The Voynich Manuscript Compared with Other Encrypted Books

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Abstract

The Voynich Manuscript is definitely not the only encrypted book known to crypto historians. The authors of this submission are aware of over 100 other tomes that are written completely or to a considerable part in cipher. This paper provides an overview on these with a focus on their properties and the reasons why they were created. The main goal of this paper is to compare the Voynich Manuscript with other encrypted books in order to draw conclusions and make educated guesses with respect to some of the unanswered questions surrounding this famous cryptogram. Most of all, after we categorize the other known encrypted books, then based on the Voynich Manuscript's similarities with books in various categories, the purpose of the manuscript can be narrowed down with some certainty to two categories: the knowledge book category and the hoax category.

Keywords

Voynich Manuscript, encrypted books, Rohonc Codex, Steganographia, hoax, criminal profiling, knowledge

1. Introduction

One of the many fascinating aspects about the Voynich Manuscript is that so little is known about its origin. Neither the author nor the creation place nor the purpose are known, while the text creation method – it might or might not involve encryption – has never been identified. One of the few clear points is that the vellum was created in the early 15th century [1], though it is not known how much time passed between the production of the material and the writing of the text.

Searching for clues in the manuscript itself has not proven very successful, as the text cannot be read and the illustrations contain extremely few references to historical events, culture, region, philosophy or religion. Further, the manuscript is not mentioned in any known source before the 1630s, which means that the first two centuries of its assumed existence are not documented at all.

1.1. Investigating a cryptologic cold case

The current situation of Voynich Manuscript research has some similarity with a cold case in forensic science: In spite of many efforts, the investigators (the Voynich Manuscript scholars) have failed to solve the case (i.e., to clarify the mysteries surrounding the manuscript); virtually all available investigation methods have already been tried at length, but to no avail.

In forensic science, a method for solving cold cases has gained importance in recent decades: criminal profiling. The authors of this work are far from being experts in this field, but they believe that criminal profiling techniques may also be applicable for investigating historical cold cases such as the one of the Voynich Manuscript. This idea is not completely new. For instance, over the last twenty years Gordon Rugg and Torsten Timm tried to produce Voynich-Manuscript-like nonsense texts with methods already available in the 15th century [2, 3]. Both came up with creation methods that appear more promising than the countless decipherments that have been proposed. Their approach can be

compared with the work of criminal profilers who reenact a murder in order to learn how the perpetrator might have killed their victim.

A different approach used in criminal profiling is to compare a certain case with others of the same kind. This method often reveals important information about the perpetrator in a relatively simple way. For instance, if all documented cases of strangulation of an adult victim have been committed by male individuals, this strongly suggests that an unsolved crime involving the strangulation of an adult was committed by a man.

Just like comparing a crime with others, it is possible to compare the Voynich Manuscript with other documents. For instance, it might be an interesting project to take other illustrated books from the 15th century or other old books depicting plants as comparison objects. As we, the authors of this paper, are crypto history specialists, we have chosen a different approach: We compare the Voynich Manuscript with other encrypted books. In this paper we present our findings.

Of course, there is no one clear definition of a book. For our purposes, we define a book as having one or more of the following properties:

- At least 20 pages
- Being bound as a book
- Being referred to by its author(s) as a book
- Not being something obviously different (a letter, postcard, telegram, etc.)

For reasons of simplicity, we use the term "encrypted book" in this work, though we know that the content of the Voynich Manuscript and of some books we compare it with could also be written in an unknown script or contain mere nonsense. It is also important to note that all the following considerations only cover documents that qualify as books, while letters, telegrams, postcards, sculptures, and newspaper ads are out of scope. In addition, we assume that the Voynich Manuscript was created in the early 15th century, as suggested by the age of the vellum. We leave the hypothesis that the manuscript was written on old material generations or even centuries later to future research.

1.2.   Our method

For our analysis, we have compiled a list of 118 encrypted books, including the Voynich Manuscript itself [4]. We tried to make the list as complete as possible, which includes that we added all encrypted books that are mentioned in the crypto history literature of which we are aware. In addition, we consulted internet search engines, online archives, and libraries to find more documents of this kind. Still, our collection is certainly far from complete.

The comparisons of the Voynich Manuscript with other books we examined depend to a large extent on classifications. We classify the books on our list according to different criteria, and then we check to which class the Voynich Manuscript might belong. Our hope is that this method will allow for conclusions and educated guesses with respect to unanswered questions about the manuscript. Of course our method has a limitation: If some property of the Voynich Manuscript is not shared by any of the 117 comparison objects, it will not be considered.

Besides comparing the Voynich Manuscript with the other encrypted books on our list, this paper provides information about encrypted books in general. It is our hope that the classifications and comparisons we perform will lead to a better understanding of encrypted books and to further research.

2. Classification according to purpose

In a first step, we classified the encrypted books on our list according to their intended purpose. We identified ten categories that cover almost the whole collection. In the following, we compare the Voynich Manuscript with the members of each group. Some aspects only play a minor role, as they are addressed in later sections: Creation time, cipher method used, handwritten or printed, encryption broken or unbroken, and number of authors.

2.1.   Diaries

40 books on our list are encrypted diaries, which makes this category the largest. By diary, we mean something that had a single author, and was written chronologically with an entry for almost every day. Diaries are usually only intended for reading by the creator. We found that the Voynich Manuscript is for several reasons significantly different from all of the encrypted diaries that we have seen. First, the illustrations are atypical for a diary; second, there are almost no visible corrections in the text; third, no dates and separations between diary entries can be seen; and fourth, all encrypted diaries we know of are based on simple substitutions or abbreviations, which appears not to be the case for the Voynich Manuscript. All these observations suggest that the Voynich Manuscript is not a diary.

2.2. Treatises of secret societies

As is well known, the Freemasons published numerous enciphered or abbreviated books (sometimes referred to as "Cyphers"), most of which contain ritual descriptions or similar treatises. As our list shows, other secret societies have created documents of this kind as well, including the Oddfellows, the Association of Maiden Unity and Attachment, and the Occulists. Prison gangs have produced encrypted treatises, too. Altogether we count 23 tomes of this category in our catalog.

There is not much similarity between these secret society documents and the Voynich Manuscript. For instance, the illustrations in the latter have no equivalent in any of the encrypted secret society books we are aware of. In addition, all secret society treatises on our list are encoded in either a simple substitution system that can easily be broken or based on an abbreviation code. Neither of these fits with the Voynich Manuscript.

2.3. Notebooks

Several encrypted notebooks, written by artists, prisoners of war and scientists, have made it to our list. In comparison to diaries, notebooks are usually undated, and are fairly unstructured. Diaries might have many consecutive dates, whereas notebooks might be used only occasionally. Diaries generally are composed of sentences and paragraphs, whereas notebooks are more likely to contain lists and sentence fragments (notes). They also often contain sketches and drawings. For several reasons it is very unlikely that the Voynich Manuscript is an encrypted notebook. In particular, the writing in the manuscript, which is generally considered to be copied from a master text, is almost by definition not consistent with a notebook. In addition, notebooks usually contain short paragraphs, sketches, and numerous corrections, none of which can be found in the Voynich Manuscript.

2.4. Religious books

The Rohonc Codex, another popular encrypted book, appears to fall into the category of "Religious books" [5]. These contain religious content such as prayers, sermons, and religious treatises. Other tomes of this kind include Fabian Humphrey's Prayer Book, the Gelle Prayer Book, and Andrew Fuller's sermon book. The Voynich Manuscript is different from all of these. In particular, the illustrations do not fit with a religious book, as despite the inclusion of hundreds of drawings, practically none of them include religious symbolism. Further, it would be highly unlikely for a religious book to contain the content that the Voynich Manuscript does, such as images of naked women, and Zodiac signs. There is of course a hypothesis that the illustrations have just been added to mislead the reader. This is covered in the "A disguised book?" chapter below.

2.5. Knowledge books

Eleven of the encrypted books on our list contain some kind of (usually secret) knowledge. We define this category as knowledge books. This category includes books about medicine, magic, and alchemy. It is a sister category to that of "religious books", with the difference that the content is not religion-related. Examples include "Das zweyte Silencium Dei" (about alchemy, only partially

encrypted), the Adelsbach Manuscript (about medicine), and MSS-Borg.lat.898 (about medicine). As will be pointed out later in our paper, four of the knowledge books have a closer visual similarity with the Voynich Manuscript than any other book on the list and were even created roughly at the same time. All in all, it seems well possible that the Voynich Manuscript is a book about secret knowledge.

2.6. Literature

Some encrypted books represent literature: novels, memoirs, or poetry collections. Illustrations in these works are generally high quality and intended for publication. Works of this kind have been created by Simeone Levi, Pietro Giannone, Ernest Rinzi and others. The encrypted book of Ernest Rinzi (1836-1909) even contains illustrations (see Figure 1). However, the kind of illustrations in the Voynich Manuscript do not fit very well with a piece of literature. The hypothesis that the illustrations have just been added for misleading the reader is covered in the "A disguised book?" chapter.
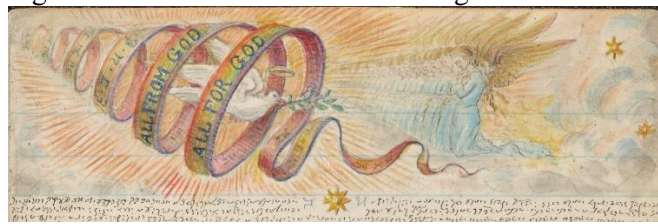

Figure 1: Like the Voynich Manuscript, the encrypted memoirs of Ernest Rinzi (1836-1909) contain many illustrations. Still it is unlikely that the two works have a similar content.

2.7. Puzzles

Eight books on our list were created as challenges for crypto enthusiasts. These can be differentiated from other categories by the quality of the drawings, and by the way that they are formally published. They usually have a known author who has stated, "Here is a puzzle to be solved". However, all of these works have been made over the last 50 years, which makes it extremely unlikely that the Voynich Manuscript is of the same kind.

2.8. Hoaxes

Seven books on our list can be regarded as hoaxes. Being a hoax in this context means that a book has no purpose except for impressing or misleading a potential beholder. A hoax encrypted book may be decipherable, but once solved, does not provide useful content. Or, the author may openly admit that it's a hoax. Of course, if a work has not been solved, it may still be unknown as to whether or not it's a hoax. As four of the said seven books are modern productions, we only list the older ones here:

- The most famous hoax of this kind is the "Steganographia" written by Johannes Trithemius in the 15th century [6, 7]. It appears to be about magic, containing long lists of numbers that allegedly play a role in this context. In reality, the numbers encode messages, all of which have no practical value. The intent of Trithemius was to ridicule other books with fantastical theories about magic, as he wrote effectively nonsense, but this nonsense encrypted a message.
- A part of The "Book of Soyga" can be regarded as a hoax too [8]. This 16th century tome contains 36 tables of letters that were created with an algorithm and therefore have no real meaning. The purpose of this hoax is still unclear.
- Charles Dellschau's books, created between 1899 and 1922 (there are 13 volumes which for simplicity we count as one book) provide information about a nonexistent society, Nymza, and they depict fantastical aircraft (see Figure 2). Dellschau was a German immigrant to the United States who worked as a butcher and was effectively unknown during his lifetime. He made no attempt to publicize his books and all were set to be destroyed after his death, but someone else discovered them, and preserved them due to their beautiful illustrations. It is

not known whether the books were created as an elaborate science-fictional world, or whether Dellschau was attempting some sort of fraud and wanted people to believe his claims that powered air flight was actually 50 years older than as claimed by the Wright Brothers. The text in the books is a mixture of English, German, and encrypted text. The encryption method has been discovered, but most of the text has not yet been decrypted.

The Voynich Manuscript has a few things in common with these works. The first two books listed show that hoaxes already existed in the 15th century. The nonexistent technology depicted in the Dellschau books, though written centuries later, corresponds with the non-identifiable plants in the Voynich Manuscript. All in all, it is well imaginable that the Voynich Manuscript is also a hoax according to the definition above.

Figure 2: The encrypted books of Charles Dellschau (1830-1923) can be regarded as hoaxes. They have a few things in common with the Voynich Manuscript, including the fact that the illustrations show non-identifiable objects.

In the hoax category, numerous names as potential hoaxsters have been proposed, such as Edward Kelley, John Dee, or even Wilfrid Voynich himself, though none of them had any history of creating fraudulent encrypted works. Also in the hoax hypotheses, it has been suggested that the Voynich Manuscript was either created around the time that the vellum was created, meaning the early 15th century, or that a hoaxster obtained older vellum in later centuries, and then put seemingly encrypted text on the vellum in order to create a "curiosity" to be sold to a wealthy benefactor such as Emperor Rudolf II. These theories must now be reconsidered in the light that none of the other older encrypted books in the hoax category on our list (to our knowledge) were created in order to be sold.

2.9. Art

Eight encrypted books on our list have been created as artwork. Most of these fall into this category simply because an artist (such as Guy de Cointet or Hyo Myoung Kim) has openly said that the book is art and the encryption is part of the artistic process. These books may or may not be decipherable. All of the books in this category have been created within the last 50 years. The Voynich Manuscript appears to be too old to fit into this quite modern category.

2.10. Others

There are several books on our list that do not fit in any of the above categories or cannot be categorized because not enough is known about them. One category we have not covered is about books created by a mentally ill person. As many other artworks have been made by individuals of this kind [9], it seems possible that the Voynich Manuscript has a similar origin, though it needs to be taken into account that the vellum used was an expensive material a mentally ill person usually did not have access to. Of course, it would be interesting to compare the Voynich Manuscript with encrypted books that have such a background, but we are not aware of any.

2.11. Conclusion with regards to purpose

As can be seen, there are only two categories that appear to be a good fit for the Voynich Manuscript: the hoax and the knowledge book groups. In the following section, we cover a few more arguments that support these hypotheses.

3. Classification according to creation time

As table 1 shows, all encrypted books on our list were created since 1400. The Voynich Manuscript, which was made before 1450, is one of the oldest, or even the oldest, work in our virtual collection.

Table 1
Creation time of encrypted books

Century	Number of encrypted books
15th	6
16th	5
17th	7
18th	11
19th	27
20th	36
21st	19
Unknown	6

It is now especially interesting to look at the books that were created roughly at the same time as the Voynich Manuscript. Apart from the Voynich Manuscript, five tomes on our list are 15th century productions. Three of these were created by the humanist Giovanni Fontana (1395–1455). His books, which we place in the knowledge book category, describe a wide range of technical constructions with numerous illustrations, many of which show devices that would not work in practice. Many, but not all paragraphs in these three books are encrypted. Another 15th century encrypted knowledge book is "Codex Palatinus Germanicus", a treatise about magic, alchemy, and astrology (see Figure 3). A large amount of the content is written in cipher (which has been solved). The "Codex" also contains a few illustrations depicting animals.

Figure 3: "Bellicorum instrumentorum" by Giovanni Fontana (middle), the Codex Palatinus Germanicus (right), as well as two more Giovanni Fontana books (not depicted) have the closest visual similarity with the Voynich Manuscript (left), and they were created at roughly the same time. All four fall into the knowledge book category.

Another encrypted book from the 15th century is the aforementioned "Steganographia" by Johannes Trithemius, which in the 20th century was finally confirmed to be a hoax. This means that all five contemporaries of the Voynich Manuscript on our list are either knowledge books or hoaxes. This confirms what we already stated previously: The knowledge book and the hoax categories fit best with the Voynich Manuscript.

We are not aware of any other encrypted books from the 15th century. For this reason, we look at 16th century productions next, five of which are on our list. This selection includes the oldest diary on our list, written by Eric Brahe. As we have ruled out diaries, this work is not relevant here. The four remaining ones are two religious works, one knowledge book, and one literature tome. All in all, there are no additional conclusions we can draw from these 16th century creations.

4. Classification according to handwritten or printed

78 of the 117 encrypted books we examined are handwritten. This is a surprisingly high ratio, considering that the vast majority of books created over the last six centuries are printed. One reason

for this high number might be that many encrypted books appear to be personal documents, such as diaries and notebooks. In addition, documents created before printing was in common use often needed to be reproduced by hand. The Voynich Manuscript belongs to the handwritten category. Since we have ruled out the potential of it being a diary or notebook, this lends credence to it being a member of the knowledge books or hoax categories, since most books in those categories are handwritten. As a sidenote: of the encrypted books on our list, 32 use a standard / recognizable alphabet, 81 use a secret alphabet, 4 are unknown, and one uses a mix of both standard and secret alphabets. There appeared to be no difference in terms of categories when a document used a standard alphabet or not.

5. Classification according to broken or unbroken

An obvious classification of encrypted books is based on the question of whether the text can be read and understood. This is not yet the case for the Voynich Manuscript. Of the 118 encrypted books in our virtual collection, only 15 are unbroken, while all others can be read because they have been deciphered or the key is known. With the exception of the Voynich Manuscript, all the other unbroken works were created over the last 100 years. This once again shows that the Voynich Manuscript is unique in some respect.

It is, however, worth noting that there are three encrypted books from the 15th and 16th century that were only deciphered in the last 30 years. We have already mentioned all of these: the Rohonc Codex, the "Book of Soyga", and "Steganographia". Just like the Voynich Manuscript, these tomes baffled scholars for centuries. The Rohonc Codex is a religious book, which is, as already stated, an unlikely category for the Voynich Manuscript. "Steganographia" and the "Book of Soyga" are hoaxes, which shows that within this classification the Voynich Manuscript is consistent with a hoax, too.

6. Classification according to the cipher method

62 of the books on our list have been created with a monoalphabetic substitution cipher (MASC). We know of 17 books, all of which stem from the Freemasons or other secret orders, which were made with an abbreviation cipher. Both a MASC and an abbreviation cipher are also candidates for the text in the Voynich Manuscript, but so far all deciphering attempts based on these assumptions have failed.

Table 2

Encryption method used

Method	Number of encrypted books
Monoalphabetic substitution	62
Abbreviation	17
Code	1
Algorithm	1
Random	2
Other	12
Unknown	22

All other encryption systems are encountered only rarely on our list. For instance, the aforementioned Rohonc Codex is the only book known to us that appears to have been created with a code-type (as opposed to cipher) encryption system. The "Book of Soyga", which we have already addressed, contains letter sequences that were created with a simple mathematical algorithm. Two other books on our list, in our "other" category, were probably written using random typewriter keystrokes. While this is clearly not an option for the Voynich Manuscript, it at least shows that books containing completely meaningless text exist. Ultimately, it can be said that a code, an algorithm, or random letter sequences are all possible explanations with respect to the question of how the text in the Voynich Manuscript was created. Further evaluation of these hypotheses is beyond the scope of this paper.

7. Classification according to the number of authors

75 books on our list were created by single authors, eight of whom were female. All encrypted books that were provably written by women turn out to be diaries. For 44 works in our collection, the number of authors is not known to us. We are not aware of any encrypted book that was provably created by more than one person. As far as we can tell, even the illustrated books in our collection were not made by a writer cooperating with an artist, but by one individual acting as both. All this clearly suggests that the Voynich Manuscript was created by a single mind, too. We know, however, that other research has come to a different result [10]. Considering that female authors only played a very minor role, except for diaries, it seems likely that the Voynich Manuscript was created by a man.

8. A disguised book?

When exploring the purpose of the Voynich Manuscript, one more hypothesis needs to be considered: The illustrations in a manuscript might have no real meaning and were only included to confuse the beholder. This would mean that the Voynich Manuscript is a disguised book. Several encrypted books on our list include disguise elements:

- The Kassel Zauberhandschrift looks Arabian but is not.
- "Ancient Mysteries" and "Mysteries of Vesta", two 19th century creations, are secret order treatises looking like foreign language novels.
- Donald Hill's Second World War diary is disguised as a collection of mathematical tables.
- "Steganographia" by Trithemius is not only a hoax but also a disguised book. It appears to be about magic but in reality it encodes useless messages.
- The Rilke cryptogram consists of ciphertext pages glued into an unobtrusive book (a biography of the German poet Rainer Maria Rilke) [11].

In a similar way, the Voynich Manuscript could be a work disguised as a knowledge book about plants, astrology and bathing, while the encrypted text covers something completely different. If this is the case, it would become much more likely that the Voynich Manuscript is a religious book or a piece of literature. This would mean that a 15th century author wrote a religious treatise or some fiction or non-fiction report and that they encrypted it to keep the content secret. In addition, the author included numerous illustrations to disguise the true nature of the work.

An important argument against the disguise hypothesis is the high number of illustrations in the manuscript and the amount of space these take. Much fewer images would have been sufficient for a convincing disguise. Waiving most of the illustrations not only would have saved the author work but also money, as vellum was an expensive material at that time. In addition, the depicted naked women, the fold-outs, and the large plant images make the Voynich Manuscript look especially conspicuous – something the author of a disguised book is likely to avoid.

9. Are the illustrations consistent with a knowledge book?

When further exploring the knowledge book hypothesis, the illustrations need to play an important role. The images in the Voynich Manuscript depict non-identifiable plants, naked women, seemingly meaningless rosettes and a few other motifs. Some illustrations are presented on elaborate fold-outs. While images of this kind make perfect sense for a hoax, as they attract attention and make the manuscript look mysterious, it is much harder to explain how they fit into a knowledge book. What kind of knowledge would somebody provide about nonexistent plants and a group of rosettes filling four pages? As encryption experts, we leave the answer to this question to art and science historians.

10. Conclusion

Independently from the Voynich Manuscript, our list of encrypted books reveals interesting information. For instance, there are numerous encrypted diaries and still we are not aware of a systematic overview of this type of document, except for two chapters in crypto history books [12, 13]. Similarly, countless encrypted books have been published by secret societies, but no systematic overview is known to us.

Apart from this, our overview has shown that, compared to other encrypted books, the Voynich Manuscript is an unusual, even unparalleled document. It is one of the oldest encrypted books known and by far the oldest that has not yet been deciphered. The text in the manuscript is different from virtually everything else we have encountered in works of this kind.

The most important result of our examination relates to the intended purpose of the Voynich Manuscript. In our view, it is very unlikely that the manuscript is a diary, a secret-society treatise, a notebook, a religious book, a piece of literature, a puzzle book, or an artwork. The only remaining categories (except for "others") are knowledge books and hoaxes. We have presented several works that fall into the knowledge book and hoax classes, which were created roughly at the same time as the Voynich Manuscript and that have other properties in common with it. We are therefore of the opinion that either a knowledge book or a hoax must be the most convincing explanation for the purpose of the Voynich Manuscript.

We know that the examinations presented in this work are just a first step. It is necessary to extend our list of encrypted books to allow for additional comparisons and more precise conclusions. Among other things, we hope that we will find more comparison works from the 15th and 16th century, which are the most interesting ones. Extending our list might also reveal whether the "others" category includes further plausible explanations, such as the "mentally ill author" hypothesis.

Coming back to the introduction of this work, we hope that more criminal profiling techniques will be employed in the Voynich Manuscript research. For instance, the question of whether the manuscript has been created by a mentally ill person should be examined by a mental health professional. The general question of why someone might have written something like this could be explored by psychology experts. Finally, the Voynich Manuscript should be compared with works that are not encrypted, including historical hoaxes such as books, artworks, certificates, and maps. We hope that art historians and philologists will fill this gap in the near future.

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