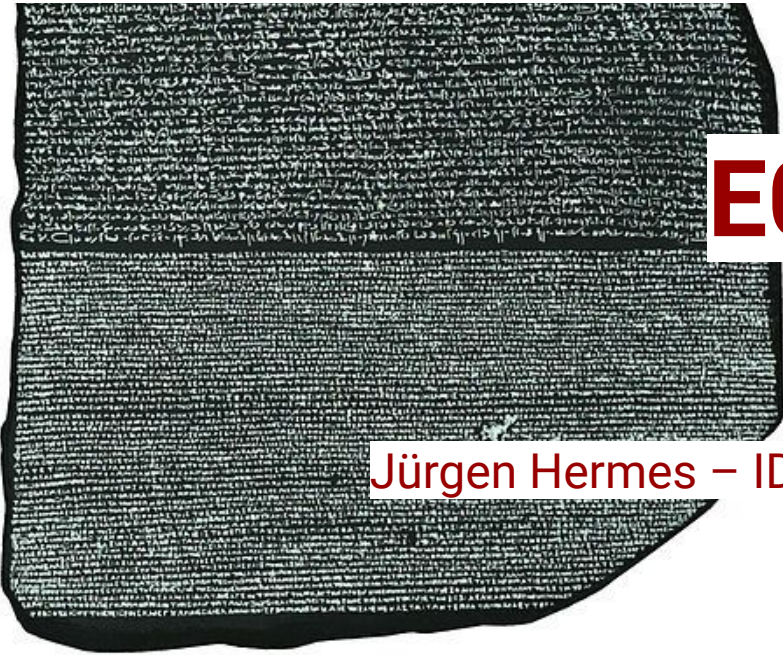


# Anatomie der Schriftsprachen



**E05**

Jürgen Hermes – IDH – WiSe 2022/2023



rasul masani damu medon mastiell abro masti pasu lanu cadafur pason dromes rare dias medon rassin lanu abul rassel pasas medon rassin masani pasan pasus thani damu  
meda rassot pasi dien badel pasun ran admi abien badu damus masties masariat pasul fare dromat pasu rassin masarie raros cadafen damul diaf rasson masaren pasil pasas abro fan  
ome mesos dromel ran cadafur pasel faros dno mastiell pasi farel damon rarix cadafan mastiell raros omiu mesa fons lanu abul masties masariat damu abien damus damul damu mada  
mesel ran masariet abien diet diet pasen medu rassat lanu damu rasse masarie paser dromio damu madebas medun phosn masaria damu badar masarit abien masti mastiell omes damen  
pasen cadafur abien medi abie lanu abies dno cadafur ran dromas mastiell fare raro badar pasis cadafur madebu farel pasar damu medu abien madaf omos pasi rassin raros mastiell  
lanu ran cadafan madebu badar pase abus rassin pasar thani rassit rassol masariot abius rassul badax abun dno dromit damu dromos damus badu rassot masarien pasu rare  
madaf omu damu pher madebu pasu mastie lanu rara mastiell pasari farel rassin damel pasel medus raros admi rassin masariot pasos medon ran badel abun omi omus pasil cadafur  
ran x meson dien damu badis masarias dromen abul dias madeba medon badan lanu damus mastiell rassot dromen meder rassel masaron damu medon fons pasi medu madebu omi rasse  
dames medes phi madebu damu rassin pasu pasi thani badan damus rassan dames diot faras medul damel dno badan pasil dame rassin madaf farot damu diaf farall medi madaf abul  
badis badan damu diet rassot rare mastien omes abros mesu masarit damu farall masari omu mesos cadafur pasas madaf abun rassin pasu cadafur abien mastien mastiell farat ran  
abien badis masari pasu medu badis masari pasu ranu lamu da farall rassol masarien pase pasu thani damu medu rassin se diaf badel farat farat damu masarit damus  
cadafur cadafur pasu medu badis masari pasu masariat pasos die medul damu masari omes pasu damu phi adu ranu phosn masaria damu rassol damus ran dias  
phosil damu rassan masariet damu abun rassot masariot pasu rassu pasas thani rassot raros admi rassot masaron pasari dromos medel phosn masariot damus badis masarias damu  
medos rara admi rassun pasu die faras pasan adus pasu farot farat pasari cadafur rassat raros abul meda ran mesu dno damu badu masari pasen medos pasu rassot masaria pasas  
mastien abien mastiell pasu pasu masariet damu pasari ada omes mesu rara madebu rassan omi damu die pasas medu madaf pasu ranu rassul ran dias rassat masari  
pasas dromes ran meden rasse medul abro omu damu pasu diaf rassit abun diaf cadafur cadafur damu adu adel damu badu madeban omu rassun rassit raros pasu thani masties  
omus abien damu die medan rassot abia rassot damus meda rassel damu badu abiel omu mastien lanu raros masties pasu lanu rassu damel pasari medos ran x admi ranu mesul dias  
damu badan masariet pasi medul pasu medan masariot ran x phosn medul masarias raros phosn rassat faron damu rassel masariet pasis dromon damu madebu medus medun rassun  
pasul mastiell phosn damus medul pasu rassat pasu medon pasu omu ranu mastien pasu ranu abul badan lanu medu rassin se diaf badel farat farat damu masarit damus  
dromel phosn masariet rare medu pasu abus mastien mastiell omu damus badel abun rassat damus rarel dias omi rare ran bodos medon omu damus badan pasel abul dno abien  
lanu rassun damu adu damus badu damu abian omu omos abian dno farat madeba abun farall pasun mastiell ranu damu die rassu medos raros madebu rassot masaria raros  
phosi abiel diet abu mastie mastiell omu damus badu abian rassat damu rarol dias rara admi rassat masaria dame mede badan damu masties masariot pasul farel farat pasul dno  
pasu farat abien rassat pasu medu abun rassit pase thani rassu rassu masariot abia rassu badel rarol dromas pasan mede madebu pase lanu mesal badan omu ran meden pasen  
rassun ran rassu masariot pasu medan rassan abia rassit dame medos rassin damus badul abul omu mastien farel ran mastiell pasos lanu rassit damu pasis medos rare adu raros  
mesu diaf damu badis masariet pasul meder pasul abun dias cadafur adel damu die abiel omu omu mesu cadafur damus meden badul madebu medi medu pasu medu mastien rara  
mede medul damu madaf omes pasu medu rassu abien lanu rassot damu die farat mastien raros damu die rassot mede raros admi badu lanu mesari mastie rassul ran abia dno abun

# Polygraphia III – The Cipher that pretends to be an artificial language

Jürgen Hermes – University of Cologne

# Structure

➤ The properties of Voynichese (and the problems arising from it)

➤ The hypothesis of Friedman (and the problems arising from it)

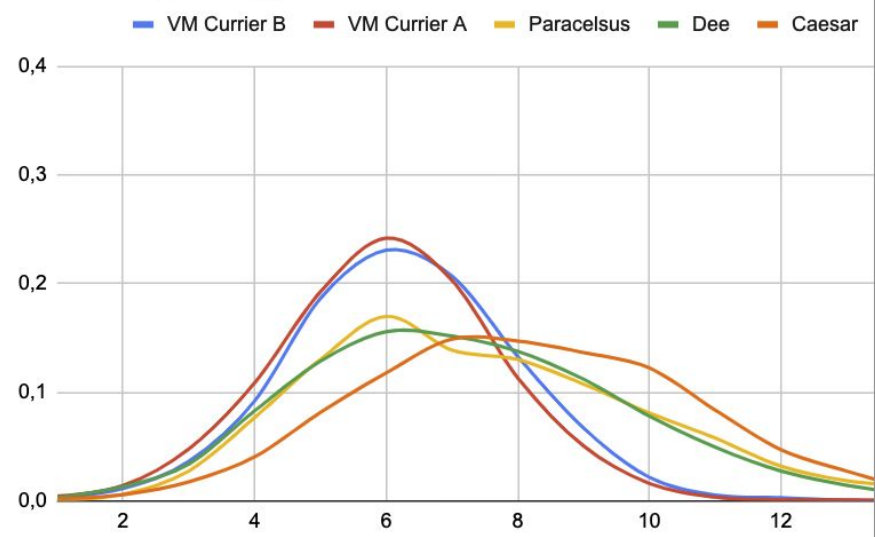
➤ The ciphers of Trithemius – Polygraphiae I and III

➤ Experiments and results

➤ What I (do not) claim

# The Odd Properties of Voynichese: Word Length

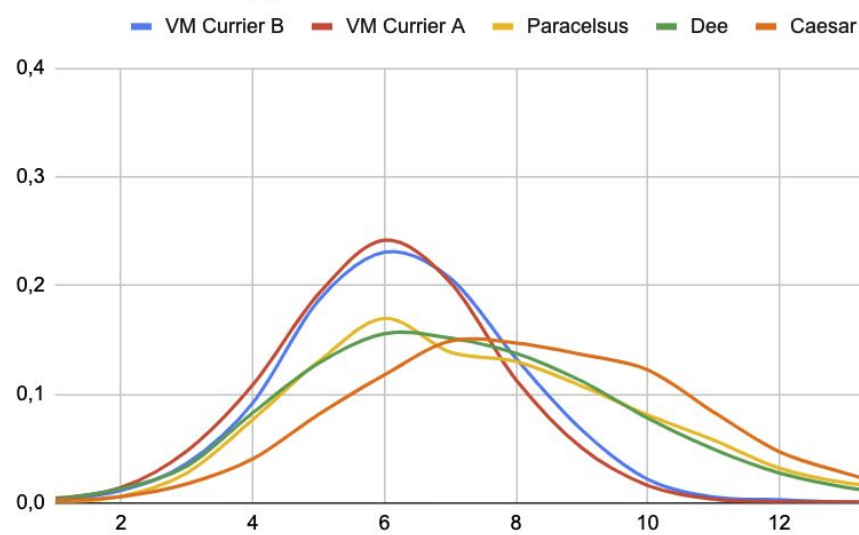
Word Lengths Types



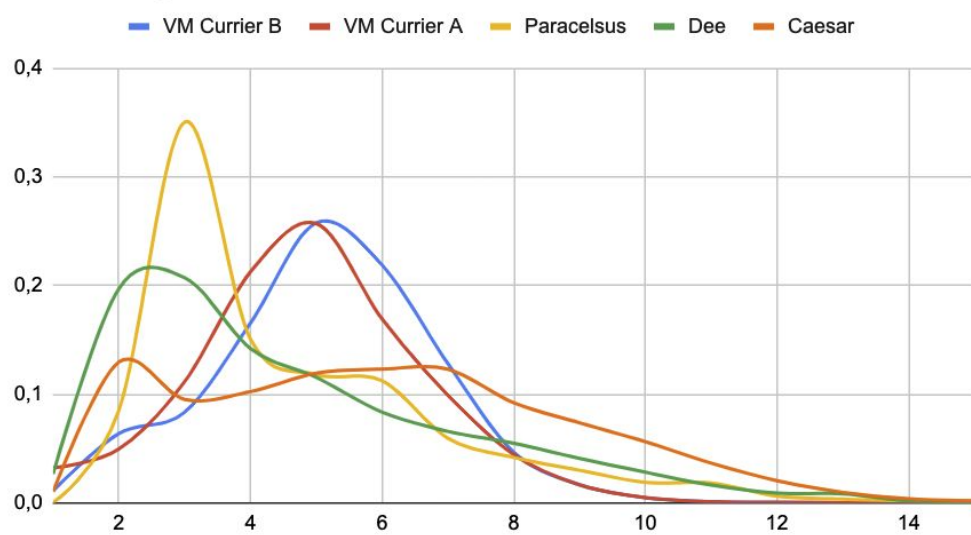
... rassen masaru danu medu mastiel abru masti pasu lain cadalu pasu dromes rare dias medu rassen laus abul rassel pasas medu rassen masaru pasu pasus thant danu  
weda rasset pasi dien badel pasu an adui abien badu danus mastis masariat pasul fare dromat pasu rassi masare rous cadalen danul diaf rassen masaru pasu pasas abru fait  
ome mesos dromel rous cadalu pasel laus dia mastiaf pasu fait danun rare x cadalan mastiaf rous omu mesa laus laun abul mastis masariat danu abien danus danul danu mada  
mesel anu masariat abien dief dief pasu medu rassel laus danu rassa masaru pasu danu danu mada pas medu rassa masaru pasu badu masariat abien pasu mastiaf omes danu  
rasu cadalu abien medu abru laun abru pas cadalu rous dromas mastiaf fare abru badu pasu cadalu mada danu fare pasu danu medu abien mada rous pasu rassen rare x masti  
faran rare cadalan mada danu badu pase abus rassen pasari thant rasset rasset masaru abus rasset badu x abun dia dromit danu dromas danus badu x rasset masaru pasu rare  
madaf omu danu pler mada danu pasu mastie faran rare mastia pasu fare rassen danul pasel medus rare adui rassen masaru pasus medu an badel abru omu omus pasu cadalu x  
danus mastia rasso dromen medu rassel masaru danu medu laus pasu medu mada danu omu rasse  
z drom laus medu danul die badu pasu danu rassi mada faru danu diaf farell medu mada abul  
zaru omu mesas cadalu pasas mada abru rassel pasu cadalu abien mastien mastiaf fare an  
bul masaru pase pasu thant danu medu rassi pase dan badu pasu an adui masaru danes  
e medu danu mada omes pase danu dief adui rous faru dromu abru rassel danus rare dies  
ssut rare x adui rasset masaru pasu dromes medu pasu masaru danes badu masaru danu  
za rare x abul meda an mesu danu danu badel masaru pasu medus pasu rasset masaru pasas  
mada danu rassen omu danu dief pasas medu medas rare dromu pasu rare adu rassa masaru  
cadalu cadalu x danu adu adu danu badu mada danu omu rassen rassel rare pasu thant mastiaf  
faran mastien laun rare masties pasu laun rassa danul pasari medus rare x adui rare mesul dies  
rare x pler rasset faru danu rassel masaru pasu dromu danu mada danu medus medu rasset  
mastien pasu cadalu abul badu danu mastia masaru pasas fait medu mesi medu rasset pasu  
brun rasset danes rare dies omu rare an badu medu omu danu badu pasel abul die abien  
par abru farell pasu mastien rare danu die rasso medus rare x mada danu rasset masaru rare x  
z rare x adui rassa masaru danu medu badu danu masties masaru pasul fare laun pasu danu  
na rasso badel rare dromas pasu medu mada danu pase faru mesa badu danu an medu pasu  
rassen rare rasse masaru pasu medu rassen abul rasset danu medus rassen danus badu abul omu mastien fare an mastia pasu laun rasset danu pasu medus rare adu rare  
mesu diaf danu badu masaru pasu medu pasu abun dia cadalu adu danu die abul omu omu mesu cadalu danu medu badu mada danu medu medu pasu medu mastien rare  
medu medu danu mada danu pasu medu rassa abien faru rasset danu dies fare mastien rare x danu dies rassen medu rare adu badu fait mesu mastie rasset an abru die abru

# The Odd Properties of Voynichese: Word Length

## Word Lengths Types



## Word Lengths Tokens



# The Odd Properties of Voynichese: Entropy

$$h_2 = \sum_{I=1}^n p(I, J) * b(I, J) = - \sum_{I=1}^n \sum_{J=1}^n p(x_I) * p(y_J|x_I) * \log_2(p(y_J|x_I))$$

rasul wasanl damu medu mastiel abru masti pasu lain cadafu pasu dromes rare dias medon rassen laus abul rassel pasas medon rassen masam pasu pasus thant damu  
meda rasset pasi dien bades pasun ran adru abien badi damus mastis masarat pasul fare dromat pasu rassi masare rous cadafu damul diaf rassen masaren pasul pasas abru fait  
ome mesos dromel rous cadafu pasel faras dia mastiaf pasi farel damon rare x cadafu mastiel rous omu mesa farus lauru abul mastis masarat damu abien damus damul damu mada  
mesel raut masaret abru die dief rassen medu rassel lain damu rasse masare pasu dromat damu mada bades medu rous masare damul bades masant abien masti mastiel omes damu  
rasun cadafu abien medu abru fait abies die cadafu rous dromat mastiaf fare abru badi pasis cadafu mada badi fare pasu damu medu abien mada rous pasu rassen rare x masti  
faran ran cadafu mada badi badi pase abus rassen pasat thant rasset rassel masaras abus rassel badi x abru die dromit damu dromes damus badi x rasset masaren pasu rare  
madel omu damu pler mada badi pasu mastie faran rare masti pasu farel rassen damul pasel medus rare adru rassen masarat pasus medu ran bades abru omu omus pasul cadafu x  
ran x meson die damu badi masara dromen abul dias mada badi medu badi laur damu masti rasso dromen medu rassel masaram damu medu laus rasi medu mada badi omu rasse  
damus medes pler  
bades bades damu  
abien bades masu  
cadafu x cadafes  
plasi damu rassen  
medus rare adru rassen pasu die faras pasu adus pasu fait fara pasu cadafu rassel rare x abul meda raut mesu die damu bades masari pasu medus pasu rasset masara pasas  
mastiu abru mastiu pasus faru mades farel damul pasu adaf omes meson rare mada bades rassen omu damu dief pasas medu medas rare dromu pasul rare adus rassel masari  
pasas dromus ran medu rasse medul abru omu damu pasu diaf rasset abru diaf cadafu cadafu x damu adru aduf damul badi mada badi omu rassen rasset rare pasu thant mastiaf  
omus abru damu die medu rasset abru rasset damus meda rassel damu badi abiel omu mastiu faru rare masties pasu faru rassa damul pasu medus ran x adru rare mesul die  
damu badi masaref pasi medul pasul medu masam ran x plasi medul masaras rare plasi rasset faru damu rassel masara pasis dromen damu mada badi medus medu rasset  
pasul masti plasi damus medu pasis cadafu pasu mada badi pasu omu ran mastiu pasu cadafu abul badi damu masti masare pasas fait medu mesi medu rasset pasu  
dromul plasi masaret rare medu pasu abus mastian mastiall omu damus badi abru rasset damus rare dies omu rare raut bades medu omu damus badi pasel abul die abien  
faran rassen damul adru damus badi damu abru omu omus abru die fait mada badi abru fait pasu mastiu raut damu die rasso medus rare x mada bades rasset masara rare x  
plasi abiel die abru mastie mastiu omu damus badi abru rasset damu rare dias rare x adru rassel masara damu medu badi damu masties masam pasul farel fara pasul die  
pasu fait abru rasset pasu medu abru rasset pase thant rasso rasso masam abul rasso bades rare dromat pasu medu mada bades pase faru mesa badi omu ran medu pasu  
rassen rare rasse masaras pasu medu rassen abul rasset damu medus rassen damus badi abul omu mastiu farel ran masti pasus faru rasset damu pasis medus rare aduf rare  
mesu die damul bades masari pasul medu pasul abru die cadafu aduf damu die abiel omu omu mesu cadafu damus medu badi mada badi medu medu pasu medu mastiu rare  
medu medul damu madi omu pasu medu rassa abru faru rasset damu die fait mastian rare x damu die rassen medu rare adru badi fait mesu mastie rasset ran abru die abru

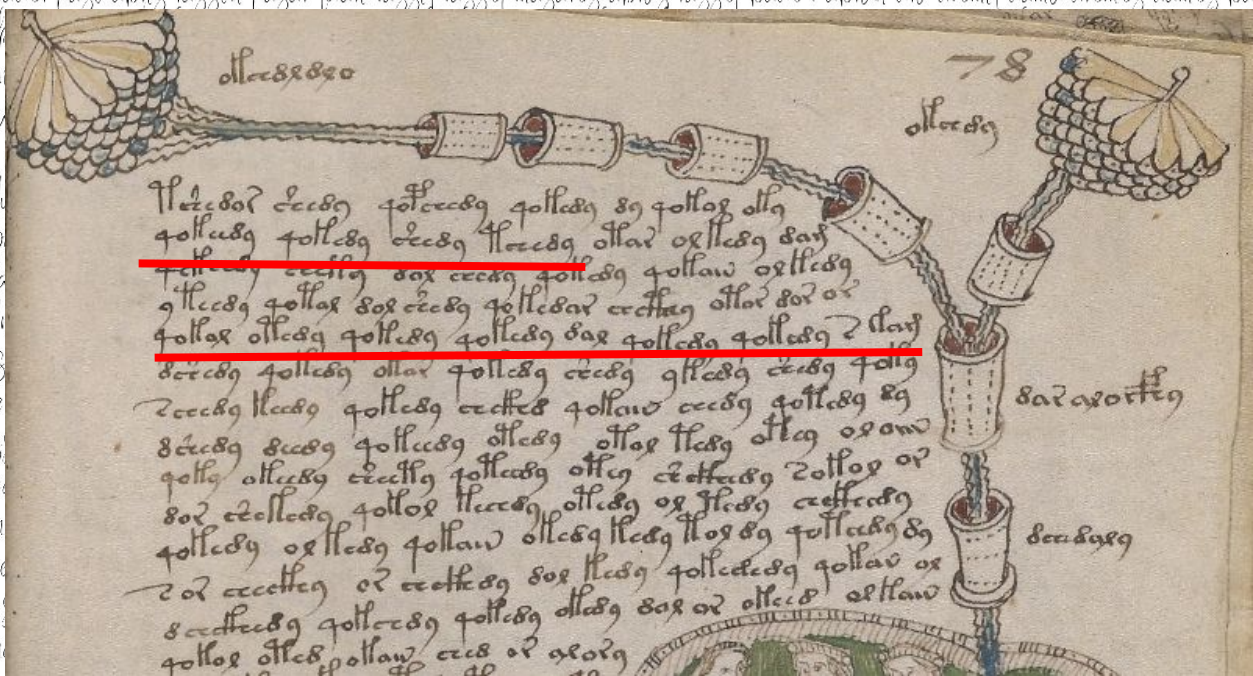
edi madi abul  
stiaf fait ran  
masant damus  
us ran dies

# The Odd Properties of Voynichese: Entropy

$$h_2 = \sum_{I=1}^n p(I, J) * b(I, J) = - \sum_{I=1}^n \sum_{J=1}^n p(x_I) * p(y_J|x_I) * \log_2(p(y_J|x_I))$$



# The Odd Properties of Voynichese: Repetitiveness

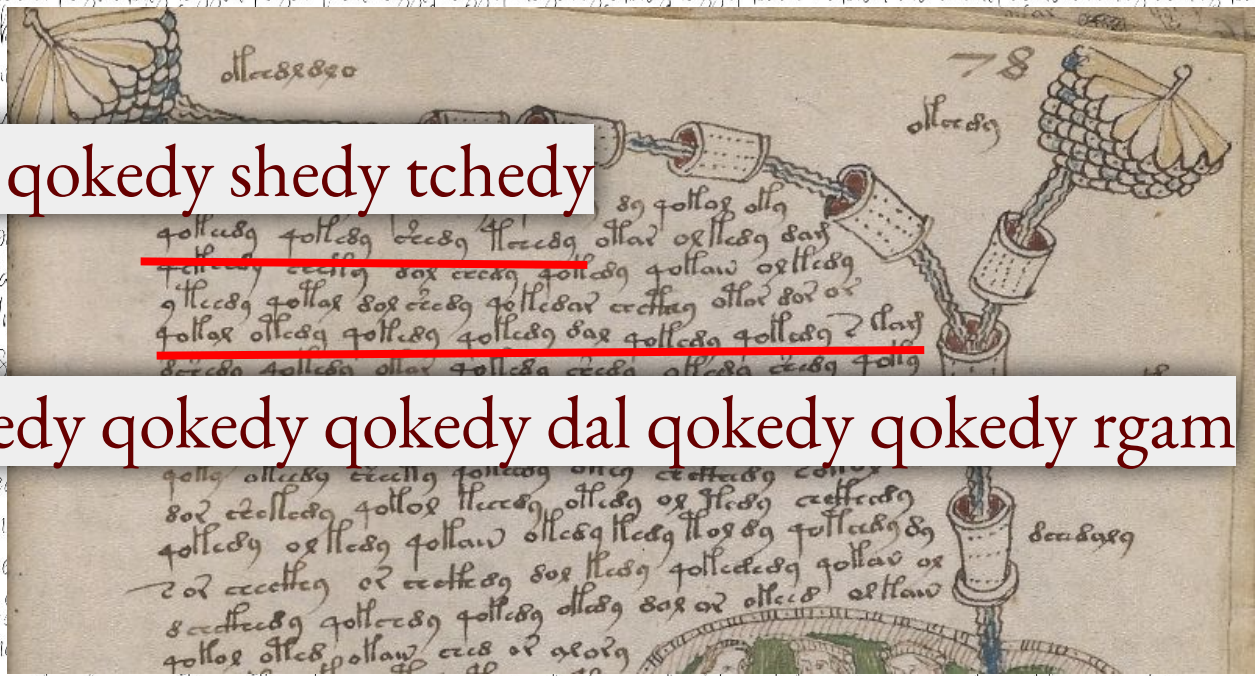




# The Odd Properties of Voynichese: Repetitiveness

qokeedy qokedy shedy tchedy

qokal otedy qokedy qokedy dal qokedy qokedy rgam



# The Anagram Friedman left us (1959)

"I put no trust in anagrammatic acrostic cyphers, for they are of little real value — a waste — and may prove nothing — finis."

# The Anagram Friedman left us (1959)

"I put no trust in anagrammatic acrostic cyphers, for they are of little real value — a waste — and may prove nothing — finis."

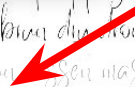
"The Voynich Manuscript was an early attempt to construct an artificial or universal language of the A-Priori type. — Friedman."

# Real Characters (Wilkins 1668)

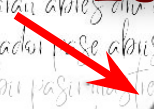
rassul wasanil damu medon mastiell abro masti pasin lain cadafu; pason dromes rare dias medon rassin laus abul rassel pasas medon rassin masam pasan pasus thant damu  
 meda rassot pasi dien bades pasun an adui abien badu danius masties masariat pasul fare dromat pasu rassin masare arus cadafen damul diaf rasson masaren pasul pasas abro fait  
 eme mesos dromel aus cadafu; pasel faras dia mastiaf pasi fare daniun rare x cadafan mastiaf aras omni mesa farus lainu abul masties masariat dani abien danius daniat daniu mada  
 mesel anif masariet abun diet diet pasen ebu rassot am dani rassel masare pasu dromat dani masties rare x pasu pasan danius rare x masariet abien mastia mastiaf omes daniun  
 rasson cadafu abien medi abie faran abies dia cadafu; aras dromas mastiaf fare aru badaf pass cadafu madonon pafu pasat daniun medu abien madaf omes pasu rassin rare x mastie  
 faran rare cadafan madefon badu pase abus rassin pasat thant rassit rassul masarias abus rassul badu x abun dia dromit dani dromas danius badu x rassot masaren pasu rare  
 madaf omni daniun pefi madefon pasu mastie faran rare mastia pasat fare rassin daniel pasel medus aras adui rassin masariet pases medon an bades abun omni omis pasul cadafu x  
 an x meson dien dani dromas masarias dromen abul dias madefon medon badu fait danius mastia rasson dromen medel rassel masaren daniun medu faris pasi medu madefon omi rasse  
 danius medes pefi madefon dani rassin pasu 4 si thant badu danius rassin 6 7 danius 8 faris 9 dani dani 10 di badu 11 pasul dani rassin madis farat daniet diaf farat medu madaf abul  
 bades badu daniun diet rassin rare mastien omel abrus mesu masariet dani dani dani mesariet omni mesas cadafu; pasas madis abun rassin pasu cadafu abien mastien mastiaf fait an  
 abien bades masariet pasul medu bades omni abien dani droman dani dia fait rassul masaren pasu pasan thant daniat medu rassin pasu diaf badul pasat an adui masariet danius  
 cadafu x cadafu; pasu medu dani dromas masarias dromen abul dias madefon medon badu fait danius mastia rasson dromen medel rassel masaren daniun medu faris pasi medu madefon omi rasse  
**I am believing God the Father Almighty Maker of Heaven and**  
 rassit dani rassin masariet dani dromen abul dias madefon medon badu fait danius mastia rasson dromen medel rassel masaren daniun medu faris pasi medu madefon omi rasse  
 medus rare adui rassin pasu die faras pasan adus pasu farat fare pasat cadafu; rassal rare x abul meda an mesu dnu daniun bades masariet pasen medus pasin rassot masaria pasas  
 mastien abien mastien pasu; lainu madis fare daniel pasan adu omes meson faran madefon rassin omi dani dromat diaf pasas medu medas aris dromen pasul aris adus rassal masariet  
 pasas dromas rare x dani dromat abro omel droman pasu diaf he cobas cōpas hāi saba 18 adu dani dani medefon omni rasson rassin rare x pasu thant mastias  
 omis abien dani dromat rassin abro rassot dani dromat rassel faran badu abul omni mastien lainu aras masties pasu lainu rassin daniel pasat medus rare x adui aris mesul dies  
 daniun badu masariet pasi medu pasat medan masariet an phos medu masarias aris phos rassal faran daniun rassel masaria pasis dromen dani medefon medus medu rassul  
 pasul mastia phos medu medu pasis cadafu; pasu madefon pasu dromen an mastien pasu cadafu; dani dani mastia masare pasas fait medu mesi medu rassel pasen  
 dromel phosan masariet rare medu pasu abus mastian mastiaf omni 27 mas 18 der abien rassal danius rare x dies 31 rare anif bades medu omni danius badu pasel abul di abien  
 lainu rassin dani adu danius badu dani abien omni omis abian dia fait madefon abul fait rassin mastien omel daniun die rassin medus rare x madefon rassot masaria rare x  
 phos abul diaf dani mastie mastien omni danius badu abun rassal daniun rare x diaf rare x daniun rassal masaria dani mede badu dani masties masariet pasul fare faru pasul dnu  
 pasin farat abro rassot dani dromat rassin abro rassot dani dromat rassel faran badu abul omni mastien fare an mastia pasas lainu rassit dani pasis medus rare adu aris  
**of Earth, and in Jesus Christ his Son only our Lord, who was**  
 pasul medu medu pasis cadafu; pasu madefon pasu dromen an mastien pasu cadafu; dani dani mastia masare pasas fait medu mesi medu rassel pasen  
 dromel phosan masariet rare medu pasu abus mastian mastiaf omni 27 mas 18 der abien rassal danius rare x dies 31 rare anif bades medu omni danius badu pasel abul di abien  
 lainu rassin dani adu danius badu dani abien omni omis abian dia fait madefon abul fait rassin mastien omel daniun die rassin medus rare x madefon rassot masaria rare x  
 phos abul diaf dani mastie mastien omni danius badu abun rassal daniun rare x diaf rare x daniun rassal masaria dani mede badu dani masties masariet pasul fare faru pasul dnu  
**conceived by the Holy Ghost, born of the Virgin Mary, suffered**  
 rassin rare x rasse masarias pasu medan rassin abul rassit dani medus rassin danius badu abul omni mastien fare an mastia pasas lainu rassit dani pasis medus rare adu aris  
 mesu diaf dani bades masariet pasul medel pasul abun dias cadafu; adel daniet die abiel omni omni meser cadafu; danius medon badu madefon medi medu pasu medu mastien rare  
 mede medu daniun madaf omi pasin medu rassin abien faran rassit daniet dies fait mastian rare x daniun dies rassin mede rare x adui badu fait mesariet mastie rassul anif abia di abun

# Real Characters (Wilkins 1668)

rassel wasanl damu medu mastiell abru masti pasu lain cadafu pasu dromes are dias medon rassen laus abul rassel pasas medon rassen masaru pasu pasus thant damu  
 meda rassel pasi dien badel pasun an adui abien badu danus masties masariat pasul fare dromat pasu rassi masare arus cadafen danul diaf rassen masaren pasul pasas abru fait  
 eme mesos dromel aris cadafu pasel faras dia mastial pasi fare danun are x cadafan mastial aris omni mesa farus lainu abul masties masariat danu abien danus danul danu mada  
 mesel auf masariet abru diet diet pasen ebu rasselam danti rassel masare pasu dromu danu masties are bu pasu pasan danus pasu masariet abien mastia mastial omes danun  
 rason cadafu abien medu abie faran abies dia cadafu aris dromas mastial fare are badul pasu cadafu madonun panti pasan danun medu abien madul omes pasu rassen are x mastie  
 faran are cadafan madebul badu pase abus rassen pasari thant rasset rassel masariat abrus rassel badu x abru dia dromit danu dromas danus badu x rassel masaren pasu are  
 madul omni danun panti madebul pasu mastie faran are mastia pasari fare rassen danul pasel medus are adui rassen masariat pasus medon an badel abru omni omis pasul cadafu x  
 an x meson dien are dromas masariat dromen abul dias madebul medon badun fait danus mastia rassa dromen medu rassel masaren danun medu faris pasi medu madebul omi rasse  
 danus medus pl badel danu rassin pasu pasu thant pasu danus rassel danus rassel medu danu dromu badu pasul dame rassi madul fait danu diaf fait medu madul abul  
 badis baden danu diaf rassa are mastia omi abrus mesu masariat danu dromu masaru omni mesu cadafu pasas madul abru rassel pasu cadafu abien mastien mastial fait an  
 abien badu pasu pasu medu badis omni abru danu dromu danu dia fait rassel masaren pase pasu thant danu medu rassi pase dan badul pasul an adui masariat danus  
 cadafu cadafu believing God the Father Almighty Maker of Heaven and Earth, and in Jesus Christ his Son, only our Lord, who was  
 conceived by the Holy Ghost, born of the Virgin Mary, suffered  
 and died under Pontius Pilate, was crucified, dead and buried, he descended into Hell, the third day he rose again, he ascended into Heaven, he sitteth at the right hand of God the Father Almighty, he shall come again to judge the living and the dead, his Kingdom shall have no end. Amen.



# Real Characters (Wilkins 1668)



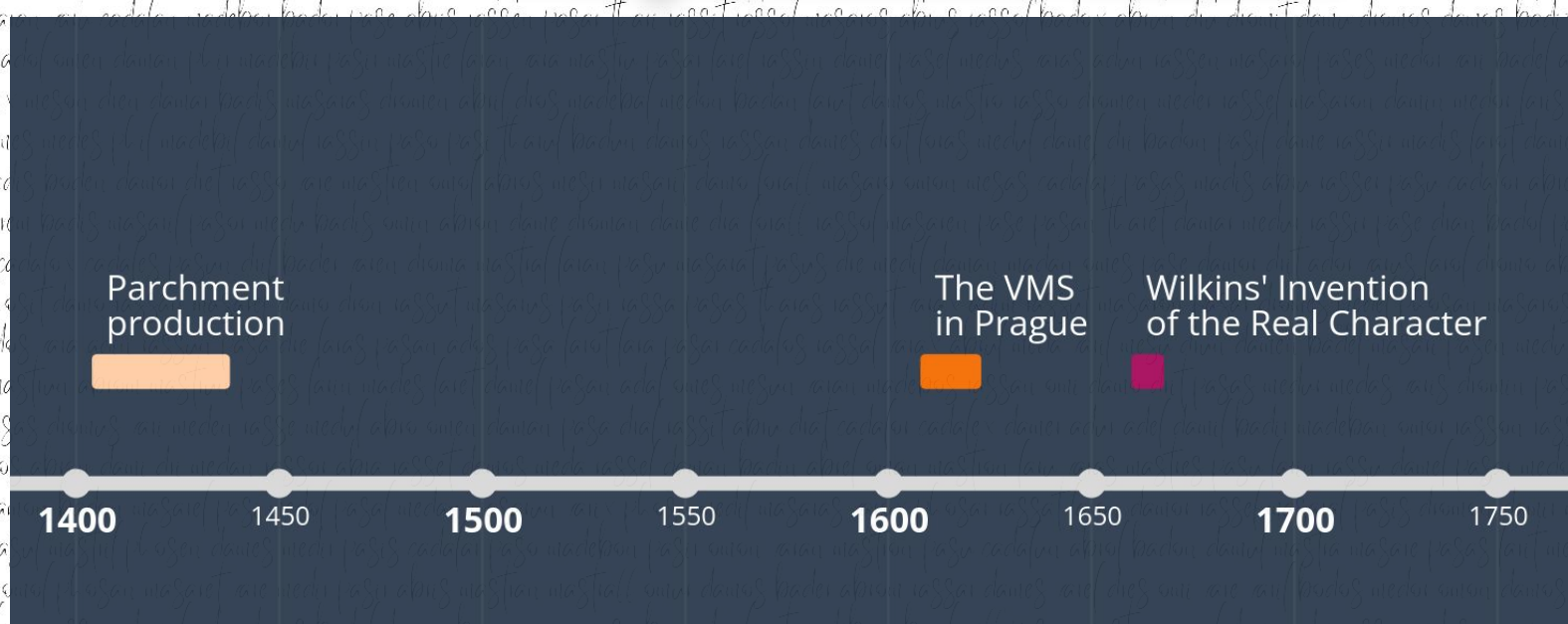
1 2 3 4 5 6 7 8 9 10 11  
I am believing God the Father Almighty Maker of Heaven and

of Earth, and in Jesus Christ his Son only our Lord, who was

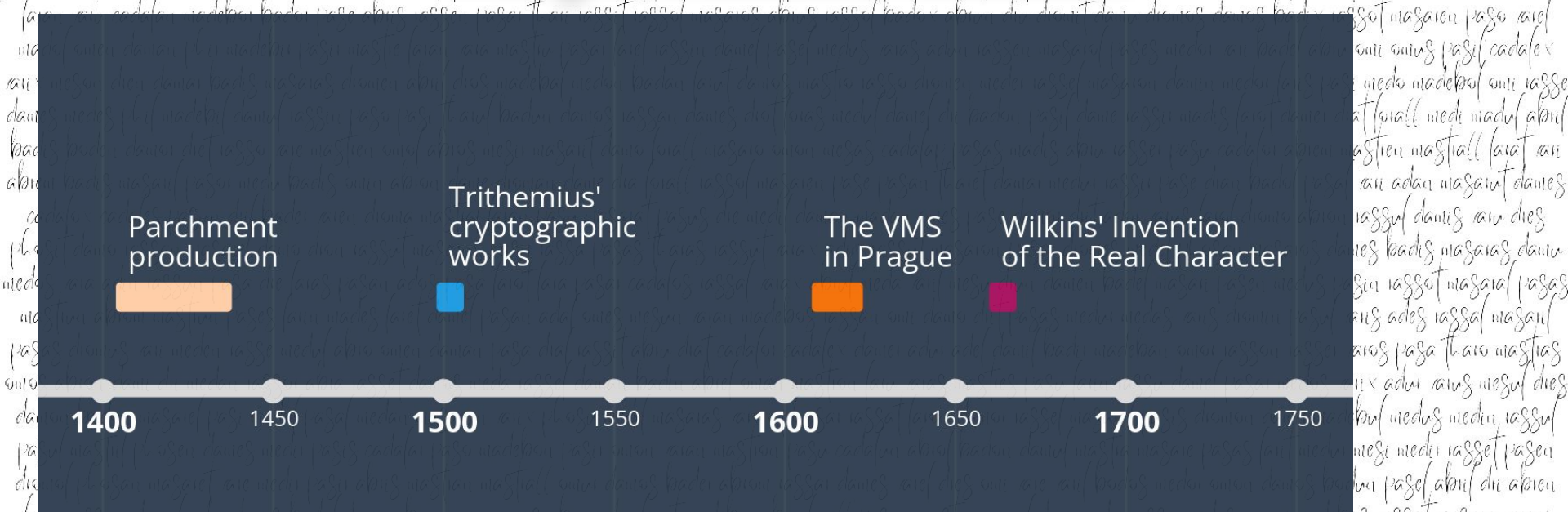
conceived by the Holy Ghost, born of the Virgin Mary, suffered

rasul wasail danna medon mastiell abro masti pasin lain cadafu pason dromes rare dias medon rassin laus abul rassel pasas medon rassin masaru pasan pasus thant danna  
meda rassot pasi dien bades pasun an adui abien badu danna masties masarat pasul fare dromat pasu rassin masare arus cadafu danna chaf rasson masaren pasul pasas abro fait  
ome mesos dromel ans cadafu pasel faras dia mastiell pasi fare danna rare x cadafan mastiell aras omni mesa farus laun abul masties masarat danna abien danna danna danna mada  
mesel an masaret abun diet diet pasen abro rassot am danna rassel masare pason dromat danna masties pasan pasu dromat pasan masarat abien masti mastiell omes danna  
pasan cadafu abien meda abie abies dia cadafu arus dromat mastiell fare abro badu pasu cadafu madon pasu pasat danna meda abien madaf omes pasu rassin arax mastiell  
faran rare cadafan madobu badu fare abus rassin pasat thant rassit rassot masaras abus rassul badu x abun dia dromit danna dromat danna danna badu x rassot masaren pasu rare  
madaf omni danna bu madobu pasin mastie faran ara mastiell pasat fare rassin danna rassel medas arax adui rassin masaru pasus medon an bades abun omni omis pasul cadafu x  
an x meson dien danna danna masaras dromen abul dias madobu medon badu laun danna mastiell rassot dromen meda rassel masaren danna medon laus pasi meda madobu omni rassel  
danna medes phi madobu danna rassin pasu 4 si thant badu danna rassin 6 7 danna 8 9 arax 10 danna 11 pasul danna rassin madaf farat danna diet farat meda madaf abul  
bades badu danna diet rassin rare mastiell omni abros meso masarat danna danna masarat omni mesas cadafu pasas madaf abro rassin pasu cadafu abien mastiell mastiell farat an  
abien bades masaru pasin meda bades omni abion danna danna danna danna danna danna danna danna danna danna danna danna danna danna danna danna danna danna  
cadafu cadafu pasan meda danna  
pasit danna rassin masaru danna  
medas ara adui rassin pasu die faras pasan adus pasu farat fara pasan cadafu rassin arax abul meda an mesu dnni danna badu masaru pasen medus pasin rassot masaru pasas  
mastie abien mastie pasu laun medes fare danna pasan adaf omes meson arax madobu rassin omni danna diet pasas medu medas arax dromit pasul arax adus rassin masaru  
pasas dromes rare danna danna abro madobu pasu dia he cobas cōpas hōi saba adaf danna badu madobu omni rassin rassin arax pasu thant masties  
omni abion danna die medan rassin abro rassot danna meda rassel faran badu abul omni mastiell faran arax masties pasu laun rassin danna pasat medas arax adui arax mesul die  
danna badu masaru pasu meda pasat medan masaru an phasu meda masaras arax phasu rassin faran danna rassel masaru pasus dromen danna madobu medus medon rassin  
pasul mastiell phasu meda pasus cadafu rassin madobu pasin danna an mastiell pasu cadafu cadafu badu danna mastiell masaru pasas fait medu mesi medu rassel pasen  
dromel phasu masaret rare meda pasu abus mastiell mastiell omni 27 mas 18 der abion rassin danna rare dies 31 rare an badus medon omni danna badu pasel abul die abien  
faran rassin danna adui danna badu danna abien omni omis abion die farat madobu abro phell pasun mastiell farat danna die rassin medus arax madobu rassot masaru arax  
phasu abul diet danna mastiell mastiell omni danna badu abion rassin danna rare dias ara danna rassin masaru danna meda badu danna masties masaru pasul fare fara pasul dnni  
pasin farat abro rassot danna meda danna  
rassin arax rassel masaras pasu medan rassin abul rassit danna medus rassin danna badu abul omni mastiell fare an mastiell pasus laun rassit danna pasis medas rare adaf arax  
meso diet danna bades masaru pasul meda pasul abun dias cadafu adaf danna die abiel omni omni meser cadafu danna medon badu madobu medi meda pasu medon mastiell ara  
meda medaf danna madaf omni pasin medu rassin abien faran rassin danna diet farat mastiell rare danna dies rassin meda arax adui badu fait mesat mastie rassin an abro die abion

# The problematic timeline



# The problematic timeline



Parchment production

Trithemius' cryptographic works

The VMS in Prague

Wilkins' Invention of the Real Character

1400

1450

1500

1550

1600

1650

1700

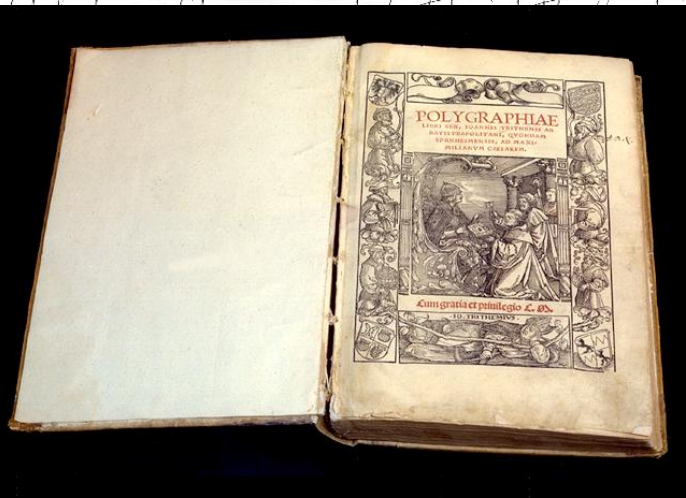
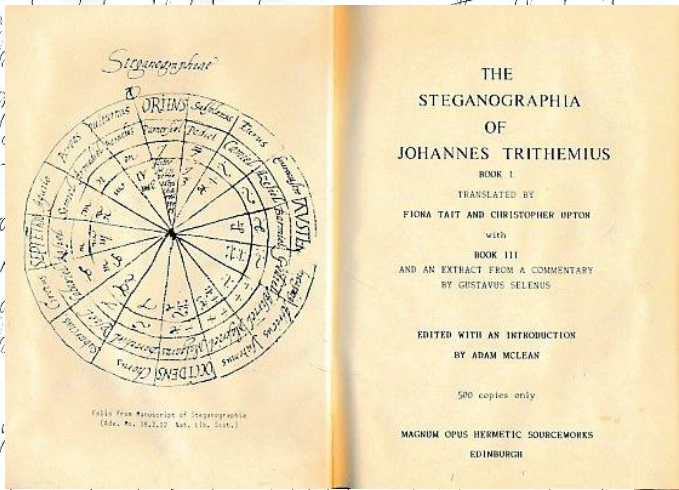
1750



# Johannes Trithemius (1462-1516)

## Steganographia (1499/1500)

## Polygraphia (1506)



# Polygraphia I: Ave Maria (Hale Mary) Cipher

## POLYGRAPHIAE

<b>A</b> Deus	<b>A</b> clemens
<b>B</b> Creator	<b>B</b> clementissimus
<b>C</b> Conditor	<b>C</b> pius
<b>D</b> Opifex	<b>D</b> piissimus
<b>E</b> Dominus	<b>E</b> magnus
<b>F</b> Dominator	<b>F</b> excelsus
<b>G</b> Consolator	<b>G</b> maximus
<b>H</b> Arbitr	<b>H</b> optimus
<b>I</b> Iudex	<b>I</b> sapientissimus
<b>K</b> Illuminator	<b>K</b> inuisibilis
<b>L</b> Illustrator	<b>L</b> immortalis
<b>M</b> Rector	<b>M</b> aeternus
<b>N</b> Rex	<b>N</b> sempiternus
<b>O</b> Imperator	<b>O</b> gloriosus
<b>P</b> Gubernator	<b>P</b> fortissimus
<b>Q</b> Factor	<b>Q</b> sanctissimus
<b>R</b> Fabricator	<b>R</b> incomprehensibilis
<b>S</b> Conferuator	<b>S</b> omnipotens
<b>T</b> Redemptor	<b>T</b> pacificus
<b>V</b> Auctor	<b>V</b> misericors
<b>X</b> Princeps	<b>X</b> misericordissimus
<b>Y</b> Pastor	<b>Y</b> cunctipotens
<b>Z</b> Moderator	<b>Z</b> magnificus
<b>W</b> Salvator	<b>W</b> excellentissimus

<b>A</b> creans	<b>A</b> coelos
<b>B</b> regens	<b>B</b> coelestia
<b>C</b> conferuans	<b>C</b> supercoelestia
<b>D</b> moderans	<b>D</b> mundum
<b>E</b> gubernans	<b>E</b> mundana
<b>F</b> ordinans	<b>F</b> homines
<b>G</b> ornans	<b>G</b> humana
<b>H</b> exornans	<b>H</b> angelos
<b>I</b> constituens	<b>I</b> angelica
<b>K</b> dirigens	<b>K</b> terram
<b>L</b> produccens	<b>L</b> terrena
<b>M</b> decorans	<b>M</b> tempus
<b>N</b> stabiliens	<b>N</b> temporalia
<b>O</b> illustrans	<b>O</b> aeternum
<b>P</b> intuens	<b>P</b> auiterna
<b>Q</b> monens	<b>Q</b> omnia
<b>R</b> confirmans	<b>R</b> cuncta
<b>S</b> custodiens	<b>S</b> vniuersa
<b>T</b> cernens	<b>T</b> orbem
<b>V</b> discernens	<b>V</b> astra
<b>X</b> illuminans	<b>X</b> solem
<b>Y</b> fabricans	<b>Y</b> stellas
<b>Z</b> saluificans	<b>Z</b> vitam
<b>w</b> faciens	<b>w</b> viuercia

## LIBER L 50

<b>A</b> sanctis	<b>A</b> coelis
<b>B</b> electis	<b>B</b> coelestibus
<b>C</b> predelectis	<b>C</b> supercoelestibus
<b>D</b> sanctissimis	<b>D</b> aeternum
<b>E</b> iustis	<b>E</b> perpetuum
<b>F</b> iustificatis	<b>L</b> sempiternum
<b>G</b> predestinatis	<b>G</b> secula seculorū
<b>H</b> angelis	<b>H</b> aeternum sanctum
<b>I</b> archangelis	<b>I</b> saeculum
<b>K</b> amatoribus	<b>K</b> regno caelorum
<b>L</b> cultoribus	<b>L</b> altissimis
<b>M</b> amicis	<i>fuis in</i> <b>M</b> excelsis <i>amen</i>
<b>N</b> apostolis	<i>fuis in</i> <b>N</b> paradiso <i>amen</i>
<b>O</b> prophetis	<b>O</b> olympo
<b>P</b> discipulis	<b>P</b> paradyfiacis
<b>Q</b> martyribus	<b>Q</b> olympicis
<b>R</b> sanctificationis	<b>R</b> fulgoribus
<b>S</b> dominationibus	<b>S</b> felicitate
<b>T</b> dilectis	<b>T</b> felicitatibus
<b>V</b> ciuibus	<b>V</b> gloriosis
<b>X</b> feruis	<b>X</b> honore
<b>Y</b> famulis	<b>Y</b> magnificentia
<b>Z</b> ministris	<b>Z</b> luce perpetua
<b>w</b> confessoribus	<b>w</b> patria celesti

A im

G 3 A Ma

# Polygraphia I: Ave Maria (Hale Mary) Cipher

## POLYGRAPHIAE

<b>A</b> Deus	<b>A</b> clemens
<b>B</b> Creator	<b>B</b> clementissimus
<b>C</b> Conditor	<b>C</b> pius
<b>D</b> Opifex	<b>D</b> piissimus
<b>E</b> Dominus	<b>E</b> <u>magnus</u>
<b>F</b> Dominator	<b>F</b> excelsus
<b>G</b> Consolator	<b>G</b> maximus
<b>H</b> Arbitr	<b>H</b> optimus
<b>I</b> Iudex	<b>I</b> sapientissimus
<b>K</b> Illuminator	<b>K</b> inuisibilis
<b>L</b> Illustrator	<b>L</b> immortalis
<b>M</b> Rector	<b>M</b> aeternus
<b>N</b> Rex	<b>N</b> sempiternus
<b>O</b> Imperator	<b>O</b> gloriosus
<b>P</b> Gubernator	<b>P</b> fortissimus
<b>Q</b> Factor	<b>Q</b> sanctissimus
<b>R</b> Fabricator	<b>R</b> incomprehensibilis
<b>S</b> <u>Conseruator</u>	<b>S</b> omnipotens
<b>T</b> Redemptor	<b>T</b> pacificus
<b>V</b> Auctor	<b>V</b> misericors
<b>X</b> Princeps	<b>X</b> misericordissimus
<b>Y</b> Pastor	<b>Y</b> cunctipotens
<b>Z</b> Moderator	<b>Z</b> magnificus
<b>W</b> Saluator	<b>W</b> excellentissimus

<b>A</b> creans	<b>A</b> coelos
<b>B</b> regens	<b>B</b> coelestia
<b>C</b> conferuans	<b>C</b> supercoelestia
<b>D</b> moderans	<b>D</b> mundum
<b>E</b> gubernans	<b>E</b> mundana
<b>F</b> ordinans	<b>F</b> homines
<b>G</b> ornans	<b>G</b> humana
<b>H</b> exornans	<b>H</b> angelos
<b>I</b> constituens	<b>I</b> angelica
<b>K</b> dirigens	<b>K</b> terram
<b>L</b> produccens	<b>L</b> terrena
<b>M</b> decorans	<b>M</b> tempus
<b>N</b> stabiliens	<b>N</b> temporalia
<b>O</b> illustrans	<b>O</b> aeternum
<b>P</b> intuens	<b>P</b> aeterna
<b>Q</b> monens	<b>Q</b> omnia
<b>R</b> confirmans	<b>R</b> cuncta
<b>S</b> custodiens	<b>S</b> vniuersa
<b>T</b> cernens	<b>T</b> orbem
<b>V</b> discernens	<b>V</b> astra
<b>X</b> illuminans	<b>X</b> solem
<b>Y</b> fabricans	<b>Y</b> stellas
<b>Z</b> saluificans	<b>Z</b> vitam
<b>w</b> faciens	<b>w</b> viuercia

## LIBER L 50

<b>A</b> sanctis	<b>A</b> coelis
<b>B</b> electis	<b>B</b> coelestibus
<b>C</b> predelectis	<b>C</b> supercoelestibus
<b>D</b> sanctissimis	<b>D</b> aeternum
<b>E</b> iustis	<b>E</b> perpetuum
<b>F</b> iustificatis	<b>L</b> sempiternum
<b>G</b> predestinatis	<b>G</b> secula seculorū
<b>H</b> angelis	<b>H</b> aeternum sanctum
<b>I</b> archangelis	<b>I</b> saeculum
<b>K</b> amatoribus	<b>K</b> regno caelorum
<b>L</b> cultoribus	<b>L</b> altissimis
<b>M</b> amicis	<b>M</b> excelsis <i>amen</i>
<b>N</b> apostolis	<b>N</b> paradiso <i>amen</i>
<b>O</b> prophetis	<b>O</b> olympo
<b>P</b> discipulis	<b>P</b> paradyfiaciis
<b>Q</b> martyribus	<b>Q</b> olympicis
<b>R</b> sanctificationis	<b>R</b> fulgoribus
<b>S</b> dominationibus	<b>S</b> felicitate
<b>T</b> dilectis	<b>T</b> felicitatibus
<b>V</b> ciuibus	<b>V</b> gloriosis
<b>X</b> feruis	<b>X</b> honore
<b>Y</b> famulis	<b>Y</b> magnificentia
<b>Z</b> ministris	<b>Z</b> luce perpetua
<b>w</b> confessoribus	<b>w</b> patria celesti

A im

G 3 A Ma

# Polygraphia I: Ave Maria (Hale Mary) Cipher

## POLYGRAPHIAE

A creans	A celos
B regens	B coelestia
<u>C conferuans</u>	C supercoelestia
D moderans	D mundum
E gubernans	E mundana
F ordinans	F homines
G ornans	G humana
H exornans	H angelos
I constituens	I angelica
K dirigens	K terram
L producons	L terrena
M decorans	M tempus
N stabiliens	N temporalia
O illustrans	O æuurn
P intuens	P æuurna
Q monens	Q omnia
R confirmans	<u>R cuncta</u>
S custodiens	S vniuersa
T cernens	T orbem
V discernens	V aftra

## LIBER I 50

A sanctis	A celis
B electis	B coelestibus
C prædilectis	C supercoelestibus
D sanctissimis	D æternum
E iustis	E perpetuum
<u>F iustitibus</u>	L sempiternum
G prædestinatis	G sæcula sæculorũ
H angelis	H æuum sanctum
I archangelis	I sæculum
K amatoribus	K regno cœlorum
L cultoribus	L altissimis
M amicis	<i>suis in</i> M excelsis <i>amen</i>
N apostolis	<i>suis in</i> N paradiso <i>amen</i>
O prophetis	O olympo
P discipulis	P paradyficiis
Q martyribus	Q olympicis
R sanctificatis	R fulgoribus
S dominationibus	S foelicitate
T dilectis	T foelicitatibus
V ciuibus	<u>V gloriõis</u>

secret: Conservator magnus conferuans cuncta iustis [suis in] felicitibus [amen].

Excelsissimus

A

Aim

G 3 A Ma

# Polygraphia III: The Artificial Language Mimic

1	2	3	126
A Abra	A mada	A badar	1
B Abre	B made	B bader	2
C Abri	C madi	C badir	3
D Abro	D mado	D bador	4
E Abru	E madu	E badur	5
F Abra	F madas	F badan	6
G Abres	G mades	G baden	7
H Abri	H madis	H badin	8
I Abros	I mados	I badon	9
K A brus	K madus	K badun	10
L A bran	L madan	L badas	11
M A bren	M maden	M bades	12
N A brin	N madin	N badis	13
O A bron	O madon	O bados	14
P A brun	P madun	P badus	15
Q A bral	Q madal	Q badal	16
R A brel	R madel	R badel	17
S A bril	S madil	S badil	18
T A brol	T madol	T badol	19
V A brul	V madul	V badul	20
X A brax	X madax	X badax	21
Y A brix	Y madix	Y badix	22
Z A brix	Z madix	Z badix	23
w A brox	w madox	w badox	24
		Ff 3 Aca	

	P.III-1	P.III-2	P.III-3	P.III-4	P.III-5	P.III-6	P.III-7
a	abra	mada	badar	cadalan	pasa	adam	lora
b	abre	made	bader	cadalen	pase	adem	lore
c	abri	madi	badir	cadalin	pasi	adim	lori
d	abro	mado	bador	cadalon	paso	adom	loro
e	abru	madu	badur	cadalun	pasu	adum	loru
f	abras	madas	badas	cadalas	pasan	adas	loraff
g	abres	mades	bades	cadales	pasen	ades	loreff
h	abris	madis	badis	cadalis	pasin	adis	loriff
i	abros	mados	bados	cadalos	pason	ados	loroff
k	abrus	madus	badus	cadalus	pasun	adus	loruff
l	abran	madan	badan	cadalap	pasas	adan	loras
m	abren	maden	baden	cadalep	pases	aden	lores
n	abrin	madin	badin	cadalip	pasis	adin	loris
o	abron	madon	badon	cadalop	pasos	adon	loros
p	abrun	madun	badun	cadalup	pasus	adun	lorus
q	abral	madal	badal	cadalar	pasal	adar	loran
r	abrel	madel	badel	cadaler	pasel	ader	loren
s	abril	madil	badil	cadalir	pasil	adir	lorin
t	abrol	madol	badol	cadalor	pasol	ador	loron
v	abrul	madul	badul	cadalor	pasul	adur	lorun
x	abram	madax	badax	cadalax	pasar	adal	lorat
y	abrem	madex	badex	cadalex	paser	adel	loret
z	abrim	madix	badix	cadalix	pasir	adil	lorit
w	abrom	madox	badox	cadalox	pasor	adol	lorot

3 damus badu x rasset masaien pasu are  
 in an badel abru omi omis pasil cadale x  
 in medun fairs pasi medo madebol omi rasset  
 eds fiant damer dia fiant medo madul abru  
 u cadalen abren mastren mastrial fiant an  
 dan badul pasal an adan masant damer  
 farol damu abren rasset damus an dies  
 asan masaras damer badis masaras damu  
 ni pasen medus pasin rasset masara pasas  
 us dramin pasul an adas rasset masant  
 an rasset rasset an pasu th an mastias  
 rel pasal medos an x adu an mesul dies  
 drimon damer madebol medos medun rasset  
 pasas fiant medu mesi medu rasset pasen  
 i amon damus badun pasel abru di abren  
 eds an x madebol rasset masara an x  
 asties masaru pasal fiant fira pasul dnu  
 faren mesa badan amon an medun pasen  
 an rasset damer pasis medos an adol an x  
 leban medu medan pasu medu mastren an x  
 fiant mesar mastie rasset an abia di abru

# Polygraphia III: The Artificial Language Mimic

1	2	3	126
A Abra	A mada	A badar	1
B Abre	B made	B bader	2
C Abri	C madi	C badir	3
D Abro	D mado	D bador	4
E Abru	E madu	E badur	5
F Abras	F madas	F badan	6
G Abres	G mades	G baden	7
H Abri	H madis	H badin	8
I Abros	I mados	I badon	9
K A brus	K madus	K badun	10
L A bran	L madan	L badas	11
M A bren	M maden	M bades	12
N A brin	N madin	N badis	13
O A bron	O madon	O bados	14
P A brun	P madun	P badus	15
Q A bral	Q madal	Q badal	16
R A bre	R madel	R badel	17
S A bril	S madil	S badil	18
T A bro	T madol	T badol	19
V A brul	V madul	V badul	20
X A brax	X madax	X badax	21
Y A brex	Y medex	Y badex	22
Z A brix	Z madix	Z badix	23
w A brox	w madox	w badox	24
	Ff		

	P.III-1	P.III-2	P.III-3	P.III-4	P.III-5	P.III-6	P.III-7
a	abra	mada	badar	cadalan	pasa	adam	lora
b	abre	made	bader	cadalen	pase	adem	lore
c	abri	madi	<u>badir</u>	cadalin	pasi	adim	lori
d	abro	mado	bador	cadalon	paso	adom	loro
e	abru	<u>madu</u>	badur	cadalun	<u>pasu</u>	adum	loru
f	abras	madas	badas	cadalas	pasan	adas	loraff
g	abres	mades	bades	cadales	pasen	ades	loreff
h	abris	madis	badis	cadalis	pasin	adis	loriff
i	abros	mados	bados	cadalos	pason	ados	loroff
k	abrus	madus	badus	cadalus	pasun	adus	loruff
l	abran	madan	badan	cadalap	pasas	adan	loras
m	abren	maden	baden	cadalep	pasas	aden	lores
n	abrin	madin	badin	cadalip	pasis	adin	loris
o	abron	madon	badon	cadalop	pasos	adon	loros
p	abrun	madun	badun	cadalup	pasus	adun	lorus
q	abral	madal	badal	cadalar	pasal	adar	loran
r	abrel	madel	badel	<u>cadaler</u>	pasel	ader	loren
s	<u>abril</u>	madil	badil	cadalir	pasil	adir	lorin
t	abrol	madol	badol	cadalor	pasol	<u>ador</u>	loron
v	abrul	madul	badul	cadalul	pasul	adur	lorun

secret: abril madu badir cadeler pasu ador

u	abrom	madox	badox	cadalox	pasor	adal	lorat
						ader	loret
						adil	lorit
						adol	lorot

# Polygraphia III: The Artificial Language Mimic

1	2	3	126
A Abra	A mada	A badar	1
B Abre	B made	B bader	2
C Abri	C madi	C badir	3
D Abro	D mado	D bador	4
E Abru	E madu	E badur	5
F Abra	F madas	F badan	6
G Abres	G mades	G baden	7
H Abri	H madis	H badin	8
I Abros	I mados	I badun	9
K Abra	K madus	K badun	10
L Abra	L madan	L badas	11
M Abren	M maden	M bades	12
N Abri	N madin	N badis	13
O Abri	O madon	O bados	14
P Abri	P madun	P badus	15
Q Abri	Q madal	Q badal	16
R Abri	R madel	R badel	17
S Abri	S madil	S badil	18
T Abri	T madol	T badol	19
V Abri	V madul	V badul	20
X Abri	X madax	X badax	21
Y Abri	Y madex	Y badex	22
Z Abri	Z madix	Z badix	23
W Abri	W madox	W badox	24

	P.III-1	P.III-2	P.III-3	P.III-4	P.III-5	P.III-6	P.III-7
a	abra	mada	badar	cadalan	pasa	adam	lora
b	abre	made	bader	cadalen	pase	adem	lore
c	abri	madi	badir	cadalin	pasi	adim	lori
d	abro	mado	bador	cadalon	paso	adom	loro
e	abru	madu	badur	cadalun	pasu	adum	loru
f	abras	madas	badas	cadalas	pasan	adas	loraff
g	abres	mades	bades	cadales	pasen	ades	loreff
h	abris	madis	badis	cadalis	pasin	adis	loriff
i	abros	mados	bados	cadalos	pason	ados	loroff
k	abrus	madus	badus	cadalus	pasun	adus	loruff
l	abran	madan	badan	cadalap	pasas	adan	loras
m	abren	maden	baden	cadalep	pasas	aden	lores
n	abrin	madin	badin	cadalip	pasis	adin	loris
o	abron	madon	badon	cadalop	pasos	adon	loros
p	abrun	madun	badun	cadalup	pasus	adun	lorus
q	abral	madal	badal	cadalar	pasal	adar	loran
r	abrel	madel	badel	cadaler	pasel	ader	loren
s	abril	madil	badil	cadalir	pasil	adir	lorin
t	abrol	madol	badol	cadalor	pasol	ador	loron
v	abrol	madol	badol	cadalor	pasol	ador	loron
				cadalax	pasar	adar	lorat
				cadalex	paser	ader	loret
				cadalix	pasir	adir	lorit
				cadalox	pasor	ador	lorot

cheese: pasi pasin pasu pasu pasil pasu

# Experiments

➤ **Hypothesis:** The application of a cipher that works according to the principle of Polygraphia III produces a text with similar properties to a text in Voynichese.

➤ **Generate texts by simulating encryptions with the PIII cipher.**

➤ **Compare the statistical properties of this texts to the properties of (medieval / early modern) texts of different languages**

■ **English: Dee – Elements**

■ **German: Paracelus – Paragranum**

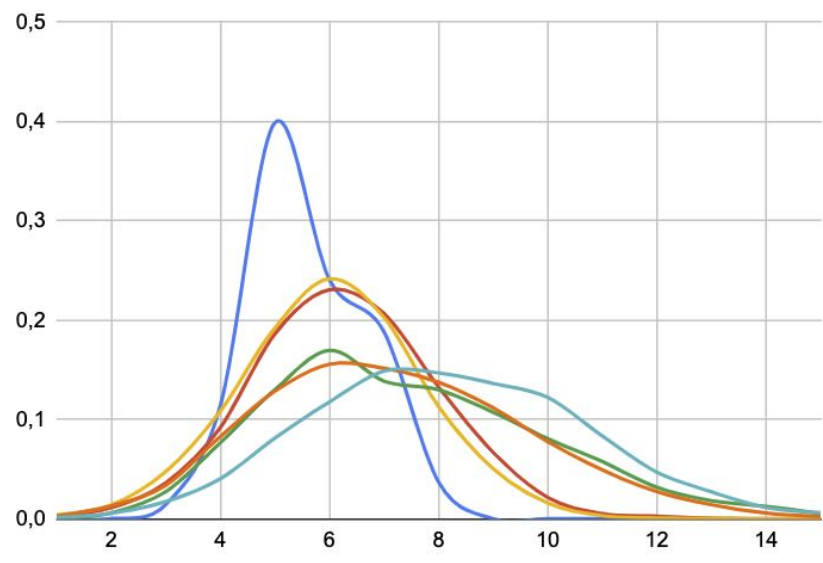
■ **Italian: Dante – Divina Comedia**

○ **Voynichese**

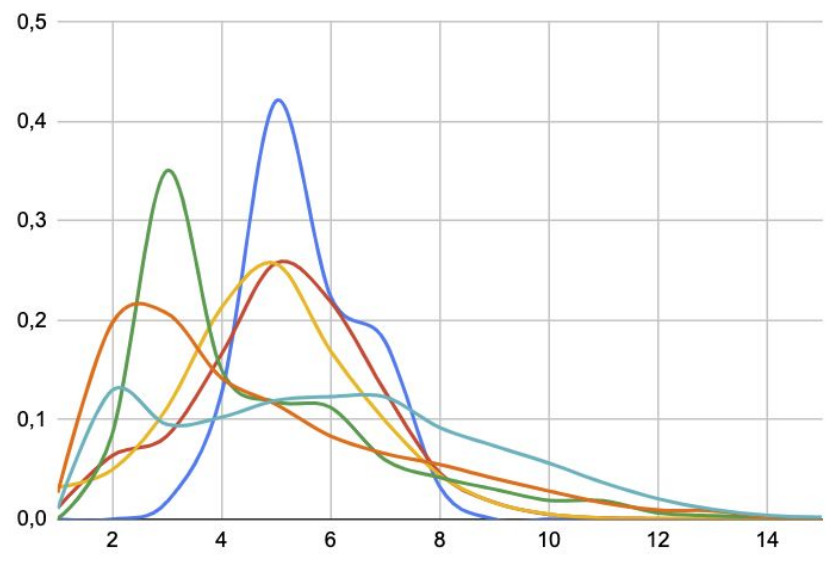


# Results: Word Length Distributions

### Word Lengths Types



### Word Lengths Token



- PIII
- VM Currier B
- VM Currier A
- Paracelsus
- Dee
- Caesar

# Results: Entropy Values

	Dee	Dante	Paracelsus	VMS A	VMS B	P.III big	P.III small
$h_{words}$	9.27	9.66	8.93	9.88	9.89	10.74	6.52
$h_0$	5.36	4.59	4.95	4.46	4.46	4.52	4.00
$h_1$	4.10	3.93	4.04	3.85	3.88	4.00	3.57
$h_2$	3.29	3.11	3.14	2.17	2.01	2.90	1.90
$h_1 - h_2$	0.81	0.82	0.90	1.68	1.87	1.10	1.67

Word entropy and the three character-based entropies:  $h_0$  is  $h_{max}$ ,  $h_1$  is the entropy of single,  $h_2$  of joint characters. The last column gives the difference between  $h_1$  and  $h_2$ . (see Stallings 1998)

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# Results: Minimal Pairs and Repetitions

	Dee	Dante	Paracelsus	VMS A	VMS B	P.III big	P.III small
<b>Minimal pairs</b>	5.53	2.61	6.40	35.32	30.25	11.12	222.23
<b>Minimal triplets</b>	0.08	0.10	0	2.26	1.70	0.06	47.21
<b>Word repeated</b>	0.98	0	2.56	9.59	8.46	1.36	25.65

## Proportions of minimal pairs resp. minimal triplets resp. word repetitions in all pairs resp. triplets of the texts.

# What I don't claim (This one is for you, Reviewer 2)

➤ **Trithemius is the author the VMS.**

➤ **The VMS is encoded in Latin.**

➤ **The VMS is definitely an encoded text.**

➤ **It is likely that the VMS was encoded with a codebook.**

➤ **I have made the best attempt yet to generate a text with the properties of the VMS.**

**But...**

➤ **Still a key question: “How could a text with the crude characteristics of the Voynich Manuscript have been created?”**

➤ **Previous attempts to explain a natural language or a known cipher as the basis for the generation were (imo) not convincing**

➤ **Described methods for generating a meaningless text are (imo) comprehensible, but they only produce a meaningless text.**

➤ **Knowing that there were encryption methods in late medieval times that could produce a text with properties similar to a**

**Voynichese text at least keeps alive the hope for a hidden information in the favorite manuscript of all of us.**

rassul masaril damur medon mastrell abro mastri pasin larin cadalup pason dromes vare dras medon rassin laris abul rassel pasas medon rassin masarun pasan pasus thani damor  
meda rassot pasi drien badel pasur van adim abren badur danus mastri masarat pasul fare dromat pasu rassir masare varos cadalen damul dial rasson masaren pasit pasas abro larit  
ome mesos dromel varis cadalup pasel faros dro mastri pasi larit damon vare x cadalan mastri varas omun mesa lonis larun abul mastri masarat danu abren damos damal damir mada  
mesel varil masare abren diet diet pasen medu rassat larin damir rasse masare paser dromo damar madebas medun phosn masara damor badar masant abren mastri mastri omes damen  
pason cadalir abren medi abre larun abres dnu cadalup varis dromas mastri fare varo badar pasis cadalix madebur farel pasar damir medur abren madol omos pasi rassin varox mastri  
larun varu cadalan madebur badar pase abris rassin pasar thani rassit rassol masaras abris rassol badox abren dnu dromit danu dromos damos badix rassot masaren pasu vare  
madol omen daman phir madebur pasir mastri larun vara mastri pasar farel rassin damel pasel medus varas adun rassin masarat paser medor vani badel abru omi omus pasil cadalix  
varix meson drien damar badis masaras dromen abul dros madebal medon badan larit damos mastri rassu dromen meder rassel masaron damir medor laris pasi medo madebol omi rasse  
dames medes phil madebul damul rassin pasu pasi thani badun damos rassan dames dro faras medul damel dri badon pasit dame rassir madis farot damer dia faraff medi madul abul  
badis boden damor diet rassu vare mastri omos abros mesir masant damo faraff masaro omun mesas cadalup pasas madis abru rassir pasu cadalir abren mastri mastri farel var  
abren badis masaril pasu medo basis omi abren damo dromen larin dia faraff rassol masaren pase pasan thani damur medor rassir pasu vani badal pasil var adun masant dames  
cadalir cadalir pasur dri baden varu damo mesar larun pasu masarat pasus de medu larun mador omes pase damir dri adur varis larit drom abren rassin damis larun dros  
phosil damo rassan masare damo drom rassu masarun pasir rassu pasas faras rassul varax adun rassu masaron pasar dromes medel phosn masaras dames badis masaras danu  
medos vara adun rassin pasu die faras pasan ados pasu farot fara pasar cadalir rassal varax abul meda varil mesur dnu damen badel masari pasen medus pasir rassot masarat pasas  
mastri abren mastri paser larun medes farel damel pasan adal omes mesur varun madebas rassu omi damo dri faras medur medas varis dromen pasul varis ades rassal masari  
pasas dromus vani meden rasse medul abro omun damur pas adal rassu abro dri cadalir cadalir damer dnu adel dami badu madebur vare rasson rassir varos pasu thani mastri  
omos abren dami dri medan rassor abru rassu damos medo rassel daman badu dromen mastri damer mas mastri pasu larun rassu damel pasar medos varix adur varis mesul dros  
damon badon masarel pasi medos pasil medan masarun varix phosn medil masaras varox phosar rassat larun damor rassel masarat pasis dromen damir madebul medus medun rassu  
pasul mastri phosn dames medir pasis cadalir pasu madebur pasir omun varun mastri pasu cadalir abro badon damul mastri masare pasas larit medur mesi medir rassit pasen  
dromel phosn masarel vare medir pasir abris mastri mastri omun damos badar abren rassar dames varel dros omi vare varil bodos medor omun damos bodun pasel abul dri abren  
larun rassin damul adur damis badal damu abran omun omos abran dro farat madebar abru forell pasur mastri varul daman die rassu medos varax madebas rassot masara varox  
phosi abrel dri abri mastri mastri omi damis badar abran rassal damor varol dras varax adun rassal masarat dame mede badon damal mastri masarun pasul farel fara pasul dnu  
pasir farot abren rassat pasu medur abru rassit pase thani rassu rassu masarun abul rassu badel varol dromas pasan mede madebas pase larun mesal badan oman vani meden pasen  
rassin varis rasse masaras pasu medan rassan abul rassit dame medos rassin danus badul abul omun mastri farel varu mastri pasos larun rassit dami pasis medos vare adol varas  
meso driat damo badis masaril pasul meder pasul abru dros cadalir adel damer die abrel omun omun meser cadalir damas meden badul madebur medi medar pasir medun mastri varal  
mede medol damen madil omal pasir medor rassu abren larun rassu damer dros farat mastri varox damen dros rassor mede vare adun badu larit mesar mastri rassul varil abru dri abru

# abrol pasin pasa pasol pasum paser cadalir loros

# Literatur zur Nachbereitung / Vorbereitung

- Falls Sie das Paper zum Vortrag lesen wollen, finden Sie in ILIAS **Jürgen Hermes (2016): Polygraphia III – The cipher that pretends to be an artificial language**. (Veröffentlichung steht noch aus, deswegen bitte noch nicht weitergeben)
  - Erstellen Sie ein möglichst großes Korpus für Ihre Sprache und berechnen und visualisieren Sie einige Basiskennwerte. Genauere Anweisungen finden Sie in ILIAS.
  - Für die Bearbeitung der Aufgabe haben Sie bis zum 8.1.2023 Zeit. Sie können dafür u.a. die nächste Unterrichtsstunde nutzen, die als Online-Sprechstunde stattfinden wird.
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