

THE MAGIC LANTERN OF GIOVANNI DA FONTANA

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Introduction

Some years ago I obtained *Der Weg des Films* by F. von Zglinicki¹ and like Mr Piasio² I found myself speculating about the Magic Lantern of Giovanni da Fontana (GdF). It soon appeared that Zglinicki had misinterpreted one of the pictures. This led to some research on Giovanni. The picture shown on page 655 of his book does not represent a magic lantern, but an English dark lantern or bull's eye. This drawing, reproduced in our journal² has given rise to some confusion.

The latin caption of the picture gives information on the use of the lantern. The bull's eye was probably shown to Giovanni by an English sailorman when he visited the harbour of Venice.

This misinterpretation led me to have a closer look at Giovanni's works, especially those on light and optics. Another picture reproduced by Zglinicki¹ from Giovanni's book *Liber Instrumentorum* seems indeed to represent a magic lantern. A photo of this picture taken from the MS is shown here by courtesy of the Bayerische Staatsbibliothek: see figure 1. The obvious question is: Is it a magic lantern?

Before jumping to a conclusion, we should look at the historical information available.

Next, we will briefly define the principle of the magic lantern, so we can recognize it and distinguish it from other optical devices.

A thing one should keep in mind is the richness of trickery in the Middle Age; for example, what are we to think of a manuscript in which texts in latin and in cipher have been put in different handwriting? One has to go by scarce facts, by the old books available and by one's own judgement.

In the following, I will argue why I think that figure represents a magic lantern.

So often later reviews are coloured by personal opinions, that I shall be delighted if any of our readers can shed more light on this dim subject.

What kind of pictures?

What kind of pictures are we talking of? The picture shown in Zglinicki's book are borrowed

from the MS *Bellicorum instrumentorum liber cum figuris delineatis et ficticiis literis conscriptus*, i.e. freely translated: "Book on instruments of war, containing line drawings and descriptions in cipher". The MS probably dates to 1420 and is located in the library of Munich, indexed as the *Codex Monacensis Iconogr.* 242". It has a red velvet binding with 70 pages of parchment in Small-Quart.

The above title is believed not to be authentic. Later reviewers³⁻⁴ have simply referred to the book as *Liber Instrumentorum*. The *ficticiae literae* in the full title points to the cipher code, which GdF probably used to keep certain notes for himself.

We should keep in mind that the MS has a history of its own and that the notes in cipher were possibly translated by a later owner.

The drawings appear to be made in port crayon. The text is calligraphic and concise, sometimes put on the page of the drawing and usually accompanied by a text in cipher.

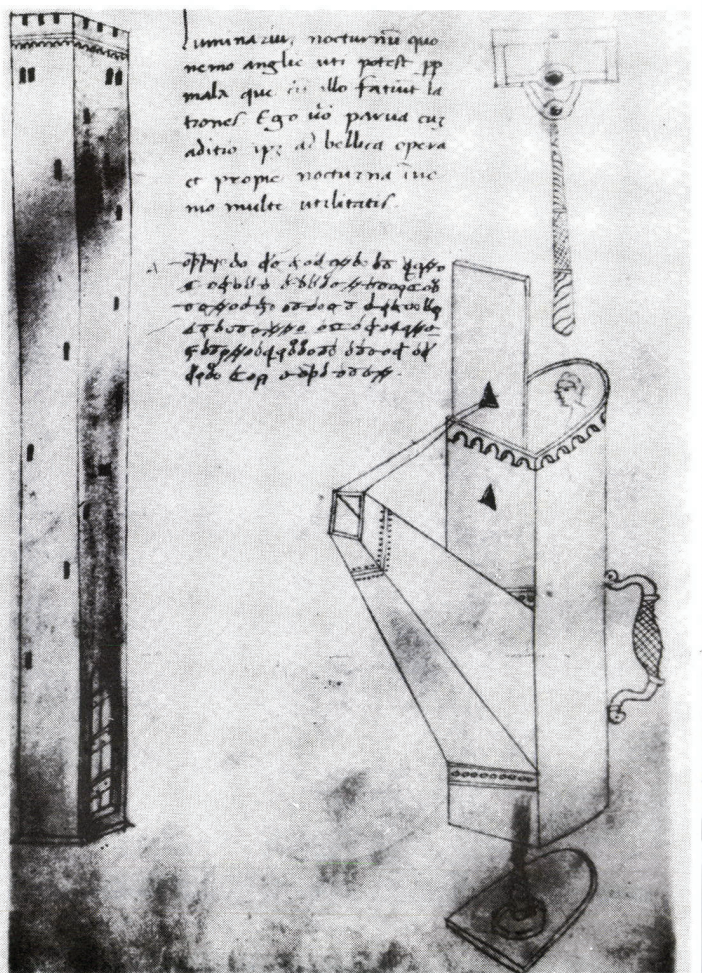
The manuscript contains descriptions of various equipment to make a medieval war; details of ships, waterworks, mechanical contraptions and some curiosities to impress for instance courtiers.

Anyone looking at the drawings with a technical eye will at first wonder about the mixing of the possible and the impossible. There are a few real "armchair inventions". Thus the description of a self-powered car, called *cathedra deambulatoria*, moved on by the driver, using a rope acting on some toothed wheels is a very unlikely construction.

But on the whole GdF put his ideas in a concrete form. Under the heading "Curiosities" I gather the optical devices, such as the lanterns. There is a

1. The magic lantern of Giovanni da Fontana after a photo from the *Liber Instrumentorum: Codex Monacensis Iconogr.* 242, made by Bayer. Staatsbiblioth, Munich. The latin inscription: *Apparentia nocturna ad terrorem videndum* (sic) videndum.

The 'Lantern' illustrated in the editorial of NMLJ, Vol 2. No.1



description of a lantern with a high light intensity; *nocturnus ignis, qui videntibus inima ostendit*, i.e. "a figure in the night that exposes the enemy to the viewers". This is an important remark, because for projection a strong (and steady) light source is of great advantage. However an indication in another book makes it probable that the light is of pyrotechnical origin, so it has a short life time.

From later works⁵ it is known that GdF was experimenting to shoot rockets in the air with gunpowder to get a firework creation of a devil or the appearance of a flying dragon belching fire from his mouth.

Who was Giovanni da Fontana?

One could write a book on Giovanni da Fontana (1395?-1455?) and his many publications. In this article we limit our scope to a few details only.

What kind of a man was Giovanni? According to Thorndike's review³, which did not include the *Liber Instrumentorum*, the picture arises of an academician in the style of the *Homo universalis*. GdF was a Venetian by birth. His licentiate and doctorate in arts are dated June 1418 and his licentiate in medicine May 1421.

It is difficult to get a notion of such a person and his surroundings. Luckily there is a rich literature on Leonardo da Vinci (1452-1519), who lived shortly after Giovanni. Many books on the Italian Renaissance convey ideas on the circumstances of life and the mentality of the people. Feldhaus⁶ and others suggest that GdF was in the years before 1418 professor at the university of Padua (nearly 40 km from Venice) and from 1418-1419 a rector of the arts college. To me it seems more probable that in the years 1410-1418 GdF was a student. According to Huelson⁴ in this time he wrote and drew his *Liber Instrumentorum*. He probably did so in order to attract the attention of Francesco Carrara, a ruler who in 1405 had taken Padua from the Venetians.

According to the literature about him, GdF must have written many publications; on some of them the authors name has been removed, but most of these have been traced back to GdF.

In spite of the confusion about his publications, da Fontana is a noteworthy man, whose observations, reflections and experiments earn him a high rank among the scientists of his time. Brushing aside the criteria by which some historians judge the greatness of historical figures, we restrict ourselves to the one question: "Was GdF the inventor of the magic lantern or its concepts?". The answer is no.

However, we are glad that in his book he mentioned the magic lantern, as a milestone along the road of time.

Optics as curiosity

Giovanni also made a note about a trick for devotional purposes: "*Mitra vel episcopalis corona quae... sua artificio fulget, et ita resplendet ut nemo in eam firmiter intueri possit, quin radiis confundatur*". In other words: "A mitre or bishop's crown shining artificially, so that nobody can look hard into it without being confused by the rays".

Besides other thoughts about the device, GdF again makes a note about a special light source of high intensity.

In the caption of the picture of the dark lantern mentioned above we read: "*Luminarum nocturnum, quo nemo in Anglia uti potest propter mala quae cum illo faciunt latrones*". This means: "The night light, which nobody in England can use, because of the evil use robbers make of it". Not much to add!

The really important matter for us in the *Liber Instrumentorum* is the figure of the *Lantern Magica* itself. According to the text it is an "*apparentia nocturna ad terrorem videntium*", i.e. "a nocturnal appearance for terrifying viewers". The deciphered text says: "*Habes modum cum lanterna quam propriis oculis vidisti ex mea manu fabricatum et proprio ingenio*", i.e. "Hold the lantern that you have seen with your own eyes and which I have made with my hands and designed myself".

Figure 1 shows that on an imaginary screen there is an enlarged shadow of the picture drawn on the glass of the lantern. We know that the possibility of such a projection is limited by the halfshades if the light source is not a pinpoint.

Zglinicki's note, i.e. "the lantern can be used to terrify the enemy", is misleading. GdF did not suggest it, probably he used it inside a room for a private performance, as a form of "*mundana dilectatio*" as was usual among rulers of state and church.

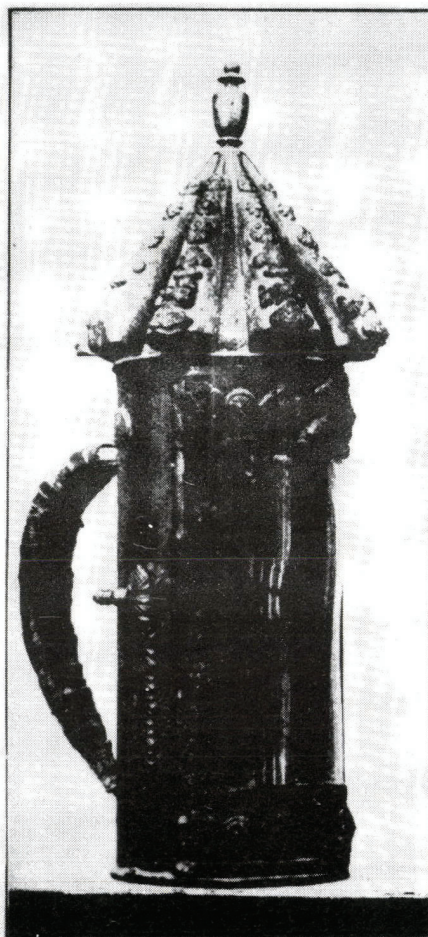
The lantern construction itself looks very much like one in use in many households in those days.

The Lantern of Florence

A lantern known to almost everyone in that time, prescribed by the government to prevent robbery when a citizen had to go in dark along the streets, is given in figure 2⁷. This lantern of a prosperous family of the 14th century contains a candle fixed in a short tube at the bottom.

The construction resembles more or less the later lamphouses of magic lanterns; the style of the light-tight funnel is also foreshadowed. The lantern is forged of wrought iron in a cylindrical shape and contains a door window with glass.

2. Closed candle lantern with glass window and funnel. This Florentine lantern dates from the 14th century.



It is obvious GdF means this kind of lantern in his drawing. On the glass he had painted *proprio ingenio* the terror inducing picture. Here we probably meet the first handpainted lantern plate. Elsewhere, he sketches an enlargement of the picture on the wall. In this way GdF stumbles upon a few basic things of the magic lantern.

It must be noted that he did not use the word "*Lantern Magica*" for his contraption. I suppose this word is of a later date. Even Athanasius Kircher (1602-1680) has not coined the word; in his book *Ars Magna Lucis et Umbra* (1671) he uses the word "*Lucerna Magica*", i.e. Magic Lamp.

In his MS GdF had used "*lucerna*" for a description of a lamp of the antique word; the *Lucerna Ptolemaei*.⁴

Conclusion

Before we draw any conclusion it will be good to agree on what we mean by a magic lantern. A rough but fairly short definition is: "A magic lantern is a device using artificial light to project a picture on a screen in order to impress the viewer". According to this definition I conclude that GdF had described the real concept of a magic lantern. Although the *Liber Instrumentorum* probably was written when Giovanni was less than 25 years old, it seems very likely that he did not invent the magic lantern. Probably the lantern shown predates the time of GdF. But the idea of a painted glass on a lantern is probably stated here for the first time. However, as far as I know, later work by him does not contain descriptions of magic lanterns.

Reflections

It may come as a surprise to some, that the notion of the invention of the magic lantern is wrong. In fact a lot of so called inventions were very common in the antique world and are of undetectable origin. Writers like da Fontana, Kircher and others can be seen as 'idea concentrators' of the period in which they lived, just as were the later encyclopediae.

If we want to trace the origin of the magic lantern before Giovanni, we meet names like Roger Bacon (1214-1294), or the Arabic Alhazen (965-1038), but I have to leave this investigation to others, because it is not the subject we wish to treat here.

The above study seems to indicate too that the word '*Lantern Magica*' is not used before about 1600. Who has given this name?

A small list shows:

- 1420 da Fontana calls it an *Apparentia Nocturnal*.
- 1659 C Huygens writes in a letter about the *Lanterne Magique*.
- 1671 A Kircher points to a *Lucerna Magica*.
- 1676 J C Sturm talks about a *Lampas Megalographica*.

Not having consulted all sources, I presume that it was Huygens who introduced the word *Lantern Magica*.

NOTES

- 1 Fr. von Zglinicki: *Der Weg des Films*, Berlin 1956, p. 56, pp. 654-655.
- 2 *The New Magic Lantern Journal*, Vol. 2, no. 1, January 1981, p. 1.
- 3 L. Thorndike: *History of Magic and Experimental Science*, 1960, Vol. IV, p. 150-180.
- 4 C. Huelson: *Der Liber Instrumentorum des Giovanni Fontana*, 1914, Festausgabe Hugo Blumner, pp. 507-515.
- 5 S. J. von Romocki: "Geschichte der Explosivstoffe", I, 1895, *Johannes de Fontana Skizzenbuch*, p. 231-240.
- 6 F. M. Feldhaus: *Die Technik der Antike und das Mittelalters*, 1931, pp. 347-348.
- 7 W. B. Niemann: "Die Entwicklung der Beleuchtung", I, 1906, *Die Urkraft der Erde*, p. 409.