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Cracking Voynich's Manuscript:
An data science
and forensic
context analysis

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PART 1

VOYNICH'S MANUSCRIPT

CHAPTER 1: INTRODUCTION

VOYNICH'S MANUSCRIPT, (VM) is a mysterious illustrated book, written in unknown script in an unknown language. According to radiocarbon dating (C14), used inks, parchment are dated between 1404 and 1438. The book is named after Wilfrid Michael Voynich who acquired the manuscript in Italy in 1912. The text is currently owned by Yale University under the name MS 408.



Figure 1.1: VM page 59, Source of picture: [1]

The manuscript is of interest to many scientists of various disciplines, especially cryptologists. Purpose of this project is show indications of possible linguistic relationships between the Voynich and other languages and propose hypothesis, assumption supported with historical context of origin of this manuscript.

The book probably had about 272 pages in 17 sheets, but only 240 have survived. The text is written on parchment in unknown script and unknown language, except some small Latin notes text on margin fo pages . The whole book has about 35,000 words, while the individual characters do not follow each other randomly, but certain laws can be traced in them, which testifies to the existence of spelling and grammar rules. Statistical analysis of the text suggests that Zipf's law [2] applies to the language used,

the average length of each word is roughly the same as Latin or English. According to the illustrations, the book is divided into several parts, it is likely that it is a treatise or treatises from several areas:

- **Botanical part.** The illustrations contain pictures of plants, most of them are difficult to identify, some have not been identified to date.
- **Astronomical part.** Illustrations include astronomical diagrams, astrological diagrams and symbols, zodiac sketches. Some diagrams are followed by the names of the months of the year in Latin, in the Romance language, perhaps in Catalan or Occitan. However, it is possible that the passages written in Latin were added later.
- **Biological part.** The illustrations mostly show miniatures of naked women bathing in some strange formations, some of which resemble bodily organs. Some of the women have crowns.
- **Cosmological part.** The illustrations remotely resemble maps of a strange landscape or cosmological sketches. Castles, perhaps volcanoes, are shown.
- **Pharmacological part.** Illustrations show parts of plants (roots, leaves). Perhaps these are pharmaceutical prescriptions, which may be indicated by the fact that the text is divided into short paragraphs in this section.
- **Recipes.** Without illustrations, the text is divided into short paragraphs, separated by bullets in the shape of a flower or star.

A VM JOURNEY THROUGH THE CENTURIES

THe first documented owner was the alchemist Georgius Barschius, who lived in Prague and lived in the early 17th century. But this alchemist obviously didn't know how to decipher the book, because he said it "only uselessly took up space in the library." After his death in 1662, the manuscript was obtained by the physician and rector of Charles University, the scholar Jan Marcus Marci, who sent the book to the learned Jesuit Athanasius Kircher. The manuscript was stored in the library of the Pontifical University of Gregorian. For the next 200 years, there are no records of the book, but it bears ex libris the

Jesuit scholar Peter Jan Beckx (1795-1887), among others the rector of the university, which may indicate that the book has moved to his private library, from which it was in 1866 he bought the Jesuit order.

The book re-emerged in 1912, when Wilfrid Voynich found it in a Jesuit library in Italy. In the book he found a letter from 1665, written by mentioned Prague scholar Johannes Marcus Marci, who sent it together with the book to Rome to his friend Athanasius Kircher. According to the letter, the manuscript previously belonged to Emperor Rudolf II, who was to pay 600 ducats for it. It is not at all clear to whom it belonged before. All we know is that the ink dates from the first half of the 15th century, so it could have been created more than 100 years before the emperor bought it.

Wilfrid Voynich thought that the book could have been sold to the emperor by the Englishman John Dee. We do not know exactly where the manuscript originated and who created it.

OCCAM'S RAZOR PRINCIPLE OR FOLLOW THE MONEY

BY mentioned letter assumption about author and language of Voynich's manuscript, Emperor Rudolf II paid 600 gold ducats, approximately million dollars in today price ($600 \times$ troy ounce of gold, $31 \text{ g} \approx 1,86 \text{ kg}$ gold) for this manuscript. Rudolf II was well known for his ability spent lot of money to buy art, alchemistic, occult artefacts. An this was a great opportunity for speculative business for experienced alchemists, occultists like John Dee, or Edward Kelly, both acting on court of Emperor Rudolf II.

They can not resist to attempt to prepare and sell to Emperor the mysterious book with old unknown script and language. But remember that John Dee has Welsh origin and probably knows old Celtic language like for example Welsh language. To create book is than enough exchange latin script with some new one, simple replace latin character with some nice new type , which looks ancient and write botanical, astronomical or other normal text in Welsh language with new mysterious alphabet. After put illustration. If they did one page per day, whole book took 270 days, 9 months of work, but probably less some when around years 1583-1584.

They needs just procure old pergament and inks to imitate old book in their times. This fit with known fact, that used inks, pergament are dated between 1404 and 1438 at in principle not exclude John Dee and Edward Kellye from this

activity to cheat emperor with more sophisticated fake book containing some text from textbooks, or medieval literature transcribed to Voynich script and Welsh dialect may be combined with some stemmed medieval english words.

KELLY'S AND DEE'S ENOCHIAN LANGUAGE

Kelly and Dee developed language system to "talk" with angels, this means to increase their mystic reputation they fabricate alphabet with structure similar to English, so called Enochian script. Due to is quite good to suppose that they developed also Voynich's script.

EDWARD KELLEY (AUGUST 1, 1555, WORCESTER, ENGLAND - NOVEMBER 1, 1597, MOST, BOHEMIA)

also known as Edward Talbot or Edward Kelly was an English alchemist living and working much of his life at the court of Emperor Rudolf II. in Prague. In 1573 he enrolled at Oxford University. He did not complete his studies, but he liked to boast of his education and unjustifiably used his university degrees. He then studied pharmacist with Anthony Gray; this pharmacy knowledge helped him in his later alchemical work. He also worked in a law firm, where he committed fraud, for which he was punished - both ears were cut off. In 1582, under the name Talbot, he entered the service of the famous scholar, naturalist, geographer, but also the famous astrologer, alchemist, magician and mystic John Dee. Kelley claimed to be talking to angels at the time, and Dee believed him and made him his companion and medium for his sessions. In February 1584, Dee traveled with his entire family and also with his assistant Kelley to Poland, where they stayed on the estate of Albert Lasky in Lask. After a month of their stay, they went to Krakow and then to Prague, where they arrived on August 9, 1584. Here they were welcomed by the famous naturalist and the emperor's personal physician Tadeáš Hájek from Hájek, who accommodated them in his house. At his intercession, they also received an audience with Emperor Rudolf II. Some historians believe that John Dee and Edward Kelley were in fact secret agents of Queen Elizabeth I of England and were tasked with interfering in the favor of Rudolf II, who was known for his weakness for alchemy and magic.

JOHN DEE (JULY 13, 1527 LONDON, ENGLAND - 1609 MORTLAKE, ENGLAND)

was a mathematician, astronomer, alchemist, astrologer and occultist of Welsh descent. His surname "Dee" reflects the Welsh du (black). Born in 1527 in London to the family of a rich businessman. He studied mathematics and astronomy on the Paris and Cambridge universities, then extensively travelled, acquainting himself with alchemy and magic on his trips around Europe. He served as the astronomer and mathematician at the court of the English Queen Elizabeth who in 1583 entrusted him with a secret diplomatic mission at the emperor Rudolf II's court in Prague. Later becoming the court alchemist of Emperor Rudolf II, to whom he dedicated a miraculous mirror. Dee came to Prague with Edward Kelley. After losing favour in Prague, he came to the service of Wilhelm von Rosenberg. He lived most of his time at Tebo castle, until in 1589 he left the service of Wilhelm and returned back to England.

CHAPTER 2: HYPOTHESIS AND RESULTS

Following this hypothesis, suppose as origin language some medieval age version, dialect, of Welsh language. Let's look in this for example page, folio 49, botanical section, from introduction figure 1.1.

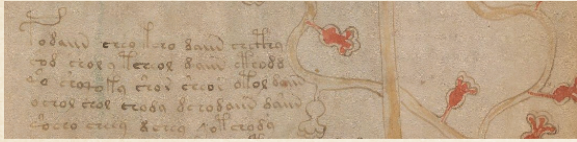


Figure 2.1: Detail of VM page 59, Source of picture: [1]

Podainn cheo kcho daiin chcthy
sod chol y tcheol daiin cthodd
qo shoqoky shor sheor otol daiin
ochol chol chody dchodaiin daiin
qocho cheey dchey qotchody

Figure 2.2: Detail clear transcription of VM page 59, Source of picture: [2]

This after transcript from voynich manuscript dataset, see below:

Page, Line	Text
f49r.P.12;H;	podaiin.cheo.kcho.daiin.chcthy
f49r.P.13;H;	sod.chol.y.tcheol.daiin.cthodd
f49r.P.14;H;	qo.shoqoky.shor.sheor.otol.daiin
f49r.P.15;H;	qo.shoqoky.shor.sheor.otol.daiin
f49r.P.16;H;	qocho.cheey.dchey.qotchody

Let's try translate first word "podaiin" using simple Google translator from Welsch to English. "podaiin" has not translation, but small change in transcription from "podaiin" to "podainn" has translation from Welsch to English as "pods" which give a sense in botanical context as well as context of picture, where we can see a plant with pods or flowers. Similar first word os second row "sod" in English "sod" also.

Voynich, Welsch(eng)	English
podaiin, podainn	pods
cheo, cheo	mist
kcho, cho	as
kcho, chof	memory
chcthy, chwthy	as well
daiin, daiinn	goodness
daiin, dainn	we dance
sod, sod	sod
chol, chol	dove
y, y	the, per
tcheol, tcheol	music
cthodd, cthodd	got up

After such combination of possible words translation with botanical context, first two sentences can be translated as:

podaiin.cheo.kcho.daiin.chcthy ->	pods mist goodness as well as
sod.chol.y.tcheol.daiin.cthodd ->	sod as dove's music to dance got up

That means, text describe some euphorical, narcotical effects of parts on illustrated plant.

Translation attempt looks promising, let's continue.

"qo.shoqoky.shor.sheor.otol.daiin", with first short word qo has not equivalent Welsh word in translation, but small transcription change q->g give "go"->"that". Similar situation is with word otol, where "o"->"a" brings "atal"->"prevent" and word prevent in context of some herbal effects give a sense. Such transcription change can have relation with unclear prononciation or some mix with dialect of medieval welsh and may be mixture with english stemming Let's do another translation table. Remember "y" can be just grammatical article

Voynich, Welsch(eng)	English
qo , go	that
shoqoky, shagy	shaggy
shor, shor	short
sheor, shear	shear
otol, atal	prevent
ochol, ochol	lateral
chol, chol	dove , peacefull, soft, moderate
chody , chady	yes
chody , chaed	he did
dchodaiin, dchodaiinn	we could
dchodaiin , dchodainn	we can
dchodaiin , dchodain	thirty
qocho , gach	each
cheey , chwee	sixe
dchey , dchwe	said
qotchody , gotch	gotch

qo.shoqoky.shor.sheor.otol.daiin ->	that shaggy short (of sod) shear prevent goodness
ochol.chol.chody.dchodaiin.daiin ->	lateral soft did could goodness
qocho.cheey.dchey.qotchody ->	each sixe said gotch

This give a botanical sense. Let's put it together.

TRANSLATION PART OF VM FROM PAGE 49

- podaiin.cheo.kcho.daiin.chcthy -> pods mist goodness as well as
- sod.chol.y.tcheol.daiin.cthodd -> sod dove's music to dance got up
- qo.shoqoky.shor.sheor.otol.daiin -> that shaggy short (of sod) shear prevent goodness
- ochol.chol.chody.dchodaiin.daiin -> lateral soft did could goodness
- qocho.cheey.dchey.qotchody -> each sixe said gotch

IN SLOVAK TRANSLATION

struky zahalia eufóriu/dobrotou ako aj drn/podzemok ako mierumilovná muzika do tanca povznáša tak krátky zostrih/orez (drnu/podzemku) zabráni blaženosti mal by spôsobi len mierne podružnú blaženos každý šiesty povedal, že ju dostal (blaženos)

PART 2

NOTEBOOKS


```
import numpy as np # linear algebra
import pandas as pd # data processing,
    CSV file I/O (e.g. pd.read_csv)
from sklearn.feature_extraction.text
    import TfidfVectorizer,
    CountVectorizer
```

```
tfidf = TfidfVectorizer()
```

```
[3]
```


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