# Thomson's Telegram
# Decrypting a Secret Message from Albania, 1914

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## Abstract

The Netherlands carried out its first international peace mission to Albania, from November 1913 to September 1914. The goal of this mission was to provide this newly formed kingdom with a solid law enforcement agency. The Dutch officers that were sent to Albania would face a divided country, torn between the powers of the Ottoman Empire and the European powers of that day. The mission commander, Major Lodewijk Thomson, was killed in battle under circumstances that are still unclear today. An encrypted Albanian telegram that recently emerged from his file in the Dutch military archives might shed some light on this part of history that is still shrouded in mystery. This article describes the cryptanalysis of the telegram, consisting of a modified hill-climbing algorithm, followed by manual analysis. The recovered message is then put in historical perspective.

## 1 Introduction

The telegram that is the subject of this article was sent more than a century ago, just before the first World War, the time of the Ottoman Empire and the Austro-Hungarian dual monarchy. To be able to understand the meaning and the significance of the telegram, it is important to sketch the historical context.

### 1.1 Indepence of Albania in 1912

Albania declared independence from the Ottoman Empire on 28 November 1912. The independence was given international recognition at the so-called Conference of the Ambassadors, held in London in 1912-1913. This was a conference held by the six Great Powers of that time: Britain, France, Germany, Austria-Hungary, Russia, and Italy. The choice for a sovereign for this new nation fell upon a German prince, Wilhelm zu Wied (1876-1945). Prince Wied was born of a noble protestant family in Neuwied on the Rhine (Swire, 1971; Durham, 2007).

It was evident that this new country not only needed a king but also a government and a military police force to guarantee the prince's rule and to ensure law and order in the country. The Conference of Ambassadors decided that public order and security should be assured by an internationally organized gendarmerie. The search for a small, neutral country to set up this "International Gendarmerie" eventually led to the Netherlands.

### 1.2 The Dutch Mission in Albania

On 19 September 1913, the Netherlands announced that they accepted the request to set up the International Gendarmerie and would make Dutch officers available for a mission to Albania. The mission began as the first officers arrived in Vlorë on 10 November 1913. It ended officially on 27 July 1914, one day before Austria-Hungary declared war on Serbia, the event that would mark the start of World War I.

Major Lodewijk Willem Johan Karel Thomson (1869-1914) was designated as the commander of this mission. He would never leave Albania alive since he was killed in battle on 15 June 1914 in Dürres during a fierce rebel attack. The exact circumstances surrounding his death were never clarified and remain an open question until today. He was, and still is considered a national hero and in the Netherlands several streets, squares and statues honour his legacy.

A thorough study of this mission can be found in Goslinga's book "The Dutch in Albania" (Goslinga, 1972) and the excellent two-volume study by J.G. Zonne (Zonne, 2014). One of the members of the Dutch mission, Jan Fabius,

wrote a Dutch eyewitness account of this complicated and chaotic situation in which the Dutch had landed (Fabius, 1991). Citations from the Dutch literature in this article have been translated by the author.

### 1.3 The Peasant Revolt

The newly established government of Albania with its new king Wilhelm zu Wied, supported by the Dutch officers, were confronted with substantial local resistance. The *Peasant Revolt*[1] in Albania, also known as the *Islamic Revolt* or *Muslim Uprising in Albania*, was the uprising of peasants from central Albania, by mostly Muslims, in 1914 against the regime of King Wilhelm zu Wied. It was one of the reasons for the withdrawal of the king from the country on 3 September 1914, marking the fall of the Principality of Albania.

A key player in this revolt was Essad Pasha Toptani. He played a double role as a strongman in the revolt and as a minister in the government of the king. The revolt was led by Muslim leaders Haxhi Qamili, Arif Hiqmeti, Musa Qazimi, and Mustafa Ndroqi. In the early days of 1914, this group of discontented Muslim clerics gathered around Essad Pasha who proclaimed himself the saviour of Albania and Islam. (Vickers, 1999)

(Swire, 1971) p 209: "Essad Pasha is generally believed to have brought about the insurrection in central Albania which ensued. But there is no evidence to this effect - in fact, rather to the contrary - unless indeed he encouraged a movement which was largely directed against himself and his class in the hope that Turkish power would be restored and with it his own authority."

### 1.4 The Telegram

The telegram that is at the heart of this article is connected to the arrest of Essad Pasha by the Dutch. When rumours were growing that Essad Pasha was playing a double role and instructing rebels to overthrow the government, king Wilhelm zu Wied ordered the Dutch to arrest Essad Pasha and hand him over to stand trial. On 19 May 1914, Dutch officers surrounded Essad Pasha's house and fired a cannon shot that destroyed part of the roof of his house. Immediately after that, Essad Pasha surrendered.

Fabius, as a Dutch officer part of the mission, describes the events in great detail (Fabius, 1991). He tells how immediately after Essad's arrest, the Dutch officers send a message to their commander Thomson to inform him about the current events. They suspect that Essad Pasha was giving out secret instructions to the rebels. To be able to prove that Essad Pasha was behind the revolt, the Dutch officers needed solid evidence. Fabius describes that Thomson takes immediate action: (Fabius, 1991): "Commander Thomson, who was in Vlorë at the time of the fall of Essad, where he had just recovered from severe pneumonia, immediately rushed to the telegraph office after being informed about the arrest, and was fortunate enough to get a hold of several[2] coded cipher telegrams.". Thomson brought these "cipher telegrams sent by Essad and intercepted (...) for inspection" (Goslinga, 1972) with him when he hurried back to his fellow officers and the king in Dürres to provide them with the evidence that Essad Pasha was indeed behind the revolt.

Unfortunately, the king was hesitant to press charges against Essad Pasha. He was persuaded by the Italians, who were afraid that it might be revealed that they supported Essad Pasha in secret, to let him go. Essad Pasha was handed over to the Italians and sent to Rome. (Heaton-Armstrong, 2005)

### 1.5 Two Mysteries

So there are two mysteries: The circumstances of the death of Major Thomson and the role of Essad Pasha in the Peasant Revolt. When an encrypted telegram was recovered from the Dutch military archive in 2009, there were hopes that it would perhaps shed some light on one of these. It is this telegram that forms the basis for the cryptanalysis in this paper. It is reasonable to assume that this telegram is the telegram from the historical sources, captured by Thomson from the telegraph office in Vlorë on 19 May 1914.

## 2 Cryptanalysis of the Telegram

The remainder of this article describes the solution process and resulting plaintext of the telegram, followed by some historical conclusions. As with all real-life cryptographic attacks, some hypotheses were tested that were just incorrect and some,

[1] See `https://en.wikipedia.org/wiki/Peasant_Revolt_in_Albania` consulted on 28 December 2021

[2] It is unclear if Fabius talks about a telegram with several pages (as the telegram in this article) or that he explicitly means multiple telegrams. This article is about a single telegram with four pages

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| **1** | | | | | | | | | | 1 |
| **2** | | 1 | 2 | | | 1 | | 2 | 74 | 49 |
| **3** | | | 7 | 8 | | 2 | 10 | 31 | 26 | 39 |
| **4** | 1 | 13 | 16 | 5 | 24 | 13 | 18 | 24 | 25 | 14 |
| **5** | 1 | 24 | 3 | 8 | 14 | 20 | 39 | 5 | 10 | 5 |
| **6** | 1 | 11 | 48 | 52 | 7 | 25 | 1 | 1 | 7 | 43 |
| **7** | | | | | | | | | | |
| **8** | | | 1 | | | | | | | 1 |
| **9** | | | | | | | | 1 | 1 | 1 |

Table 1: Telegram number frequencies, green ones have a frequency $\geq 1\%$.

with the benefit of hindsight, even s illy. This article will not reconstruct all the roads travelled and all the walls hit.

First of all, some basic facts, see the reproduction of the original telegram in Appendix A.

- The telegram consists of 736 numbers between 19 and 119.
- There are 49 different numbers.
- Frequency range per number from 1 to 74.
- The telegram is signed in Albanian "Nen Prefekt Krujes (Figure 5, Appendix A)
- The telegram has an indication of the origin (Krüje) and destination (Sjak). (Figure 6, Appendix A)

The numbers can be ordered in a 10 x 10 matrix representing all the numbers from 00 to 99 [3]. The results are shown in table 1.

There are some numbers very low in frequency and some very high. Some of these numbers might be encoding or transmission errors or other artefacts. In order to establish a set of numbers that encode an alphabet we wish to leave out the errors. The idea is that some very low-frequency numbers could be an error. In this case, the threshold is set at 1%. For a ciphertext length of 736 that would be a threshold of 7. So, numbers with a frequency larger or equal to 7 are probably valid numbers, with a mapping to a plaintext character. These numbers are marked green in table 1.

### 2.1 Cipher System

A good starting point for determining the cipher system and, possibly, the plaintext language, is calculating the Index of Coincidence or IC (Sinkov, 1966). This IC is a statistical property of a text: the property that represents the chance that two letters in a distribution are alike. The IC for every language is slightly different. If the IC of the ciphertext is within the normal range of natural languages, it is a solid indication that the cipher system in use is *monoalphabetic*.

[3] Since 119 is the only number above 100 and since 99 is not used, the number 119 is represented as 99.

| **language** | *IC* |
|---|---|
| English | 1.73 |
| French | 2.02 |
| German | 2.05 |
| Italian | 1.94 |
| Portuguese | 1.94 |
| Russian | 1.76 |
| Spanish | 1.94 |

Table 2: IC and languages.

The *IC* is computed as follows:

$$IC = \frac{\sum_{i=1}^{c} n_i(n_i - 1)}{N(N-1)/c}$$

Where:

- $n_i$ = the frequency of number i in the telegram
- $N$ = the length of the telegram = total amount of numbers
- $c$ = the size of the alphabet = the amount of different numbers in the telegram

In the case of the telegram $IC = 2.18$

From the frequency distribution in table 1, the period in which the telegram was sent, and the comparison of the *IC* with table 2 (Friedman and Callimahos, 1958), there is sufficient r eason to start with the hypothesis of a *monoalphabetic substitution cipher*.

### 2.2 Plaintext Language

Albanian is the most obvious choice for the plaintext language, because of the historical context, the fact that it was signed in Albanian, and also because the monoalphabetic cipher needed more than 27 symbols, represented as numbers, to encode letters with a frequency larger than 1%.

#### 2.2.1 The Albanian Alphabet

The Albanian alphabet is a variant of the Latin alphabet and contains 36 characters, of which 9 are

represented by **2** Latin characters (dh, gj, ll, nj, rr, sh, th, xh, zh). All this is relevant when calculating statistical properties of a digital, Albanian text. For example, the combination "nj" should be treated as a single character of the Albanian alphabet.

### 2.3 Generating the Corpus

The algorithm that is used to solve this cipher relies predominantly on language statistics. These statistics are typically derived from a *corpus* of text for a specific language. The quality of this corpus is therefore fundamental for the successful application of the solving algorithm.

A good corpus consists of a large amount of digital text from different, representative sources like books, the bible, and newspapers. For languages like English, German and Italian, many sources of easy-to-use digital text are available. For Albanian, choices are extremely limited and not suited for the purpose as presented in this article.

The website `archive.org` hosts a vast choice of books ordered by language and by year of publication. The books have been scanned, page by page, and the result is put together in a single file. In some cases, there is also the option to download the text version of the book. This text version is (probably) created by some form of OCR (Optical Character Recognition) the final result of which is unfortunately filled with errors. For this project, it was, therefore, necessary to find an alternative.

With Google Drive, an online service provided by the Google company, it is possible to store and process files in the Google cloud. Files can be stored and retrieved but there is also OCR functionality: Images containing scanned text can be converted to their digital, raw-text equivalent. The quality of this OCR process appears to be quite good in practice. Google provides a comprehensive API to access this functionality through various programming languages. In this project the Python package `gdcmdtools` [4] is used to convert the scanned books from `archive.org` to Albanian digital text that can be used as a corpus:

- Split the book `pdf` in separate pages and convert them to `jpg` files
- `gdput -t ocr page.jpg`: Upload scanned page file to Google Drive and OCR
- `gdget page.txt`: Download OCR result as raw text file
- merge text files

For the project, the following books were used based on availability, size, quality, and type[5] :

- Alber Kamy - I Huaji (1961), Albanian translation of Albert Camus - L'Étranger.
- Alber Kamy - Renia (1956), Albanian translation of Albert Camus - La Chute.
- Alber Kamy - Miti i Sizifit (unknown), Albanian translation of Albert Camus - Le Mythe de Sisyphe.
- Alber Kamy - Vera Në Algjer (unknown), Albanian translation of Albert Camus - L'Été.
- Prej Kost. Çekrezit (1917) - Letra Shkresa Fialetore
- Të Dalëtë (1912), Albanian translation of the bible book Exodus
- Ungjilli Pas Joanit (1911), Albanian translation of the bible book Gospel according to John.

This results in 1045 scanned pages of text and 1.7 MB of raw digital text.

## 3 Solving the Cipher

### 3.1 Attack Strategy

There are several very good software packages available on the internet for free that can break mono-alphabetic substitution ciphers out of the box. A great example is Cryptool 2, a full-featured, programmable, cryptographic toolkit with a graphical user interface. (Kopal, 2018).

At the start of this project, back in 2009, several of these available tools were used to work on this telegram. All available standard tools failed to reach a solution, however. We now know the cause of this, being that the telegram was written in an old Albanian dialect and that the ciphertext is full of errors. It was at the time necessary to have full control over all aspects of the analysis method to be able to study the reasons why standard software

[4] The package website: `https://github.com/tienfuc/gdcmdtools`

[5] It is a coincidence that there are so many Albanian translations of Albert Camus used in this project. The books listed in this article were at the time of writing the only serious candidates for the described purpose.

failed. For that reason, custom attack software was developed by the author.

This software has two parts. The first part is the tool that extracts the language statistics from the corpus. In this project the frequency of combinations of four letters are used, so-called *tetragram* frequencies. These frequencies are used to generate the *score* of a text. This score is a quantification of how much the statistical properties of the text resemble the statistical properties of the corpus of text (So in this case, if the frequency distributions of tetragrams are similar). A higher score signifies that the text resembles the language of the corpus more and that it is, therefore "better".

The second part is the tool that performs a modified *hill climbing* algorithm (Russel and Norvig, 2010). The idea is that the best plaintext has the highest score, so the algorithm needs to find a mapping from the numbers to the alphabet that results in a maximum score. That makes this attack an optimization problem. A standard hill-climbing algorithm can sometimes get stuck at a local maximum. *Simulated Annealing* (Pham and Karaboga, 2000) is an algorithm that is designed to address that problem. Our own software incorporates an element of Simulated Annealing by forcing the algorithm to sometimes take a *lower* score as a better candidate. This will avoid local maxima and increase the efficiency of the algorithm.

The algorithm is shown below:

$Map$=MakeRandomMapping()
$HighScore = 0$
$MaxScore = 0$
**while** *No MaxScore change in n steps* **do**
  $MapChild$=SwapTwoEntries($Map$)
  $Text$=Mapping($Telegram, MapChild$)
  $Score$=ScoreText($Text$)
  **if** $Score > (HighScore - Random)$ **then**
    $Map = MapChild$
    $HighScore = Score$
  **end**
  **if** $Score > MaxScore$ **then**
    $MaxMap = MapChild$
    $MaxScore = Score$
    $MaxText = Text$
  **end**
**end**
Output($MaxScore, MaxText, MaxMap$)

In practice, this algorithm will be run several times to make sure a global maximum is found. The output of the program is the score, the suggested plaintext, and the mapping between the numbers of the telegram and the Albanian alphabet.

### 3.2 Errors in the Ciphertext

Although no comprehensible text was produced yet, running the attack software gave some preliminary results:

- Spaces are encoded. (28 and 29 are spaces) This is somewhat unusual but very helpful for further attacks since we can now make a distinction in words. An explanation for this might be that the author was trained in the Ottoman army. (Velkov, 2002) gives an overview of Ottoman cipher systems. It shows that in some cases spaces are encoded.
- There are lots of errors in the ciphertext (the telegram). In its raw form, it is impossible to reach a solution that makes any sense at all.

Since our attack is a ciphertext only attack, too many errors in the ciphertext prevent the algorithm from reaching a solution. So a way must be found to somehow remove errors from the ciphertext and try to reach a solution with the remaining ciphertext. The question is then how to distinguish "good numbers" from "bad numbers".

It is therefore helpful to contemplate where errors are introduced in the process of sending a coded message:

- When encoding the plaintext to numbers
- When converting the numbers to morse code
- When converting the morse code to numbers

The only error that we are able to detect *from the ciphertext only* is when a number is changed into an incorrect number, i.e. into a number that does not have a mapping to an Albanian character. This is where the original statistics from table 1 become relevant again. Remember that the numbers in green have a frequency that is larger or equal than 7, and are probably part of the key. The other numbers have a very low frequency and could be an error.

Just leaving out these numbers would damage the language structure, since we would just be leaving out single letters in words. This is where

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **2** | | | | | | | | *sp* | *sp* |
| **3** | | **z** | rr | | | **v** | **u** | nj | **t** |
| **4** | **sh** | q | gj | **r** | s | **p** | **o** | **n** | ll |
| **5** | **m** | | **l** | **k** | **j** | **i** | **h** | b | |
| **6** | **f** | **ë** | **e** | **dh** | **d** | | | x | **a** |

Table 3: Key from hill-climbing attack leaving out words with low frequency numbers.

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| **2** | | | | | | | | *sp* | *sp* |
| **3** | zh | z | y | xh | x | v | u | th | t |
| **4** | sh | s | rr | r | q | p | o | nj | n |
| **5** | m | ll | l | k | j | i | h | gj | g |
| **6** | f | ë | e | dh | d | ç | c | b | a |

Table 4: Final solution.

the spaces become helpful. The fact that spaces are encoded introduces the possibility to think about *words* in the telegram. Instead of removing single numbers that are probably incorrect, we can remove words that contain these numbers. This would, more or less, leave the language statistics intact and thus enable the hill-climbing algorithm to find a solution.

So, the strategy that was chosen is: Leave out the *words*, the number sequences that begin and end with 28 or 29, that contain *low-frequency numbers*.

The resulting ciphertext was then used as new input for the attack software.

### 3.3 Structure in the Key

When running the attack software on the reduced ciphertext as described in the previous section, it was observed that the score that was reached was much higher. That means, that the resulting plaintext resembled Albanian more closely. The text, however, still failed to make sense.[6] The interesting part of the solution, however, is the recovered key as shown in table 3. In this key, parts of the Albanian alphabet can be recognised. It is important to note here that this is an emergent property of a whole chain: The numbers from the telegram as input for the attack software, optimizing for language statistics from Albanian gives as output a mapping that clearly shows parts of the Albanian alphabet. This proves to be a solid starting point for the last, manual phase, of solving the telegram.

## 4 The Solution

Table 3 shows the recovered key from the hill-climbing attack leaving out the words with low-frequency numbers. Large fragments of the Albanian alphabet can be recognised. The most likely hypothesis is that the key was generated by a human, by writing the standard Albanian alphabet in reverse order, starting at the highest number and ending at the lowest. Spaces were added at the lowest numbers. Since some of the numbers have such a low frequency, and since the telegram contains so many errors, it is impossible to prove that this is the exact same key that was used back in 1914 to encode the telegram. Having said that, table 4 is the most probable solution.

### 4.1 Reconstructing the Plaintext

The last phase in solving the telegram had to be done by hand. By a somewhat lucky coincidence, in the immediate surroundings of the author was a person who was a native speaker of Albanian and also fluent in E nglish. This proved to be of great help when reconstructing the original text. This person could recognize that the text was written in an old dialect of Albanian in a form that is no longer in use today.

The recovered key can now be used to decrypt the telegram. It is obvious that the text contains a lot of errors but there are different kind of errors. The first kind seems to be caused by the fact that the person that translated the original text to ciphertext did not seem to care that much about the distinction between 'e' and 'ë' or 'n' and 'nj'.

The other kind of error seems to come from morse code transmission or reception errors. Most of the errors are 'close' to the original number. Since the two digits of each number are transmitted separately, there are often *off-by-one* errors in one or both of the digits.

It is instructive to give an example to clarify this process:

These numbers are on the first page of the telegram : 54 45 33 63 48 58 45 56 38 42 56 38. If we apply the decryption key we get the text: kqyenjgjqithsith which is not a word out of an Albanian dictionary. Careful study shows that there are just a few, off by one errors, and one character missing

[6] Google Translate is an invaluable tool for this. In practice, it turns out that a text with some old dialect and some errors will still show some translation results.

in the numbers:

54 (45=44) 33 63 (48=49) (58=59) (45=44) 56 (38=39) 62 42 56 (38=39)

kqyenjgjqithsith turns out to be: k**ryengritësit** or in English: *insurgents*

This complete reconstruction process can be found in Appendix B. All the corrections to the ciphertext are marked in red. Both the original text and the corrected text are included in the table. In some cases, numbers seem to be completely off and then a best, reasonable guess from a linguistic point has been made. Question marks indicate the situation when no justifiable outcome could be reconstructed.

#### 4.1.1 Reconstructed Telegram

With the key recovered, the telegram decrypted and the text repaired as much as possible, the final result can be put together:

*Gjendur e ngjarjet e këtushme gjatë ngjare, ju kam diftue zotni ju.*

*Dje kryengritësit kane dërguar lajm dhe na thoshin poqe se nuk na pranoni propozimet tona do të jeni në rrezik se do te vijmë në githë këtyre trathorve.*

*I thashë qeverija sa të mundet do të kundërshtohet deri në fund të jetës.*

*Mustafa Pashë i diftova fjalët te gjithë me dhanë bësen me vdes ?? bej nje tradhëti ?? ?? ?? ??*

*E vumë flamurin te Turqisë këtu ka rëndësie të madhe.*

*Ka mundësi që ?? rrëzojshim ?? po mundëm jam tu ju ?? dhe disa këshillonjsve qi.*

*Çuen populli die me fjalë para ju.*

*Dhame pergjigje duke u thënë se do te vjimë vuë flamurin e turqiës.*

*Ju lutem një orë e më parë të dërgoni disa qindra njerëz, njerëz fuqishëm birbo.*

*Pashas të kam tregova me vehte punët janë njom ligësht.*

#### 4.1.2 English Translation

I have been in this situation here for a long time, I am telling you, sir.

Yesterday the insurgents sent news and told us if you do not accept our proposals you will be in danger that all these traitors will come.

I told him the government would oppose it as much as it could for the rest of its life.

Mustufa Pashe, I told him all that gave me the pledge to die before betrayal(?)

Placing here the Turkish flag is of great importance.

Maybe it is possible (?) to throw down (?) I can be your (?) and some counsellors.

We responded by telling them that we would come to place the Turkish flag

Please send as soon as possible a few hundred men, strong men without house or possession.

Pasha, I told you that things are delicate.

## 5 Conclusions

It is difficult to comprehend all aspects of the telegram without more context. It is clear that there is a call to mobilize “hundred strong men” to “place the Turkish flag”. This is a clear reference to the Peasant Revolt as mentioned in the introduction. The “Mustafa” in the telegram could then very well be Mustafa Ndroqi, one of the Muslim leaders behind the Peasant Revolt. The fact that the author of the message speaks about “the government would oppose” suggests that he had good knowledge of the opinions and decisions of the government which supports the case for Essad Pascha as an author.

The routing information from Figure 6 in Appendix B. shows that the message was sent from Krüje to Shijak. Shijak was known to be a stronghold of the rebels and just a few days before the arrest of Essad Pasha, on 17 May 1914, it was reported that “armed men were concentrating” around Shijak. (Swire, 1971) (Pearson, 2004).

Is Essad Pascha the author of this telegram?. There is no solid proof or even the mentioning of his name. There are some leads, however. The telegram is signed with ”Nen Prefekt Krujes”, Albanian for “The Sub Prefekt of Kruje”. During the research of this telegram, much effort has been spent in finding historical sources that mention a sub-prefekt of Kruja. To no avail. There is, however, another, intriguing scenario.

Prince Wilhelm Zu Wied was not very successful as a king of this Six Month Kingdom. He returned to Germany and rejoined the Imperial German Army under the pseudonym ”Count of Krüja” (Elsie, 2010) p. 225. Since Essad Pasha was prime minister in his cabinet and regarded himself probably as the vice-king of the country, the Sub Prefekt of Krüja points to him. This hypothesis was pre-

sented to Robert Elsie[7] in a private email conversation. He found it to be "(...) quite fascinating, and quite possible!".

### 5.1 Further Research

Since the message is written in an old dialect of Albanian and since there are so many transmission, encoding or decoding errors, the final result leaves room for improvement, especially via a combined cryptanalytic and historical approach.

## Acknowledgments

Without the contribution from Diana Zeneli MD., this article would not have been possible. Her help in repairing the plaintext and translating the final result was crucial for the result. Finally, I would like to thank prof. dr. Bart Jacobs, dr. Haedewych van Kampen and prof. dr. Antoine van Oijen for their valuable comments and ideas for this article.

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## Appendix A. The Original Telegram

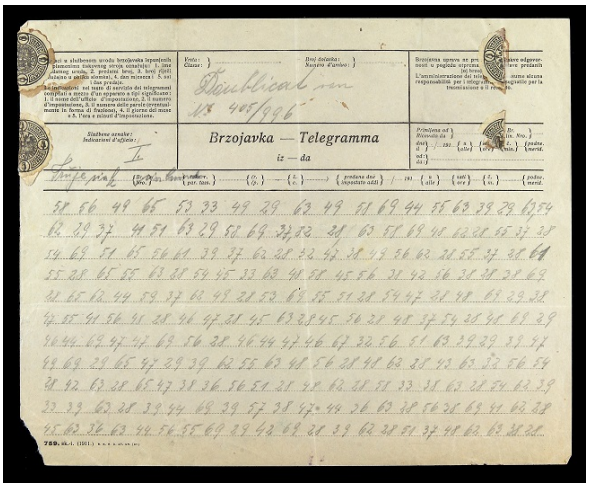


Figure 1: Page 1 of the telegram.

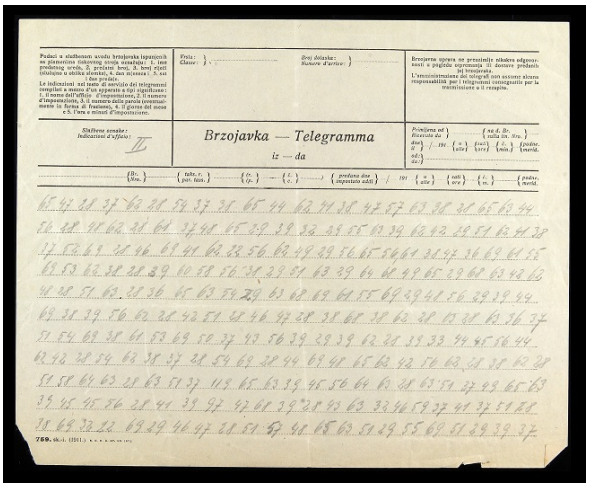


Figure 2: Page 2 of the telegram.

[7] Robert Elsie (1950-2017) was an authority on Albanian language and history. Wikipedia lemmas about Albanian history cite his work extensively.

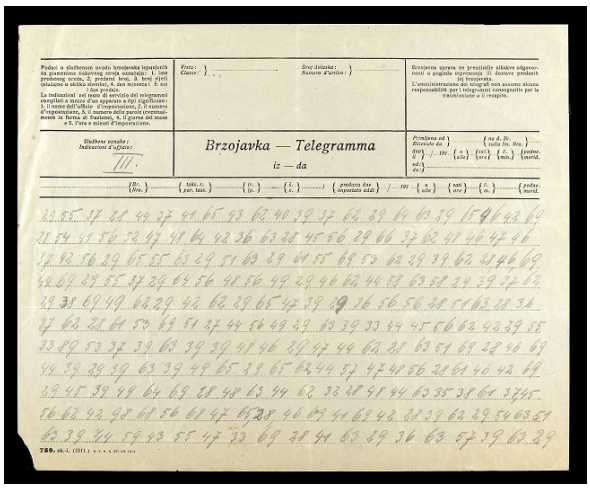


Figure 3: Page 3 of the telegram.

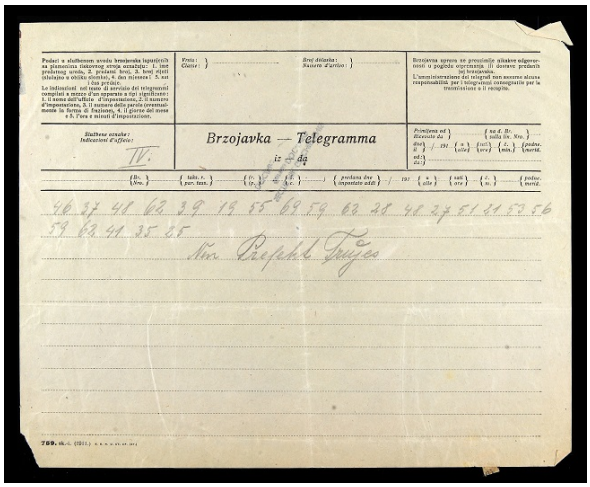


Figure 4: Page 4 of the telegram.

Figure 5: Zoom in on page 4 signature.

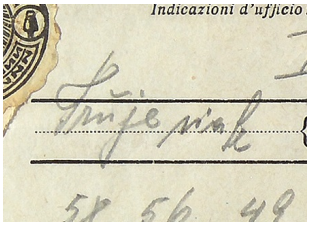


Figure 6: Metadata on page 1.

## Appendix B. The Telegram

| telegram | text | corrected text |
|---|---|---|
| 58 56 49 65 53 33 49 29 | gjindlyn | gjendur(?) |
| 63 sp 49 58 69 44 55 63 39 29 | engjarjet | e ngjarjet |
| 63 sp 54 62 (29=39) 37 41 51 63 28 | ekë ushme | e këtushme |
| 58 69 (37=39) (82=62) 28 | gjau? | gjatë |
| (63=49) 58 69 (48=44) (62=63) 28 | egjanjë | ngjare |
| 55 37 28 | ju | ju |
| 54 69 51 sp 65 56 61 39 37 (62=63) 28 | kamdiftuë | kam diftue |
| 32 47 (38=39) 49 56 (62X) 28 | zothnië | zotni |
| 55 37 28 | | ju |
| 61 55 28 | | fj |
| 65 55 63 28 | | dje |
| 54 (45=44) 33 63 (48=49) (58=59) (45=44) 56 (38=39) 62 42 56 (38=39) 28 | kqyenjgjqi thsith | kryengri tësit |
| 38 69 28 | tha | kane(?) |
| 65 62 44 59 37 (62=69) (49=44) 28 | dërguën | dërguar |
| 53 69 55 51 28 | | lajm |
| (54=64) (47=63) 28 | ko | dhe |
| (48=49) 69 28 | nja | na |
| 38 47 (55X) 41 56 (48=49) 28 | thojshinj | thoshin |
| 46 47 (28X) 45 63 28 | po qe | poqe |
| (45=42) (56=63) 28 | qi | se(?) |

| | | |
|---|---|---|
| (48=49) 37 54 28 | njuk | nuk |
| (48=49) 69 28 | nja | na |
| 46 44 69 (47=49) 47 (69X) 56 28 | praooai | pranoni |
| 46 44 47 46 (67=47) 32 56 51 63 39 28 | propczimet | propozimet |
| 39 47 49 69 28 | | tona |
| 65 47 28 | | do |
| 39 62 sp 55 63 (48=49) 56 28 | tëjenji | të jeni |
| (48=49) 62 28 | një | në |
| 43 63 32 56 54 28 | | rrezik |
| 42 63 28 | | se |
| 65 47 sp (38=39) (63 sp) 36 56 (55)) 51 (62) 28 | dothvim | do te vijmë |
| (48=49) 62 28 | një | në |
| 58 (33=55) 38 (63=62) 28 | gjythe | gjithë |
| 54 62 39 33 (39=44) 63 28 | këtyte | këtyre |
| 39 44 69 39 57 (38=39) 47 44 36 63 28 | traththorve | trathtorve |
| 56 sp 38 69 41 62 28 | ithashë | i thashë |
| 45 63 36 63 44 56 55 69 28 | | qeverija |
| 42 69 28 | | sa |
| 39 62 28 | | të |
| 51 37 (48=49) (62=65) 63 (38=39) 28 | munjëeth | mundet |
| 65 47 28 | | do |
| (37=39) 62 28 | uë | të |
| 54 37 (38=49) 65 (44 62 = 63 44) 41 (38=39) 47 57 63 (38=39) 28 | kuthdrësh thoheth | kundërshto-het |
| 65 63 44 56 28 | | deri |
| (48=49) 62 28 | një | në |
| 61 37 48 65 28 | | fund |
| 39 (32=62) 28 | tz | të |
| 55 63 39 62 42 28 | | jetës |
| 51 (62=37?) (41=42) (38=39) 37 (52=61) 69 28 | mështulla | Mustufa |
| 46 69 41 62 22 56 62 49 28 | pashë?ien | Pashë? |
| 56 sp 65 56 61 (38=39) 47 36 69 sp 61 55 69 53 62 (38=39) 28 | idifthova fjalëth | i diftova fjalët |
| 39 (60=63) sp 58 56 38 62 28 | t?gjith | te gjithë |
| 51 63 28 | | me |
| 64 (68=69) 49 (65=62) 28 | dhbnd | dhanë |
| 68 (63=62) 42 (62=63) (48=49) 28 | besënj | bësen |
| 51 63 28 | | me |
| 36 65 63 (54=42) 28 | vdek | vdes |
| 63 68 69 61 55 69 28 | ebafja bej | ?? bej |
| 48 (56=63) 28 | nji | nje |
| 39 44 69 (38=64) 39 56 62 28 | trathtië | tradhëti ??? |
| 42 51 28 | sm | ?? |
| 46 47 28 | po | ?? |
| 38 68 38 62 28 | thbtë | ?? |
| 65 28 | d | ?? |
| 63 sp 36 37 51 (54=62) (69? 38=28) 61 53 69 (50=51) 37 (43=44) 56 (39=49) 28 | evumkath fla?urrit | e vumë fla-murin |
| 39 (62=63) 28 | të | te |
| 39 33 44 45 56 (44=42) 62 (42?) 28 | tyrqirës | tyrqisë |
| 54 62 (38=39) 37 28 | këthu | këtu |
| 54 69 28 | | ka |
| 44 (69=62) (48=49) 65 62 42 56 (62=63) 28 | ranjdësië | rëndësie |

| | | |
|---|---|---|
| (38=39) 62 28 | thë | të |
| 51 (58=69) 64 63 28 | mgjdhe | madhe |
| 63 sp 51 37 119=49) 65 (63=62) (39? (45=42) 56 sp (64=45) (63=62) 28 | emu?detqidhe | ka mundësi që |
| 63 51 37 49 65 63 39 45 45 56 28 | emundetqqi | repetition of previous word with error and correction (119=49) |
| 41 39 97 47 68 39 28 | sht?obt | |
| 43 (63=62) 32 (46=47) (59=55) (37?) 41 (37=57) 51 28 | rrezpgushum | rrëzojshim? |
| 38 69 32 22 69 28 | that?a | |
| 46 47 28 | | po |
| 51 (57=37) (48=49) 65 (63=62) 51 28 | mhnjdem | mundëm |
| 55 69 51 28 | | jam |
| 39 37 28 | | tu |
| 55 37 28 | | ju |
| 44 37 41 65 43 62 40 39 37 62 28 | rushdrrë?tuë | |
| 64 63 28 | | dhe |
| 65 (46=56) 42 69 28 | dpsa | disa |
| 54 62 41 56 52 47 48 (64?) 42 36 63 28 | kshillonjdhsve | këshillonjsve |
| 45 56 28 | qi | |
| 66 37 (62=63) (48=49) sp 46 47 46 37 (42=52) 56 28 | çuënjpopusi | çuen populli |
| 65 55 63 28 | | die |
| 51 63 28 | | me |
| 61 55 69 53 62 28 | | fjalë |
| 39 62 28 | | të |
| 46 69 44 69 28 | | para |
| 55 37 28 | | ju |
| 64 (56=69) (48=51) 56 49 28 | dhinjin | dhamë? |
| 46 62 44 58 (63=56) 58 63 28 | përgjegj | përgjigje |
| 39 37 62 28 | tuë | duke u ?? |
| 38 (69=62) 49 62 28 | thanë | thënë |
| 42 (62=63) 28 | së | se |
| 65 47 sp 39 63 28 | dot | do te |
| 36 (56=55) 56 (28) | vii | vji- |
| 51 (63=62) 28 | me | më |
| 36 37 62 28 | | vuë |
| 61 53 69 51 (27=37) 44 56 49 28 | flam?rin | flamurin |
| 63 39 33 44 45 56 62 42 28 | | e tyrqiës |
| 55 (33=37) (89=28) 53 37 39 63 39 (39=29) 48 (46=62) 28 | jy?lutettnjp | ju lutet një |
| 47 44 62 28 | | orë |
| 63 sp 51 (69=62) 28 | ema | e më |
| 46 69 44 (39=62) 28 | part | parë |
| 39 63 (39 49 65) 28 | tetnd | të ?? |
| 65 (52=62) 44 (57=59) 47 (48=49) 56 28 | dllrhonji | dërgoni |
| (61=65) (46=56) 42 69 28 | fpsa | disa |
| 45 (39=56) 49 (64=65 44) 69 28 | qtndha | qindra |
| 48 63 44 62 32 28 | | njerëz |
| 48 (63 44 (63=62) (35=32) (38=28) 61 37 45 56 41 62 (42=51) 98=28 68 56 68 47 65 28 | njrextfuqiës? bibod | njerëz fuqishëm birbo |

| | | |
|---|---|---|
| 46 69 41 69 42 28 | | pashas |
| 39 62 28 | | të |
| 54 (63=69) 51 (63=28) 39 44 (59=63) 43? (55=59) 47 (33=36) 69 28 | kemetrgrrjoya | kam tregova |
| (41=51) 63 28 | she | me |
| 36 63 57 39 63 28 | | vehte |
| 46 37 48 62 39 (19=29) 55 69 (59=49) 62 28 | punët?jagë | punët janë |
| 48 (47=27) 51 (21=28) 53 56 59 62 41 (35=39) (25?) | nj?m?ligëshx | njom ligësht |