an autograph made by Scala in Rome in 1588: Paris, Bibliotheque nationale, MS italien 60. On the first front flyleaf Scala gives his name, a dedication, and the date of the work: "Joannes Scala mathematicus fecit. Au nom de ma belle maistresse. 1588." On f. 1 he entitled his work "Operattioni bellissime di geometria appartenenti alle cose che sequitano per le fortezze" (cf. Paris 1840, vol. 3, pp. 331-332 (Paulin Paris gives in error the shelfmark MS italien 16), Marsand ,1835-1838, no. 12, and the BnF catalogue description in Online resources). This manuscript belonged to the illustrious Philippe de Béthune (1565-1649) before coming to the Bibliothèque nationale. In this manuscript the section on geometry only comprises ten leaves,

while the bulk of the work, 213 leaves, is dedicated to military fortifications (cf. Paris 1840, vol. 3, p. 332).

A third manuscript in Paris, Bibliothèque nationale, MS italien 467, appears to be comparable in its contents to MS italien 60, a treatise on military fortifications by Giovanni Scala (cf. Marsand, 1835-1838, no. 821 and the BnF catalogue description in Online resources). More research is needed to establish whether it also includes a short section on geometry, as one would assume, whether the manuscript is an autograph copy, and when it was made. This manuscript was undoubtedly also destined for an important French patron, as in the following century it belonged to Jean-Baptist Colbert (1619-1665), one of the principal ministers of Louis XIV.

Scala's treatise on military fortifications was published in Rome in 1596 as *Delle Fortificationi*, and included a dedication to Henri IV of France. *Geometria prattica tratta dagl' elementi d'Euclide et altri auttori …*, was published in Rome in 1599, and in several further editions in the seventeenth and eighteenth centuries; Scala completed the volume left unfinished on the death of Giovanni Pomodoro (the first 44 plates were by Pomodoro, with text and the final seven plates by Scala). The wide diffusion of the printed editions over three centuries testifies to the success and continued validity of the work. In the second edition of *Geometria prattica* in 1603, Scala states that in order to avoid plagiarism he has included in his work a text on geometry by the mathematician Giovanni Pomodoro, enriching it with explanatory illustrations, and specifies which parts are by him and which by Pomodoro.

There is no edition or proper study of Scala's work, and our manuscript would be an essential source for such future research. Our manuscript is also especially useful for understanding how geometry developed in the Renaissance and the Early Modern period, the knowledge of which has always been more incomplete than that of arithmetic and algebra (cf. Karpinski and Kokomoor, 1928, p. 21). Finally, the handsome illustrations and the intricate volvelle make this an especially attractive scientific manuscript.

LITERATURE
Camerota, F., ed. *Il compasso di Fabrizio Mordente Per la storia del compasso di proporzione…*, Florence, 2000.

Camerota, F. *La prospettiva del Rinascimento: Arte, architettura, scienza*, Milan, 2006.

Costantini, G. *Friulani poco noti o dimenticati*, Udine, 1904, pp. 15-28.

Karpinski, L. C. and F. W. Kokomoor, "The Teaching of Elementary Geometry in the Seventeenth Century," *Isis* 10/1 (1928), pp. 21-32.

Marsand, A. *I Manoscritti italiani della Regia Biblioteca parigina descritti ed illustrati dal dottore Antonio Marsand…*, 2 vols, Paris, 1835-1838.

Paris, P. *Les manuscrits françois de la Bibliothèque du Roi*, 7 vols, 1836-1848.
See vol. 3 online: https://archive.org/details/lesmanuscritsfra03bibluoft

Zanverdiani, D. "La geometria pratica: La prospettiva pratica," in C. Balistreri Trincanato, P. Pizzati and D. Zanverdiani, *Dalla geometria euclidea al rilievo architettonico*, Mestre-Venezia, 2000.

ONLINE RESOURCES
Giovanni Scala in "Dizionario Biografico dei Friulani"
https://www.dizionariobiograficodeifriulani.it/scala-giovanni/

Paris, Bibliothèque nationale, MS italien 60
https://archivesetmanuscrits.bnf.fr/ark:/12148/cc9588s

Paris, Bibliothèque nationale, MS italien 467
https://archivesetmanuscrits.bnf.fr/ark:/12148/cc9540f

Paris, Bibliothèque de l'Arsenal, MS 3536
https://archivesetmanuscrits.bnf.fr/ark:/12148/cc841938

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