



THE VATICAN CHALLENGE – PART 3

Author: George Lasry

June 2019 (Update: November 2020)

The Secret Archives of the Vatican (ASV)



Figure: <https://www.pexels.com/photo/ancient-antique-architectural-design-architecture-442420/> licensed under Creative Commons Zero (CC0) license.

Introduction

The Vatican owns a large collection of hand-written historical manuscripts, letters and other writings, as well as printed books. Many of these writings are to be digitized and made available to the public. Some of these old historical manuscripts contain ciphertexts that have not been decrypted yet . . .

Challenge (1/5)

The following enciphered message was found in the Vatican Secret Archives (or ASV, in Latin: Archivum Secretum Vaticanum; Italian: Archivio Segreto Vaticano), Reference: ASV/ARCH-Nunz-Colonia/5/26. It is also included in the DECODE database [1].

This message starts with a date and place in cleartext, followed by a series of codes, either with 2 or 4 digits, separated by commas (or a new line).

Challenge (2/5)

<CLEARTEXT IT Bruxelles 9 Oct. 1721>

01,16,05,14,6,1,58,06,14,77,2,03,61,45,9441,43,03,04,53,06,17
66,71,38,2,67,14,77,03,38,53,38,77,22,05,04,14,40,18,77,15,35,58
16,38,77,53,9336,9485,53,03,16,06,14,66,77,17,38,16,05,14,77,222
15,77,73,2,73,77,41,04,53,58,61,15,16,66,17,77,74,04,55,77,18,04,15
35,06,40,46,61,81,40,17,66,22,73,16,14,08,77,03,16,86,88,17,74,77
05,14,16,50,61,38,17,03,61,35,17,16,76,38,58,14,17,06,77,65,9356,77
46,06,66,75,16,58,16,14,41,22,17,38,05,61,66,47,66,03,04,15,16,73
77,14,16,06,61,15,04,66,03,17,04,14,17,74,77,03,03,04,66,46,16,17
38,60,16,71,61,14,46,17,66,71,65,18,04,88,61.

The key is unknown. The plaintext of the message is unknown.

Challenge (3/5)

Some observations and hypotheses (which might be correct or wrong):

- ▶ The language is probably Italian.
- ▶ The cipher is most likely homophonic, that is, every letter may be represented by more than one code (sequence of 2 or 4 symbols).
- ▶ The shorter codes (2 digits) likely represent letters, and possibly, common syllables and prepositions.
- ▶ The longer codes usually represent words (e.g. Re = king), names (e.g. N.S. = pope), places (e.g. Roma), or common prepositions (e.g. con = with).

Challenge (4/5)

- Most of the ciphers in the ASV have nulls, that is, a set of 1 or 2 digit codes that do not represent any letter, syllable or word. They are often used to delimit words. It is not clear whether nulls are used in this challenge cipher, as commas are used, and are likely separating the codes.

Challenge (5/5)

A useful source (in German) about the history of Vatican ciphers may be found in [2] (note that the cipher in the challenge is from 1721, while Meister mainly describes 16th century ciphers).

The answer to the challenge should include:

- ▶ The key, including the mapping of the various 2-digit codes. As each 4-digit code appears only once, they might be too difficult to interpret, so their interpretation is optional.
- ▶ The plaintext.
- ▶ Optionally (for additional points): The method used to recover the key and plaintext.

Hints (coming with the update from November 2020)

1. The plaintext is in Italian.
2. The cipher is homophonic. Homophones and some common Italian prepositions and syllables are represented by either one or two digits.
3. Four-digit codes probably represent names and common words from a nomenclature. It is not required to interpret them in your solution.
4. The various codes representing the homophones are separated by commas.
5. One of the ten digits is reserved for nulls.

References

1. Megyesi, B., Blomqvist, N., and Pettersson, E. 2019. The DECODE Database: Collection of Historical Ciphers and Keys. "In Proceedings of the 2nd International Conference on Historical Cryptology (HistoCrypt 2019)." NEALT Proceedings Series 37. June 23-25, 2019, Mons, Belgium. Published by Linköping Electronic Press (<http://www.ep.liu.se/ecp/contents.asp?issue=158>). This work is part of the DECRYPT project financed by the Swedish Research Council, grant 2018-06074.
2. Aloys Meister, "Die Geheimschrift im Dienste der päpstlichen Kurie von ihren Anfängen bis zum Ende des 16. Jahrhunderts", Paderborn 1906, available online <https://archive.org/details/diegeheimschrift00meis/page/n6>