



Architecture and espionage

Description

The Spy Museum near Potsdamer Platz in Berlin features cumbersome cold-war surveillance and bugging devices, and retells the story of spying and secret communications dating back to Ancient Egypt. Architecture is always there as a stage setting for covert operations. After all, spies inhabit the shadows.



I recall from previous reading that Odysseus disguised himself as a beggar and watched out for his wife's lovers. He leapt from the shadows and slaughtered them. In so far as architecture presents as a configuration of thresholds it invites secrets, surveillance, deception and harsh justice.

Cipher wheel

But the history display of the Spy Museum alerted me to something I had failed to register from my own training in architecture. Leon Battista Alberti (1404-1472), the author of the renaissance classic *On the Art of Building in Ten Books*, also invented a method of encrypting messages. He published a significant essay, *De componendis cifris* (1466), in which he introduced the cipher wheel.

The cipher wheel is a simple device with an inner and outer disk cut out of bronze sheets (or paper), each marked into 24 divisions. The outer disk lays out the letters of the Italian alphabet in upper case and some numbers. The inner disk has lower case versions of these symbols but in an arbitrary order. The two disks can be rotated freely about the same centre. The device provides a simple way of mapping the letters from a text message to create a coded version. As long as the receiver has the same device and knows the alignment of the disks, it's simple to decode the message.

Unfortunately, it's also a simple matter for any cryptanalyst (code breaker) to work through various letter combinations to come up with a good guess at the mapping, and eventually the hidden message. Certain letters occur more frequently in any language and that acts as an initial clue for the code breaker.

The clever idea of the cipher wheel is that the coder shifts the alignment of the inner and outer disk at certain points in the message, and indicates these shifts to a new alignment by inserting a special character in the coded message. This new mapping effectively scrambles any one-to-one mapping between a symbol and its coded equivalent, making it harder for cryptanalysts. Wikipedia provides a good explanation of how this works.

Not just genius

Alberti was in the company of other renaissance polymaths who applied their inventiveness across architecture, sculpture, writing, music, astronomy and other arts and sciences. That Alberti dabbled in encryption provides just another example of renaissance genius at work.

But by a more interesting reading, Alberti's penchant for encryption is integral to his understanding of architecture. This is the argument advanced by philosopher and historian of cryptography Quinn DuPont.

It seems that the common factor between architecture and encryption is the influence of the printing press, i.e. moveable type, invented and adopted during Alberti's lifetime. Alberti's innovation paralleled radical changes in how people understood language and architecture. But more on that later

Bibliography

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- Alberti, Leon Battista. 1996. *On the Art of Building in Ten Books*. Trans. Joseph Rykwert, Neil Leach, and Robert Tavernor. Cambridge, Mass.: MIT Press. First published in Latin in c. 1450.
- DuPont, Quinn. 2017. The printing press and cryptography: Alberti and the dawn of a notational epoch. In Katherine Ellison, and Susan Kim (eds.), *A Material History of Medieval and Early Modern Ciphers*: 95-117. London: Routledge.

Notes

- Image below is from the interpretation board at the museum.

- Also see posts: [Encrypted city](#), [Romancing the blockchain](#), and [Share city](#).

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ITALY



Brillante Erfindung aus der Renaissance: Leon Battista Albertis Chiffrierscheibe (1467).
Brilliant invention of the Renaissance era: Leon Battista Alberti's cipher disk (1467).

um 1450

Kryptologie-Genie der Renaissance

Leon Battista Alberti (1404 - 1472) war ein Philosoph, Schriftsteller, Architekt, Organist und Vater der europäischen Kryptologie. Er erfand die Chiffrierscheibe, die mit ihren zueinander verschiebbaren Buchstabenreihen komplexe Codes ermöglichte. Die Zuordnung von Geheim- zu Klarzeichen konnte damit innerhalb einer Botschaft verändert werden.

around 1450

Cryptography genius of the Renaissance

Leon Battista Alberti (1404 - 1472) was a man of many talent: a philosopher, writer, architect, organist and the father of the European cryptology. He invented the cipher

disk creating complex encryption codes through

polyalphabetic substitution.

Category

1. Architecture

Tags

1. Alberti
2. ciphercity
3. cryptanalysis
4. encryption

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