# What Peter wrote, AI will read!
*Deciphering nationally important manuscripts will be a task for AI Journey 2020*

Peter the Great's letters and directives are hard to crack even for human code breakers. His peculiar handwriting meets archaic letters and the way they are written (some on the line, some in superscript), plus an abundance of strange characters and long-forgotten words.
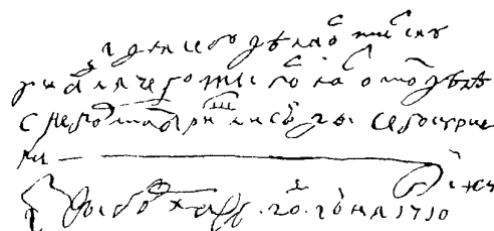
In 2020, deciphering Peter the Great's papers was made an official task for AI Journey. To enable a machine to recognize this kind of handwriting, it's necessary to figure out how to read it first. We hope you will find the text below useful.

Handwriting styles at the turn of the17th and 18th centuries

When a young Peter was learning how to write in the 17th century, Russia had two standard forms of writing – semi-ustav and skoropis (cursive). A legacy of the Old Slavonic, semi-ustav was used for ecclesiastical books, while skoropis was used for official papers, such as edicts, court records or ordinary letters. Both the stark semi-ustav and the flourishing skoropis looked as complicated as any cipher. Even when used calligraphically:
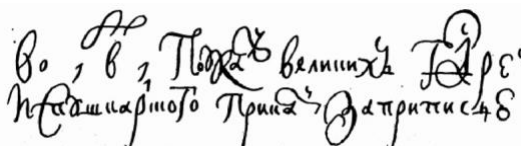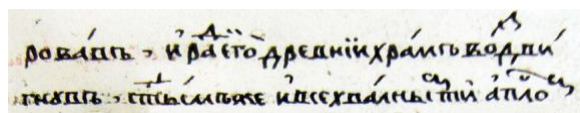
Peter the Great was not interested in writing ecclesiastical books, so he used cursive. But not just any cursive. He customized and simplified it. Besides, he just didn't like some characters. And rightly so.

The Russian language inherited a sophisticated alphabet with up to 48 characters from the Old Slavonic, including letters taken from the Greek and some Southern Slavic languages. In Peter's times, 45 characters were used, some more often than others. Some were easy to mix up, especially in a flourished cursive.

Ten most obscure archaic Russian characters (+ a small bonus)

Many sounds that are familiar to us today used to be written down in a strange manner long ago. Here is an illustrated guide to quirky signs you might encounter instead of familiar characters you'd expect.

1. "II" ("к"). Two vertical parallel sticks used to denote the letter "к". And a single stick "I" could mean the "с" (as in the third example). And a square could mean the letter "в". So the letters are all familiar, it's just that they were written differently. It happens!

2. "ω" ("omega"). This was used instead of the "о". It spawned the ligature "Сꙋ" or "ѿ" ("ot"), consisting of two letters: "ω" below, and "т" above it. "Сꙋ" is sometimes considered a single letter. It was often used to write down the preposition "отъ": "ѿ".

Can you see a check mark instead of a superscript "т" in the last two examples? You will meet it again in the description of other superscript letters (yes, there were more of them).

3. "Ѳ" ("theta"). It was used instead of the "ф". That's why Fyodor Dostoyevsky's name was actually spelled Ѳеодор.

4. "Ѧ" ("the small yus"). This is just the "я". Only it's very ancient. And it sounds like that, too: "пѧть" means "пять", "начѧти" means "начать", and "имѧ" means "имя". (And if the "Ѧ" was positioned at the beginning of a word or after a vowel and it was preceded by the sound "й", "I" had to be placed before "Ѧ". And so it was: "ꙗзыкъ" – "язык").

5. "Ѫ" ("the big yus"). This is not a "ж" and not even a consonant at all. This character was used to denote a middle sound between "о" and "у". It now reads as "у" in every word: "сѫдъ", "гѫсь" and "несѫ" are in fact "суд", "гусь" и "несу". If preceded by I, both together sound like "ю": "водоѭ" means "водою". Fortunately, there is almost zero chance of encountering this letter in Peter's writings!

6. "8" or "оу" (оу). Corresponds to the modern "у": "къ немоу" > "к нему", "оучителю" > "учителю", "на оутриꙗ" > "наутро".

7. "и", "і", "ї", "ї", "ѵ". All of those characters used to mean "и". Just "и". And the last of them, "ѵ" ("izhitsa"), could also mean "в" on occasion: "Пачелъ" > "Павел", "Єѵа" > "Ева". This is characteristic for words loaned from the Greek.

.

8. "Ѯ" (xi) and "Ѱ" ("psi"). Used to denote the sounds "кс" and "пс". "Алеѯѣевичъ" and "Ѱаломъ" > "Алексеевич" and "псалом". Both are encountered very rarely.
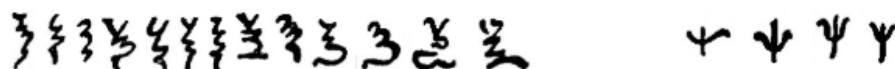
9. "˜" ("titlo"). It's not just a letter – it is rather a substitution for several letters at once. The titlo is a sign of omission. If superimposed on a word, it meant that the word was abbreviated. In Peter's times, the titlo was already considered archaic, but it was still used in ecclesiastical writings. Sometimes, as shown in the right column, the omitted letter was written under the titlo.

10. "ѣ" ("yat'"). It has many shapes in cursive and can be mixed up with anything, from a hard sign to a capital "п". Half of the words that are now spelled with "e" used to be spelled with "yat'".

In Peter's times, to confuse "ѣ" and "e" meant to confuse the meaning: "грешникъ" – a buckwheat bun, while "грѣшникъ" – a sinner, "ѣсть" means "to eat", while "есть" means "there is". All in all, it's quite an important letter.

Where was "ѣ" used? **A)** In endings of first declension nouns and personal pronouns in dative and prepositional cases (водѣ, о книгѣ; мнѣ, тебѣ, о себѣ). **Б)** In superlative and comparative suffixes (сильнѣе, сильнѣй, сильнѣйший, сильнѣйше) – even as the end letter in exceptions (болѣ, менѣ, долѣ, тяжелѣ), in suffixes of verbs ending in -ѣть (имѣть, хотѣть, смотрѣть, болѣть, краснѣть, exceptions – переться, умереть, тереть) and their derivatives (имѣть – имѣю – имѣлъ – имѣя – имѣющій – имѣвший – имѣніе). **В)** In more than a hundred Russian roots that pre-revolutionary gymnasium students had to learn by heart (the Wikipedia offers two examples of such mnemonics).

BONUS. Superscript characters

The Russian cursive was dense, had no spaces, and had only key letters written on the line, with any omitted letters added with the help of various superscript characters. The last consonant was often superscripted (to denote the end of a word and avoid writing an extra "ъ" or "ь" after it).

A vowel following a superscripted consonant could also be written above the line next to it (see examples highlighted in red). Such signs were often substituted for superscripted letters.

«Убиты ∞» = «убитыхъ»; «на тѣ ∞» = «на тѣхъ»;

«ᴎᵒ» = «ихъ»; «въ сан.ᴙ» = «въ саняхъ»;

«помо ᴑ» = «помочь»; «те ᵠ» = «течь»;

«бояро ᴟ» = «бояромъ»; «стонико ᴦ» = «стольникомъ»;

«людишка ᐠ» = «людишкамъ»; «на зи ᴫ» = «на зиму»;

«Комового двоца» = «Кормового дворца»;

«би ᴵ𝘶» = «бити»; «да ᴧ𝘶» = «дати».

«Оконичій» = «окольничій»; «жицы» = «жильцы»;
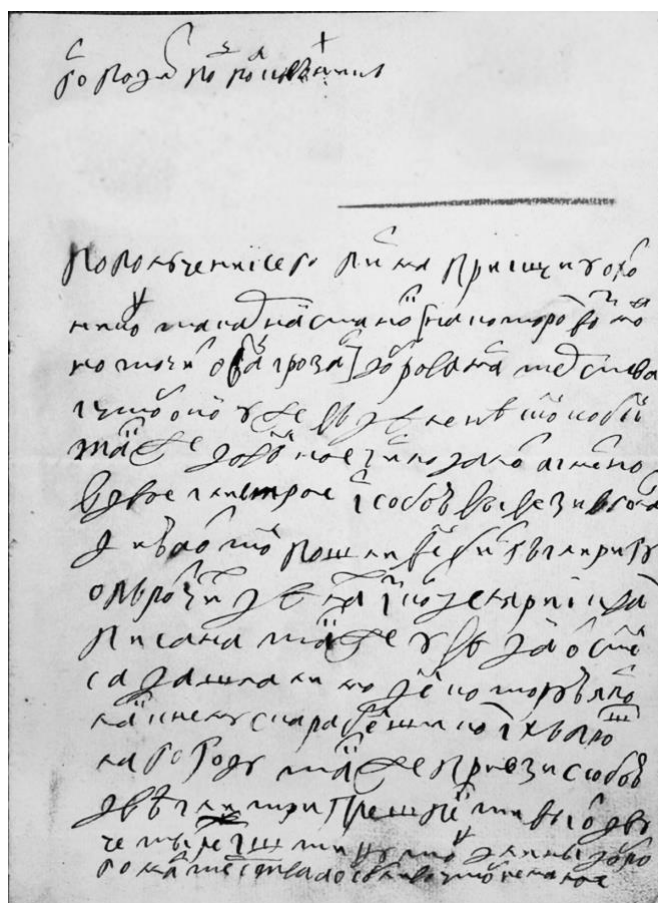
«евангеская» = «евангельская»; «сино» = «сильно».

«Оссю» = «осенью»; «бережеемъ» = «береженьемъ»;

«писае» = «писанье»; «велѣе» = «велѣнье».

«Таже» = «также»; «пима» = «письма».

Can you see how in the last couple of examples two sticks under a curve mean "к" and a single stick means "с"? Just as we told you at the beginning.

Peter the Great's personal writing style

Господинъ подполковникъ

**По полученїи сего писма приїщи у охот-
никоѐ такарноï станок(ъ) [на котором(ъ) возмож-
но точит(ь) овал(ъ) і розан(ъ)] доброва мастерства
и чтобъ оноï ужѣ въ дѣлѣ нѣсколько былъ
также довольное число далот(ъ) а именно
вдвое їли втрое і с(ъ) собою вывези в(ъ) Голан-
дию а оттол(ь) пошли в Елбинг їли в Ригу
о пъротчих(ъ) дѣлах(ъ) из(ъ) концелярiï к(ъ) вамъ
писана также увѣдай от(ъ) Стел-
са дашла ли модель которую я пос-
лал(ъ) къ нѣму с(ъ) карабелшиком(ъ) ихъ прош-
лаго году также прив(е)зи с(ъ) собою
двѣ їли три прешпективы от(ъ) дву(хъ)
четырехъ і ш(ес)ти ѳунтоѐ длины добро-
го мастерства а особливо чтоб(ъ) немалое //**

This is a letter Peter the Great wrote from London to Boris Ivanovich Kurakin on 27 May 1711 (from the archives of the Russian Academy of Sciences St. Petersburg Institute of History).

As you can see, the Czar placed certain letters above the line out of the cursive habit (such as the end "х" or "л") and made signs over words where he omitted some letters. Instead of special characters adopted in cursive to superscript omitted letters, he often placed letters above the line (such as the entire "с" – instead of a stick under a curve).

The manuscripts contain a wealth of interesting features. Instead of the "ф" ("fert") Peter uses the "ѳ" ("theta") in lowercase cursive on a regular basis( ). As per tradition, Peter

wrote the "з", "с" and final "х" above the line and superscripted the "к" before a wide-stroke "ж" (there wasn't enough space on the line for both).

He wrote the "Ю" the old way, with an upward loop (), even as he used the totally modern "я" instead of the old-time "ѧ".

He didn't like the letters "ѕ" ("zelo") or "v" ("izhitsa", used in church-related words: *мѵро, vпостась, сѵнодъ*). And he omitted the soft sign ("yer'").

The letter ï, which denoted the sound "yi" and was used before vowels and "й" (*исторïя, русскïй, Їерусалимъ, маïоръ, їодъ – pronounced* "й" in the two latter words) was consistently used by Peter instead of the second "и" in the combination of "ии" (even though the correct usage would be to place it instead of the first one).

The Czar didn't like to put spaces between words – why bother if according to the cursive traditions prepositions were joined to words and words often ended in superscript final letters?

And of course he couldn't care less about spelling. It's safe to say that the entire concept was "invented" later.

Which is to say that in Peter's times, Russian spelling was all about "individuality" (whichever way you wrote it, it was fine). The first Russian theoretical grammar appeared in print 23 years after Peter the Great passed away (by Trediakovsky, 1748), and the first grammar textbook took another seven years to complete (Lomonosov, 1755).

But all in all, the Czar wrote correctly and expressed his thoughts clearly. Yet mistakes in his text should be pointed out too. These include transmutations of foreign words ("перспектива" >"прешпектива"), "custom spellings" ("далотъ" instead of "долотъ" to denote "долото", a chisel), and the above-mentioned "i" without a dot used instead of the "и". (You can find it all in the enclosed example.)

Peter's letter outlines are not pretentious and meet the cursive standards of the time (below is an example of the standard; follow [this link](#) for ligature examples).

.

Admittedly, this choice of options looks a bit too excessive. You'd wonder, why so many letter shapes and why are they so complicated?

That's exactly what Peter the Great thought. By the age of 36 he had become so fed up with this abundance of unintelligible and often superfluous characters that he came up with a big reform.

The alphabet reform (1707-1710)

Peter wanted Russia to have more books. Not ecclesiastical books but civilian ones. Yet he was failing to establish printing in the country. And it was the state of the language that presented the obstacle.

First of all, there were superfluous letters. Some of those had become obsolete. They were created to reflect a diversity of ancient vowels many of which had lost their differences over hundreds of years. Why do we need the "omega" (Ωω), if it now sounds like "o", and why don't we just write "o"?

Secondly, the Russian language had a very complicated writing system. Take all those superscript letters with special characters. And that's before a lot of diacritical signs to show stress (´ `) and aspiration ('), not to mention the archaic titlo! All these were making typesetting a book three times as long. Why not let the characters stay on the line instead of climbing up one upon another?!

[I]

Изображенïе дрєвннхъ и новыхъ письмень славєнскихъ печатныхъ и рукописныхъ.

And so the Czar up and crossed out everything superfluous from the alphabet, leaving only 38 letters. He was going to use this "civilian" alphabet to print non-ecclesiastical books. He made sketches of letters from "A" to "T" by his own hand, gave them to a "designer" (the engineer Kuhlenbach) to refine the outlines, and ordered types for printing presses from Amsterdam. Yet the clergy insisted that some of the letters removed by the Czar be reinstated. So folks back in Peter the Great's times weren't even sure how many letters they had in their disposal.

What did Peter change, after all?

There are different opinions on what letters the Czar removed from the alphabet – some went and came back again. First of all, he removed all those letters that he almost didn't use himself: the "oy" or "8" ("uk"), "w̅" ("ot"), "ω" ("omega"), "ξ" ("xi"), "ψ" ("psi"), "v" ("izhitsa"), and "ᴀ" ("the small yus"); introduced the "I" without dots to denote the sound [и], and replaced the "ф" ("fert") with the letter "ѳ" ("theta"). The letter "ӡ" ("zemlya") was gone, ceding its place in the new alphabet to the letter "S" ("zelo"), but came back again in 1710, purging the "S" ("zelo") from the civilian alphabet forever. Peter's manuscripts also miss some or other letters from time to time. As a result, besides the modern letters we all know and love, the alphabet ended up containing just four of the "old guard" characters: the "i", "ѣ", "ѳ" and "v". And they stayed there until 1918.

One thing is certain though: Peter the Great abandoned the old practice of how numbers used to be written.

Instead of semi-ustav letters generously sprinkled with all kinds of diacritics, Peter introduced Arabic numbers. Before, Russians counted using those signs. =>

But beware: the reformer himself was totally capable of using those same obsolete signs time and again, particularly in his earlier years.

а̃	1	а̃ї	11	ӡ̃	60	т̃	300		
б̃	2	в̃ї	12	ѻ̃	0	ү̃	400		
г̃	3	є̃ї	15	п̃	80	ф̃	500		
д̃	4	и т.д.		ч̃	90	х̃	600	(а)	10 000
є̃	5	к̃	20	р̃	100	ѱ̃	700	(а)	100 000
ѕ̃	6	к̃а	21	р̃а	101	ѡ̃	800	(а)	1 000 000
ӡ̃	7	и т.д		р̃аї	111	ц̃;а	900	(а)	10 000 000
н̃	8	л̃	30	р̃ка	121	а̃	1000		
ѳ̃	9	м̃	40	и т.д		ѧ̃а̃	1001		
т̃	10	н̃	50	с̃	200	к̃	2000		

Summary

The manner and even the character set of Peter's writings were unstable as they reflected major changes in the language that Peter had initiated himself. Essentially, he was one of the few people who made the entire country write the way he preferred to. We own the subsequent transition of cursive and print to a single-line order to him.

.

Which doesn't negate the fact that letters and acts written by his own hand are evidence of a struggle between a rational spirit of transformation and an obsolete system – an archaic writing system in this case. The way those documents were written is contradictory, which makes deciphering them a major challenge.

Machine reading of documents written by this kind of unusual handwriting will become a task for you this time around. A trained neural network should output a text without translating it into modern Russian and keeping Peter's spelling, including any mistakes. Dividing it into words is nor obligatory but desirable.

Good luck!

.