Send Someone to Finish Fredenburgh's Works.
A Dutch Ciphertext (1689) from Suriname

Jörgen Dinnissen
Historian,
The Netherlands
dinnissen.jorgen@gmail.com

Nils Kopal
University of Siegen,
Germany
nils.kopal@uni-siegen.de

Abstract

A ciphertext without its corresponding key was found in the archives from the Dutch colony Suriname, in the National Archives at The Hague. We were able to decrypt it through cryptanalysis and with the use of CrypTool 2. The revealed plaintext contains a letter with military sensitive information and the name of Fredenburgh, who served as Governor ad interim from 1688 to 1689. It was sent in May 1689 by Governor Van Scharphuijsen to his directors in Amsterdam. Since 1689, the Society of Suriname (SvS) used ciphers for its militarily sensitive information. Ciphertext U3 was sent during the Nine Years' War (1688-1697) when the Dutch were at war with the French. The letter was encrypted as a precaution against possible interception by the (French) enemy.

1 Introduction

In the 17th century the Dutch divided planet Earth beyond Gibraltar into two chartered joint-stock companies. The Dutch East India Company (VOC) was born in 1602 and was empowered to trade, settle, conquer, administer, and defend their monopoly in the East, this is Asia. The Dutch West India Company (WIC) was born in 1621 and had their monopoly in the West, this is the Atlantic. The colony Suriname was subject to the charter-territory of the WIC.

After losing Dutch Brazil in 1654, the Dutch Republic's States General shouldered almost all the Atlantic military operation costs, as the WIC was financially depleted. The leadership in the Dutch Republic had little choice if they did not want to destroy the Dutch economic position in the Atlantic completely. The weakness of the WIC and the increasing competition of England and France in the Atlantic forced her to make this choice.[1]

From 1630 to 1667 Suriname was an English colony. In 1667, during the Second Anglo-Dutch War (1665-1667), Dutch from the States of Zeeland captured this colony.[2] The States of Zeeland considered Suriname as their property although neither the States General of the Dutch Republic nor the WIC had issued a patent for this. The States of Zeeland sold Suriname in 1682 to the WIC. The WIC, not wishing to undertake colonization alone, collaborated in 1683 to establish a Dutch private company, the Sociëteit van Suriname (English: Society of Suriname). This company had three participants, each holding equal shares in the society's responsibilities and profits: (1) the WIC, (2) the city of Amsterdam, and (3) the family Van Aerssen van Sommelsdijck.

The main crops for the Dutch in Suriname were sugar, cotton, and indigo. In the 18th century the single most important export product became coffee. The economy of this "transplantation

[1] Knaap (2015) and Schwartz (2014).
[2] 'Zeeland' was one of the five chambers of the WIC. It is also a province, situated in the southwest of the Netherlands, near the border with Belgium, consisting of several islands. Hence its name, meaning 'zee-land' (English: sea-land). Its capital is Middelburg. Notice, the conquest of the colony Suriname in 1667 was paid by the government of Zeeland (States) and not by the company (WIC chamber of Zeeland).

colony"[3] depended on enslaved people working on its plantations.[4]

The ciphertext U3 (1689a) is a one-page manuscript found in the Sociëteit van Suriname (SvS) archive at the Dutch National Archives, in The Hague, the Netherlands. See *Appendix 1*. In 2022, Mark Ponte noticed the ciphertext U3 and passed it on to the first author of this paper for further cryptanalysis due to the absence of a corresponding key. The name 'U3' is based on the first two codes of the ciphertext (see Figure 1). The ciphertext probably dates from 1689 because it was found physically after an archive document from April 21st 1689, in the folder with the inscription 'Number 8. Letters and papers from Suriname to the Society starting with October 22, 1688 and ending on [illegible month] 28, 1689'.[5]

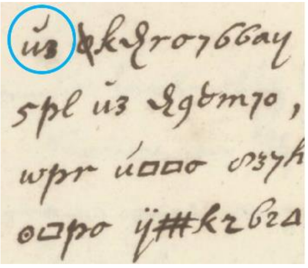


Figure 1: The first two codes of U3 (1689a), in the blue circle, gave the ciphertext its name.

This paper is organized as follows. In *Section 2*, we show the various cryptanalysis attempts that ultimately led to a breakthrough. In *Section 3*, we show the revealed plaintext and the corresponding reconstructed key. We also analyze the key and compare it with two other keys from 1739. Also, we discuss the quality of the encryption, performed by the encryptor. *Section 4* examines the automatic cryptanalysis component in CrypTool 2 (CT2). We answer questions, which are of interest of future "solvers" using CT2: Why didn't the cryptanalysis work properly in the first attempt? What tips and tricks can we take into account next time when we use it for other cryptanalysis tasks? *Section 5* discusses the use of ciphers in Suriname and describes to what extent the content of the revealed ciphertext confirms that it indeed dates from 1689. Finally, *Section 6* concludes this paper.

2 Cryptanalysis

In this section we show the various attempts that ultimately led to the breakthrough and with which attempt we were finally able to decipher the ciphertext.

2.1 First attempt: automatic cryptanalysis in CrypTool 2

Because there was no corresponding key, we used the automatic cryptanalysis component "Homophonic Substitution Analyzer" in CT2 to automatically cryptanalyze the ciphertext. Unfortunately, the first attempt yielded no readable words (see Figure 2).

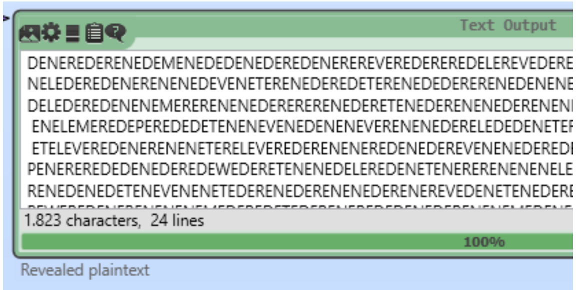


Figure 2: First attempt automatic cryptanalysis in CT2.

2.2 Second attempt: using the old and new key-1739 in CrypTool 2

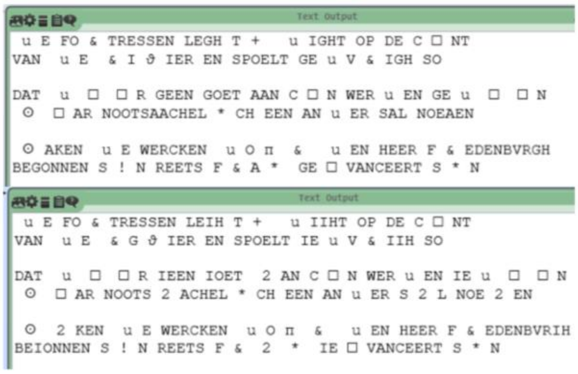


Figure 3: Second attempt with using the old (top) and the new key-1739 (bottom) in CT2 for decryption.

---

[3] A "transplantation colony" is a territory established by moving a population from one region to another, often by a colonizing power, to exploit new lands and spread their influence.

[4] Fatah-Black (2019).

[5] Original in Dutch: 'No 8. Brieven & Papieren van Suriname aan de Societijt beginnende met den 22 octob[er] 1688 ende eijndigende met den 28 [onleesbare maand] 1689'. The most recent date on a document in this folder is from August 1689. So the month must be August or later.

Karl de Leeuw (2000) writes that the WIC had one cipher, introduced in 1739, that was used over and again during the Fourth Anglo-Dutch War (1780-1784). It was specially designed for the encryption of military messages. In De Leeuw (1997) the new key-1739 is presented. If we look at the original source in the archives of the SvS we see that it is a complete and original (not reconstructed) key (New Key, 1739). On the previous page of this source we find the "old key", this is old key-1739 (Old Key, 1739). We used both keys for our second attempt in CT2. The substitution component and a handmade plain- and ciphertext alphabet, yielded better results than the automatic attempt. We were able to read Dutch words when we used the old and new key-1739: E.g. ‘spoelt’, ‘wercken’, ‘heer’, and ‘reeds’ (see Figure 3).

We observed that the old and new key-1739 do not decipher the ciphertext U3 (1689a) completely but the five Dutch words found above are basically enough to put the remaining puzzle together for the missing parts of the unknown key by hand. But before we started solving this puzzle we looked more closely at the pages before and after the ciphertext in the physical archive.

2.3 Third attempt: pin to ‘fortressen’ in CrypTool 2: our breakthrough with automatic cryptanalysis!

We noticed that the ciphertext page (see *Appendix 1*) and the page after it (see *Appendix 2*) contain about the same amount of text. On both pages the first word has two characters, the second word ten with double ‘6’ and double ‘s’ on position 7 and 8 (see Figure 4). At first, we thought that those two pages were not related because the size and the color of the paper and handwriting differed. But what happens if we pin the second word in the automatic cryptanalysis mode in CT2 to ‘fortressen’ (English: fortresses)?

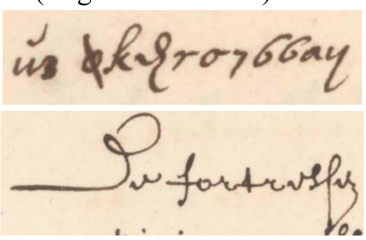


Figure 4: First two deciphered words of ciphertext U3 (1689a) and plaintext U3 (1689b).

That was the breakthrough! Immediately the first readable words appeared automatically in Dutch (see Figure 5). The first five words of the revealed plaintext are correct 17th century Dutch: *de fortressen legh te dicht* (English: the forts are too close). This means that the plaintext U3 (1689b) is the revealed plaintext of ciphertext U3 (1689a) and that we were able to relate them. So we were also able to decipher by hand (we never had to follow this path to the end) and automatic means.

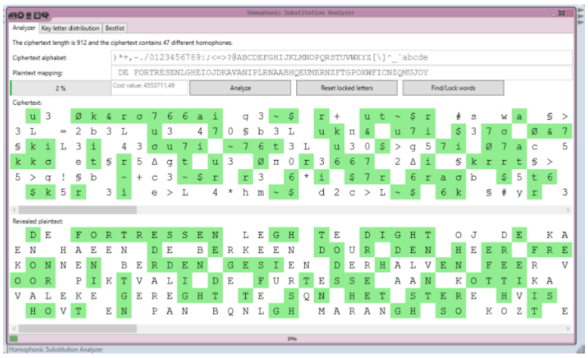


Figure 5: Breakthrough in CT2 for U3 (1689a): Pin the second word to ‘fortressen’.

3 Revealed plaintext and technical analysis

In this section we show the revealed plaintext and the reconstructed key of U3. After that, we analyze the key technically and compare it to two other keys from 1739. Finally, we discuss the quality of the encryption done by the encryptor.

3.1 Reconstructed key and revealed plaintext

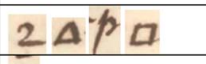
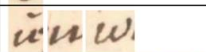
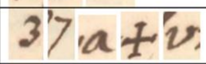
Latin letter	U3 (1689) reconstructed
A	
B	
C	
D	
E	
F	

Table 1: A part of the reconstructed key of U3 (1689a).

With some effort the complete key – this is the key that produces the most readable plaintext with the fewest errors – could be reconstructed (see Table

1). Also, see *Appendix 3* for the complete reconstructed key.

The revealed plaintext is in Dutch and reads:

DE FORTRESSEN LEGH TE DIGHT OP DE CANT VAN DE RIVIER, EN SPOELT GEDURIGH WEGH SOO DAT DAAR GEEN GOET AAN CAN WERDEN GEDAAN, MAAR NOOTSAACKELYCKE EEN ANDER SAL MOETEN MAKEN, DE WERCKEN DOOR DEN HEER FREDENBURGH BEGONNEN, SYN REETS VREY GEAVANCEERT, SYN GEDETACHEERT EN VAN AGHTEREN OPEN, GELYCK BY DE KAART SAL KONNEN WERDEN GESIEN, DERHALVEN VEEL VOLK VAN NODEN HET SELVE TE DEFENDEREN, ONS MAGASYN HEEFT MAAR VOOR DRIE WEECKEN KOST MEER, DAAROM SYNDE DE BERCK NA DE BARBADOS VOOR VICTUALY. DE FORTRESSE AEN COTTICA IS NOGH WYNIGH AEN GEVORDERT, EN DERVE DAAR MEEDE NIET VOORT VAAREN EER DEN INGENIEUR COMT ALSO EEN YEGELYCK OORDEELT DAT SEER QUALYCK GELEGT TE SYN, HET STERCK HUYS IN PARA VAN SLEGTE STOFFE OPGEMAACKT IS SEER VERVALLEN, SO DAT GROTE REPARATIEN DAAR AAN SAL MOETEN WERDEN GEDAAN, DAT IN SARANMICA VAN HOUT EN VAN WYNIGH BALANGH, SOO KOMT EEN ENGELS SCHIP MET PAARDEN EN WYNIGH VICTUALIE SO DAT DE BARCK NIET NA BARBADOS GAAT

The complete plaintext translated into English:

The forts are too close to the side of the river, (and the water) continually washes away so that it is not possible to moor there properly. But necessarily someone else will have to finish the works that sir Fredenburgh started. This (work) is already quite advanced and is detached and open at the rear. As can be seen on the map. Therefore many people are needed to defend themselves. Our warehouse only has food for three weeks. That's why a ship is to Barbados for provisions. The fortress on Cottica is still little advanced. And therefore, partly for this reason, do not sail any further before the engineer arrives. The strong house in Para is actually very poorly laid, made of bad material. It is very dilapidated and needs major repairs. The (fort) in Saranmica is wooden and of little importance. An English ship comes with horses and little provisions, so the ship does not go to Barbados.

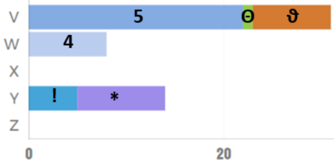
See *Appendix 5* for the complete transcription, description, and translation into English of U3 (1689a and 1689b).

3.2 Technical analysis of the three keys

In ciphertext U3 (1689a) 45 unique codes were used: twenty-one Latin letters, eight numbers (from 2 to 9), seven Greek letters, one astrological symbol (sun), and eight other symbols. Notice, that there are also four codes for punctuation. When we look at the used alphabet code elements of cipher U3 and cipher old-1739 we see that they are very similar. Cipher new-1739, on the other hand, deviates more from cipher U3 because it uses nine words in nomenclature elements. See Table 2.

Sorting nomenclature code elements		U3-1689 Code	Old-1739 Code	New-1739 Code
syllable	astrological	1	1	1
	Greek	7	9	9
	Latin	21	22	22
	number	8	9	8
	symbol	8	4	5
word	symbol			6
	Greek			3
Sub Total		45	45	54
punctuation		4		
Grand Total		49	45	54

Table 2: Three keys, sorting of their cipher codes.



alphabet code element	nomenclature code element	count
V	5	22
V	Θ	1
V	ϑ	8
W	4	8
Y	!	5
Y	*	9

Figure 6: U3 (1689) alphabet code elements over nomenclature code elements (count) in color.

In the revealed plaintext, only Latin letters were used. Twenty-two of the twenty-six Latin letters were used. The letters J, U, X, and Z were not used, which is typical for ciphers and texts of that time. For example, letters U and V share the same ciphertext symbol. Each alphabet code element has 1 to 5 code elements (homophones). See Figure 6 for more details. There are no nomenclature elements with words (only with syllables). Thus, we can conclude that the cipher for U3 is a **homophonic substitution cipher**. The same is true for cipher old-1739. Cipher new-1739 on the other hand, is a homophonic substitution cipher but with nine nomenclature elements with words. Figure 6 shows the alphabet code element frequencies of V, W, and Y. See *Appendix 4* for the complete list.

We define an assignment as a direct mapping between a plaintext element (for example the letter E) and a code element (for example the 7). If two keys encrypt the E the same way, we say they share an assignment.

If we compare the plaintext elements, code elements and their assignments we see that cipher U3 shares 71% of its assignments with cipher old-1739. For example, code element Δ is in both keys assigned to plaintext element A. The shared assignment between U3 and new-1739 is 54%. See Table 3 and 4. Also see *Appendix 6* for the details of the comparison between the three keys.

Indicator	Key U3	Key Old-1739	Key New-1739
Plaintext elements. Count	22	24	33
Code elements. Count	45	45	54

Table 3: Three keys, counting of their cipher elements.

Element	Indicator	Key U3 *A* compared Key Old-1739 *B*	Key U3 *A* compared Key New-1739 *B*
plaintext	Shared plaintext elements. Count	22	22
	Shared plaintext elements. In %	**91.7%**	**66.7%**
	Not shared plaintext elements from key *A*. Count	0	0
	Not shared plaintext elements from key *B*. Count	2	11
code	Shared code elements. Count	33	32
	Shared code elements. In %	**73.3%**	**59.3%**
	Not shared code elements from key *A*. Count	12	13
	Not shared code elements from key *B*. Count	12	22
assignment	Shared assignments. Count	32	29
	Shared assignments. In %	**71.1%**	**53.7%**
	Not shared assignments from key *A*. Count	13	16
	Not shared assignments from key *B*. Count	13	25

Table 4: Three keys, shared and not shared elements.

What is the relationship between the three keys? 1) Key old-1739 is probably derived, in an unknown year, from key U3, 73% (count 33) of their code elements are shared, 12 codes get replaced by another code. 71% of their code elements get the same assignment.

2) Key new-1739 is directly derived on December 2nd, 1739 from key old-1739. The manuscript literally reads: “old” and “new secret alphabet” (Dutch: oud en nieuw secreet alphabet). In *Appendix 6* we see that they share 82% of their code elements and 78% of their assignments. In key new-1739 nine nomenclature elements with words are added. For example, code element ‘ThreeHouses’ for plaintext element ‘buscruyt’ (English: gunpowder). It makes cryptanalysis harder.

As a rule of thumb one can say that with a shared assignment of 50% onwards a plaintext is sufficiently readable to be able to reconstruct the original key. Therefore, plaintext U3 is already quite readable if we use key old-1739 and key new-1739 for decrypting on ciphertext U3 (see Figure 3). Clearly, this also depends on the shared plaintext letters’ frequencies, e.g. if the letter E is shared.

The person(s) who designed key old and new-1739 apparently had little knowledge of and hands-on experience with cryptanalysis because key U3 and old and new-1739 overlap in such a way that the plaintext is sufficiently readable after decryption to reconstruct its complete key.

3.3 Quality of encryption?

How good was the employee of the company who did the encryption of U3 (1689a)? Did they make any mistakes? The encryptor addressed nine wrong code elements to a plaintext element. See Table 5 for the exact mistakes.

Details of Mistakes
Code ϕ (count 23) with plaintext H should read plaintext **K** (count 2)
Code ϕ (count 23) with plaintext H should read plaintext **K** (count 2)
Code i (count 41) with plaintext N should read plaintext **M** (count 2)
Code i (count 41) with plaintext N should read plaintext **M** (count 2)
Code 2 (count 27) with plaintext A should read plaintext **T** (count 1)
Code 2 (count 27) with plaintext A should read plaintext **E** (count 1)
Code Ø (count 8) with plaintext F should read plaintext **V** (count 1)
Code 5 (count 22) with plaintext V should read plaintext **F** (count 1)
Code 7 (count 41) with plaintext E should read plaintext **Y** (count 1)

Table 5: U3 (1689a) nine mistakes made in the encryption.

Line	Word in ciphertext (a) not in Dutch (b)	Word in Dutch (b) not in ciphertext (a)	Translation into English. Missing word in bold
2		wegh	continually washes **away**
6	reets		work is already **quite** advanced
22		schip	English **ship** comes with horses

Table 6: Missing words compared.

Is ciphertext U3 (1689a) based on the Dutch plaintext U3 (1689b)? Or is the Dutch plaintext the decrypted plaintext from the ciphertext? When we look in detail at the missing words (Table 6), then it is most likely that the Dutch plaintext U3 (1689b) is the decrypted plaintext from the ciphertext U3 (1689a). The decryptor added an insert symbol '^' and 'schip' (English: ship) after decryption, to make a contextually correct sentence out of it (Figure 8).

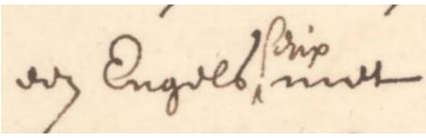


Figure 7: Line 22 in Dutch plaintext with insertion of word 'schip'.

4 Lessons learned

In this section, we look in detail at the automatic cryptanalysis component in CT2. Why didn't it work properly in the first attempt? What tips and tricks can we take into account next time when we use it for cryptanalysis?

4.1 Fourth attempt: automatic cryptanalysis in CrypTool 2

The first attempt to cryptanalyze the ciphertext with automatic cryptanalysis in CT2 failed. Now that we know what output to expect, we can take a closer look at how the automatic cryptanalysis for homophone substitution in CT2 works exactly. Was the transcription afterwards not as CT2 expected? Were the settings wrong? Another constraint?

In the fourth attempt, CT2 was able to decipher U3 (1689a) using the Homophonic Substitution Analyzer (see Figure 8).

4.2 Tips and tricks for automatic cryptanalysis

There are a few things that have to be taken into account when working with the Homophonic Substitution Analyzer of CT2 to allow it to actually decipher a ciphertext:

1) The transcription can be done and provided in different ways, but the analyzer has to know how it was done: (a) each symbol of the ciphertext was transcribed with a single transcription letter or (b) each symbol was transcribed using a word and spaces were used to separate these words. If the analyzer is not set to the correct transcription mode ("**single letter**" or "**symbol separated**"; here with the space symbol), it fails in tokenizing the ciphertext into individual code elements for the cryptanalysis.

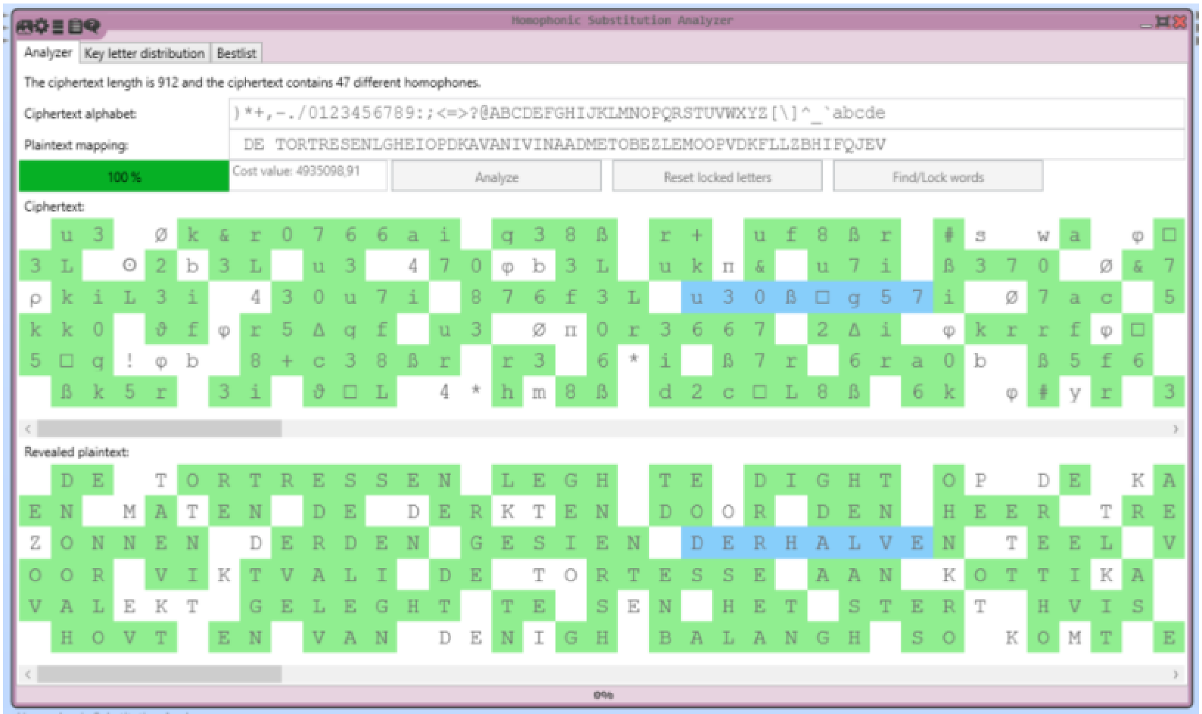


Figure 8: Fourth attempt: automatic cryptanalysis in CT2 using the Homophonic Substitution Analyzer for U3 (1689a).

2) The initial key for a first trial decryption of the automatic algorithm is created using different models of **randomness**: (a) it is equally distributed or (b) based on the assumed language of the plaintext. Depending on the cipher's type and difficulty, it makes more sense to set the key generation to equally distributed letters (e.g. to 1 for a monoalphabetic substitution cipher or e.g. to 2 for a simple homophonic substitution cipher). Here, some trial and error is needed but when the correct initial key generation is found, the automatic algorithm performs much better.

3) Set the correct **language** to be used at both, the Homophonic Substitution Analyzer as well as the used Dictionary component. The analyzer uses a language model for the cryptanalysis to improve the key and it uses the provided dictionary to find already deciphered words in the decrypted plaintext. If the languages are not set to the same (and correct) language, here in our case Dutch, the automatic cryptanalysis performs badly or fails.

4) Work **iteratively**: don't rely only on the automatic cryptanalysis. Use it as a starting point: it will find small parts of the plaintext and key. Then, correct these and lock these (green marked letters in Figure 8) in the analyzer's GUI. After that, restart the automatic process to let it improve what you found so far. By doing so, you improve the decryption (and the key) each time a little more.

After following all these tips and tricks, the automatic analysis on ciphertext U3 performed much better. Still, manual work was needed to decipher the texts completely, but the Homophonic Substitution Analyzer is a helpful tool to support the cryptanalysis process. Also, being in possession of a (different) key allowed us to enter they key and decrypt the ciphertext using another component, namely the Substitution cipher component of CT2.

5 The bigger picture

In Section 5 we discuss the use of ciphers in communication with the Dutch plantation colony Suriname and see to what extent the content of the revealed ciphertext confirms that it indeed dates from 1689.

5.1 Use of ciphers in the colony Suriname

What do we know about the use of ciphers in the colony Suriname? In 1710, in a reply to a letter from February 21st of the same year, the Gentlemen X of the WIC gave orders to the Council in Guyana, instructing them that 'encrypted letters' (Dutch: cijfer letteren) should use the old form instead of the new, advising to be used with great care to avoid mistakes. Otherwise, it could not be properly 'decrypted' (Dutch: ontcijffert werden).

In 1782, almost a hundred years later than ciphertext U3 (1689a), a couple of maps from the Suriname River with ciphertext written on them were sent to the Netherlands. De Leeuw writes about the used cipher (1997, 171): "Wollant used a secret code that was specially designed for the encryption of military messages. (...) quite simple in design and it had not changed since the outbreak of the War of Jenkins' Ear in 1739." Some years later he wrote (De Leeuw, 2000, note CLXV): "The West Indian Company, for instance, only had one cipher that was introduced in 1739 and was used over and over again during the 4th Anglo-Dutch War."

5.2 Dutch at war with England and France

In the 17th and 18th centuries the Dutch fought the following wars against England and France.

Four wars against the English:

- 1652-1654 First Anglo-Dutch War
- 1665-1667 Second Anglo-Dutch War
- 1672-1674 Third Anglo-Dutch War
- 1780-1784 Fourth Anglo-Dutch War

Five wars against the French:

- 1672-1678 Franco-Dutch War
- 1688-1697 Nine Years' War
- 1701-1714 War of the Spanish Succession
- 1740-1748 War of the Austrian Succession
- 1792-1797 War of the First Coalition

5.3 Dating U3 based on its content

Based on the physical place in the SvS archive between October 22, 1688 and [illegible month] 28, 1689 we assume that ciphertext U3 (1689a) dates from 1689 and was sent from Suriname.

What can we say about U3's dating based on its content?

- "Finish the works that Sir Fredenburgh started" (line 4-6). Abraham van Vredenburgh, commandeur and Governor ad interim between July 1688 and March 1689 after the murder of Governor Van Sommelsdijck and commandeur Verboom on July 19, 1688 (Verboom died of his injuries nine days later).[6]
- "This (work) is already quite advanced and is detached and open at the rear" (line 6-7). Referring to fort Zeelandia.
- "As can be seen on the map" (line 8). Referring to an unknown map.
- "Do not sail any further before the engineer arrives" (line 15). This seems to indicate that it is a report between an unknown reporter and the Governor in fort Zeelandia, Suriname.
- "Our warehouse only has food for three weeks" (line 10-11). Not specific enough.
- "A ship is (going) to Barbados for provisions" (line 12).
- "The fortress on Cottica is still little advanced" (line 13-14). The Fortress on Cottica is fort Sommelsdijk. Situated where the Commewijne River and the Cottica River meet. Construction on this fort started in 1684.[7]
- "The strong house in Para needs major repairs" (line 17-20). The strong house in Para is fort Houttuyn. At the mouth of the Para River in the Suriname river.
- "The (fort) in Saranmica is wooden and of little importance" (line 20-21). Unknown fortress or strong house on the Saramacca (also written as: Sarameca) or the Carameca River. On March 21st, 1689 a list was drawn up of the ammunition and other supplies present in Suriname. The following forts and posts are mentioned: fort Zeelandia, fort Sommeldijck, post Para, and post in Surammaca (Ammunition, 1689). In July 1689 Van Scharphuijsen (1689c) writes that he intends to leave the post in Surammeka and accommodate the soldiers elsewhere because this post does not provide any service to the Colony and everyone became very ill. Apparently this was a post that only existed for a few years.
- "An English ship comes with horses and little provisions" (line 22-23). This indicates that it was a time when they were not at war with England.

Based on the content of U3 we can draw the following conclusions: It’s about the Dutch plantation colony Suriname because fort Cottica and strong house Para are mentioned and the plaintext is written in Dutch. When this letter was written, the Dutch were not at war with England, otherwise the latter would not have supplied provisions. The strongest affirmation that this letter was indeed written in 1689 is the fact that the Governor ad interim of Suriname is mentioned: Abraham Vredenburgh (written as: Fredenburgh).

5.4 Sender and receiver

Who was the sender of this message and who was supposed to receive it? The letter was written in May 18, 1689 and sent by Governor Van Scharphuijsen around that date from Paramaribo, Suriname to the Directors of the SvS in Amsterdam (number 4 “a small letter in code” in Letterbook, 1689; folio 315, 316 “secret letter from Scharphuijsen” in Register, 1689).[8] On August 4, 1689 the Directors read the letters from Van Scharphuijsen and don’t mention the secret letter in code (Dutch: secrete missive of briefje in caracters) by name (Directie SvS, 1689a and

---

[6] Oudschans Dentz (1942).

[7] Meiden (1987).

[8] No date is mentioned in this source. All letters from the letterbook are listed consecutively. Folio 315, 316 states in Register (1689): “secret letter from the aforementioned Governor Scharphuijsen at this date” (Dutch: in dato dezen). And points back to Van Scharpenhuijsen’s letter of May 18, 1689.

1689b). In their letter to Van Scharphuijsen from September 10, 1689 they reply to the sent letters from May. In it they write (Directie SvS, 1689c):

- Pleased to read that the French attack on Suriname had been repulsed and that the construction of our forts is progressing.
- We sent three ships in July to Suriname before. All three were taken – two of them were sunk – by the French enemy and the shipped goods have been lost.
- With these two ships we send to you once again: victuals, materials, ammunition of war, cannons, money and 50 good and experienced soldiers.

Was this what they were waiting for in Suriname? In October 1688 they had already started building fort Zeelandia and fort Van Sommelsdijck, advancing in defense of the colony against possible enemies (Vredenburgh, 1688). On March 12, 1689 the new Governor Van Scharphuijsen was installed in the 'Raad van Justitie en Politie' and Van Vredenburg is appointed as second in command (Raad notulen, 1689). On May 4, 1689 Van Scharphuijsen writes that they are working on the fortifications, they are awaiting an engineer and requests a few masons and carpenters. He also indicates that there is a lack of victuals (Van Scharphijsen, 1689a). The next day the French enemy arrive.

On May 5, 1689 Dutch ship Waapen van Amsterdam is taken at the mouth of the river Suriname by the French. Between May 8 and 12, the French shelled Fort Zeelandia from the river with their 10 ships, but did not come ashore. The Dutch fire back. Many deaths occur, especially on the French side. On May 14 the Dutch know for sure that the French sailed away into the sea (Scharphuijsen, 1689b and Vredenburgh, 1689a and 1689b).

In his letter from May 18, 1689 Van Scharphuijsen (1689b) writes that they are preparing for a second battle with the French and that is why even more people have been put to work to complete the forts. Request for ammunition of war, victuals, good officers, and warships.

Ciphertext U3 (1689a) in a secret letter with more details about the state of defense in May 1689 in Suriname. A caption to a map. It was considered so militarily sensitive that it had to be encrypted to be unreadable in case the map and its caption was intercepted by the (French) enemy.

6 Conclusion

Our investigation revealed that the content of the revealed plaintext letter U3 (1689) contains information about the progress of the construction of various forts in the Dutch plantation colony Suriname and the amount of food in the warehouses. Both are of military strategic importance.

Dutch plaintext U3 (1689b) is the revealed plaintext of ciphertext U3 (1689a). We have been able to relate these two texts.

Since 1689, the SvS used ciphers for communicating about militarily sensitive information. Ciphertext U3 was sent by Governor Van Scharphuijsen, in May 1689, from Suriname to his directors in Amsterdam, during the Nine Years' War (1688-1697) when the Dutch (together with others) were at war with the French. The letter – a caption to a map – was encrypted as a precaution against possible interception by the (French) enemy. This message was apparently never intercepted because both the ciphertext and its revealed plaintext were found in the archive of the SvS in the Netherlands.

Acknowledgements

We wish to express our gratitude to Mark Ponte for transferring ciphertext U3 to our possession.
We would like to thank Tiemen Bosma, George Lasry, Hugo Araújo, and the three anonymous reviewers for their assistance in the preparation of this article.
This work has been supported by the Swedish Research Council, grant 2018-06074, DECRYPT - Decryption of Historical Manuscripts.

Link to the appendices

At the end of this paper *Appendix 3* is added. *Appendices 1*, *2*, *4*, *5*, and *6* can be found in DECODE record number 7841 via the following link: https://de-crypt.org/decrypt-web/RecordsView/7841.

References

Ammunition, 1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 302r-309r (scan 0322-0329).

Directie SvS, 1689a. Register van resoluties, Directors SvS from 4-8-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 3, unfoiled (scan 220-222).

Directie SvS, 1689b. Minuutresoluties, Directors SvS from 4-8-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 19, 176v-179r (scan 183-185).

Directie SvS, 1689c. Letter Directors SvS from 10-9-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 91, 115r-126v (scan 122-134).

Fred. Oudschans Dentz, 1942, Eenige bladzijden uit het leven der commandeurs van Suriname 1680 – 1804. *De West-Indische Gids* jaargang 24, nummer 1 (1942), 161-166.

Gentlemen X, 1710. 1710-9-5. NL-HaNA, WIC, 1.05.01.02, inventarisnummer 2, 1708 nov. 5 - 1710 okt. 4: scan 11 (unfoiled), f176v.

Karl de Leeuw, 1997. ‘Geheimschrift op enkele kaarten en plattegronden van de verdedigingswerken rond de Surinamerivier, 1782’, *Tijdschrift voor Zeegeschiedenis* (1997 nummer 2), 160-178.

Karl de Leeuw, 2000. *Cryptology and statecraft in the Dutch Republic*.

Karwan Fatah-Black, 2019. *Sociëteit van Suriname 1683-1795: het bestuur van de kolonie in de achttiende eeuw*.

Letterbook, 1689. Letters from Suriname to Amsterdam. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 91, 286r (scan 306).

Gerrit Knaap, Henk den Heijer, and Michiel de Jong, 2015. *Oorlogen Overzee. Militair optreden door compagnie en staat buiten Europa, 1595-1814*, 296-323.

Meiden, G. van der, 1987. *Betwist Bestuur. Een eeuw strijd om de macht in Suriname 1651-1753*, 41-69.

Old Key, 1739. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 86: unfoiled, scan 0002.

New Key, 1739. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 86: unfoiled, scan 0003.

Raad notulen, 1689. Minutes Raad van Justitie en Politie from 12-3-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 352r-353v (scan 372-374).

Register, 1689. Sent letters from Suriname to Directors SvS in Amsterdam. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, unfoiled (scan 001-011).

Scharphuijsen, 1689a. Letter Governor from 4-5-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 288r-291v (scan 308-312).

Scharphuijsen, 1689b. Letter Governor from 18-5-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 293r-292v (scan 313-315).

Scharphuijsen, 1689c. Letter Governor from 11-7-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, unfoiled (scan 545-546).

Stuart Schwartz, 2014. ‘Looking for a New Brazil: Crisis and Rebirth in the Atlantic World after the Fall of Pernambuco’, in: Michiel van Groesen (editor), *The Legacy of Dutch Brazil*.

U3, 1689a. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 315r (scan 0335).

U3, 1689b. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 316r (scan 0336).

Vredenburgh, 1688. Letter from 23-10-1688. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 78r-82r (scan 094-098).

Vredenburgh, 1689a. Letter from 16-5-1689. NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 368r-372r (scan 388-392).

Vredenburgh, 1689b. Memorie without date (probably 16-5-16890). NL-HaNA, Sociëteit van Suriname (SvS), 1.05.03, inv.nr. 219, 374r-376v (scan 394-397).

APPENDIX 3. Reconstructed Key U3 (1689), Old Key (1739) and New Key (1739)

Latin letter	U3 (1689) reconstructed	Old key (1739)	New key (1739)
A			
B			
C			
D			
E			
F			
G			
H			
I			
J	none	none	none
K			
L			
M			
N			
O			
P			
Q			
R			
S			
T			
U	none	none	none
V			
W			
X	none		
Y			
Z	none		
NC	no nc	no nc	9 nomenclature elements (nc)

Nomenclature (NC) elements and corresponding nomenclature code elements in the new key (1639):