

An Intuitive Unicode Input Method for Ancient Egyptian Hieroglyphic Writing: Applying the Input Technology of the Japanese Writing System

宮川 創



So Miyagawa

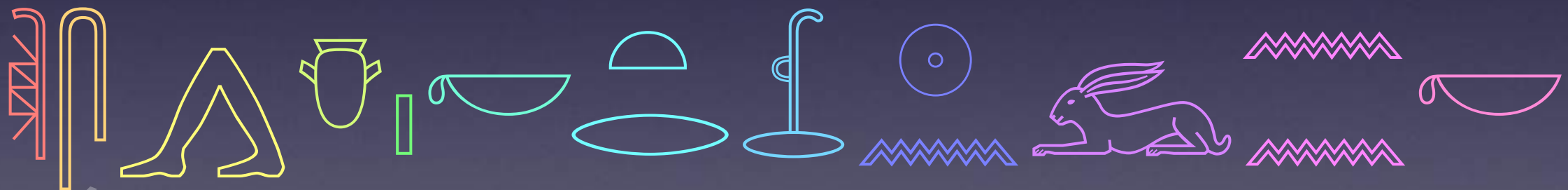
Georg-August-Universität Göttingen
Seminar für Ägyptologie und Koptologie
Kyoto University
Department of Linguistics
Member of Unicode Consortium





Goal:

To make a fast & easy way to type Hieroglyphs
that are searchable in any environment
like major modern writing systems



"Follow your heart as long as you exist"
(*The Instruction of Ptahhotep*, 186)

Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



gm

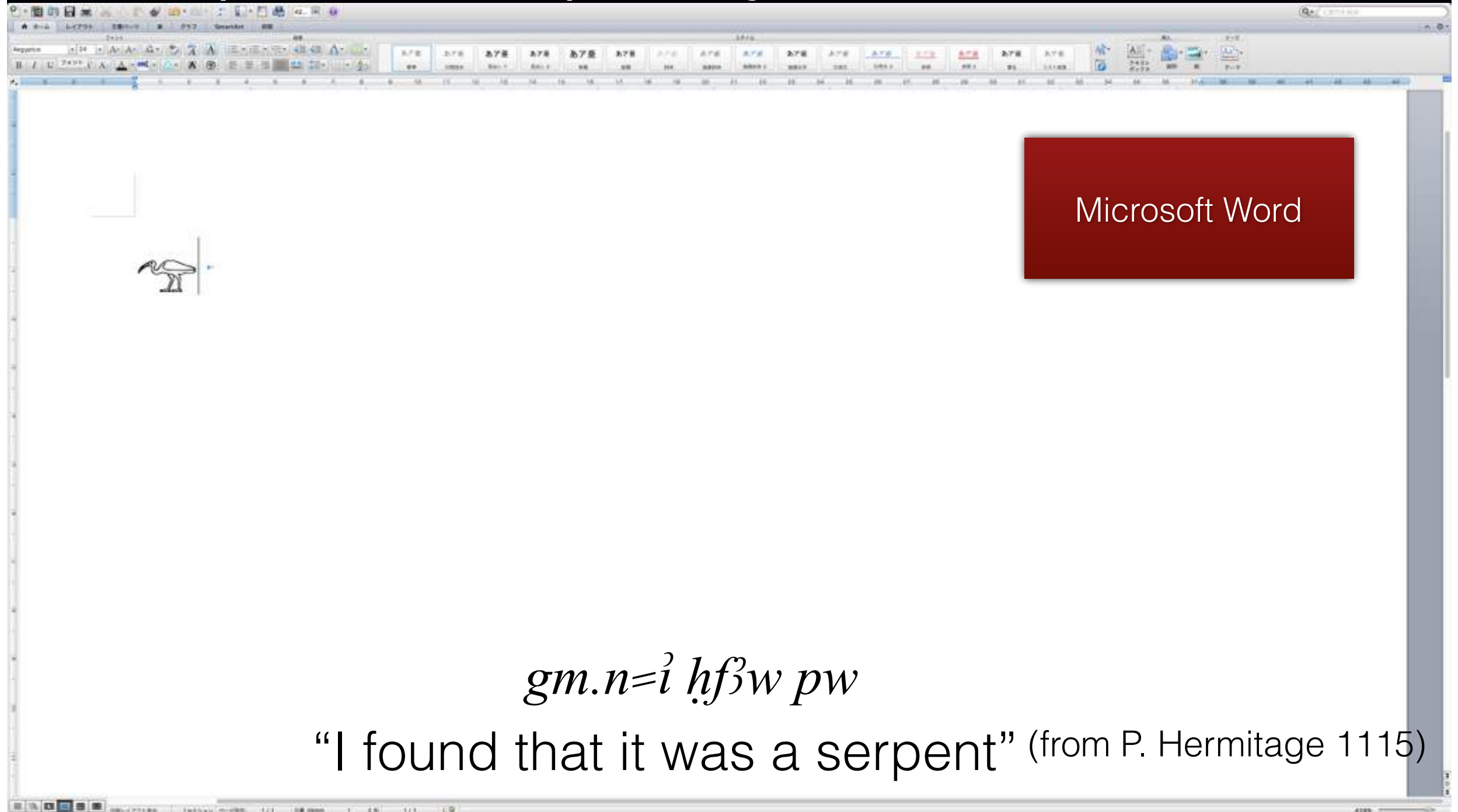
Hit the Space Bar

Microsoft Word

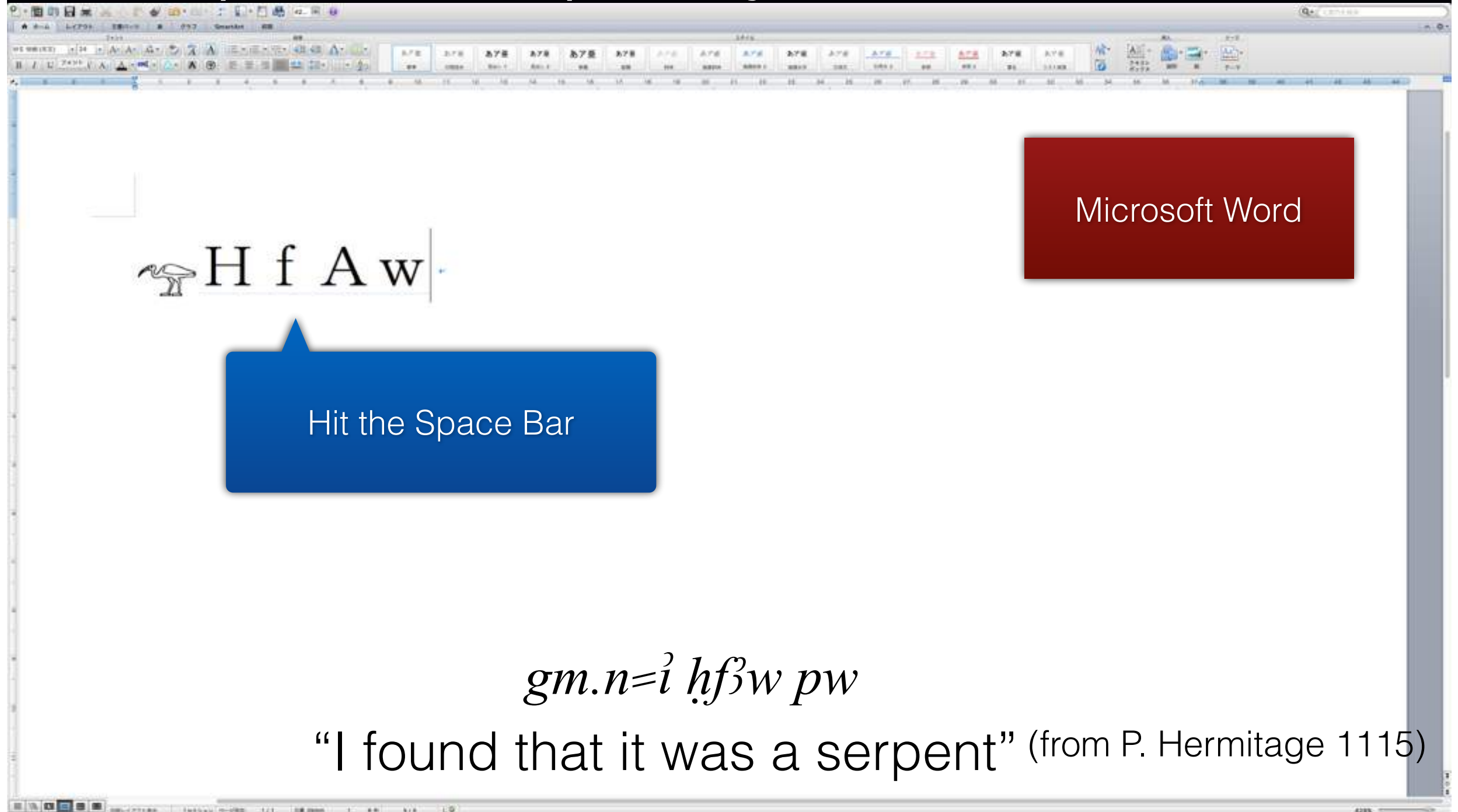
gm.n=i hf3w pw

“I found that it was a serpent” (from P. Hermitage 1115)

Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Microsoft Word

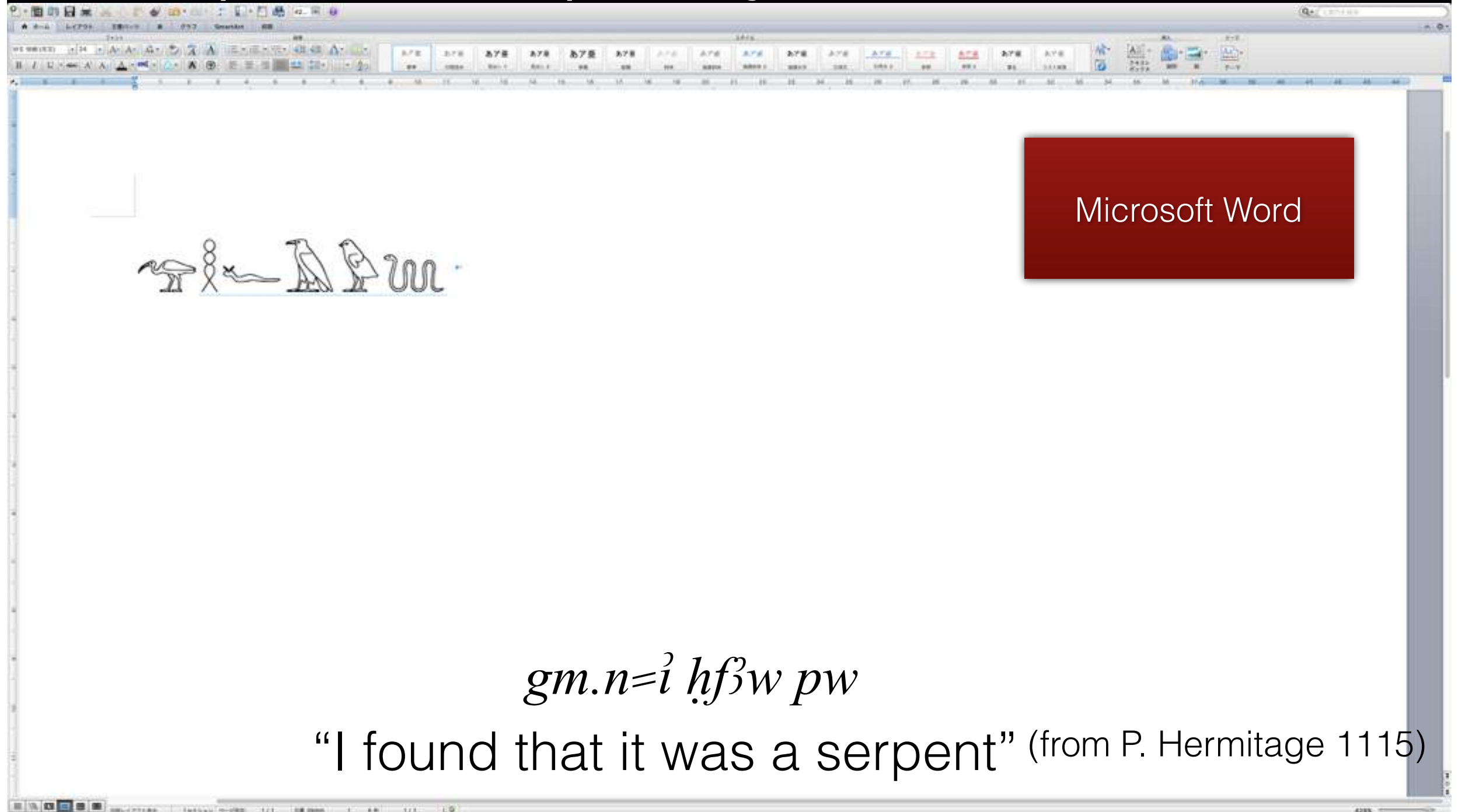
Hit the Space Bar

H f A w

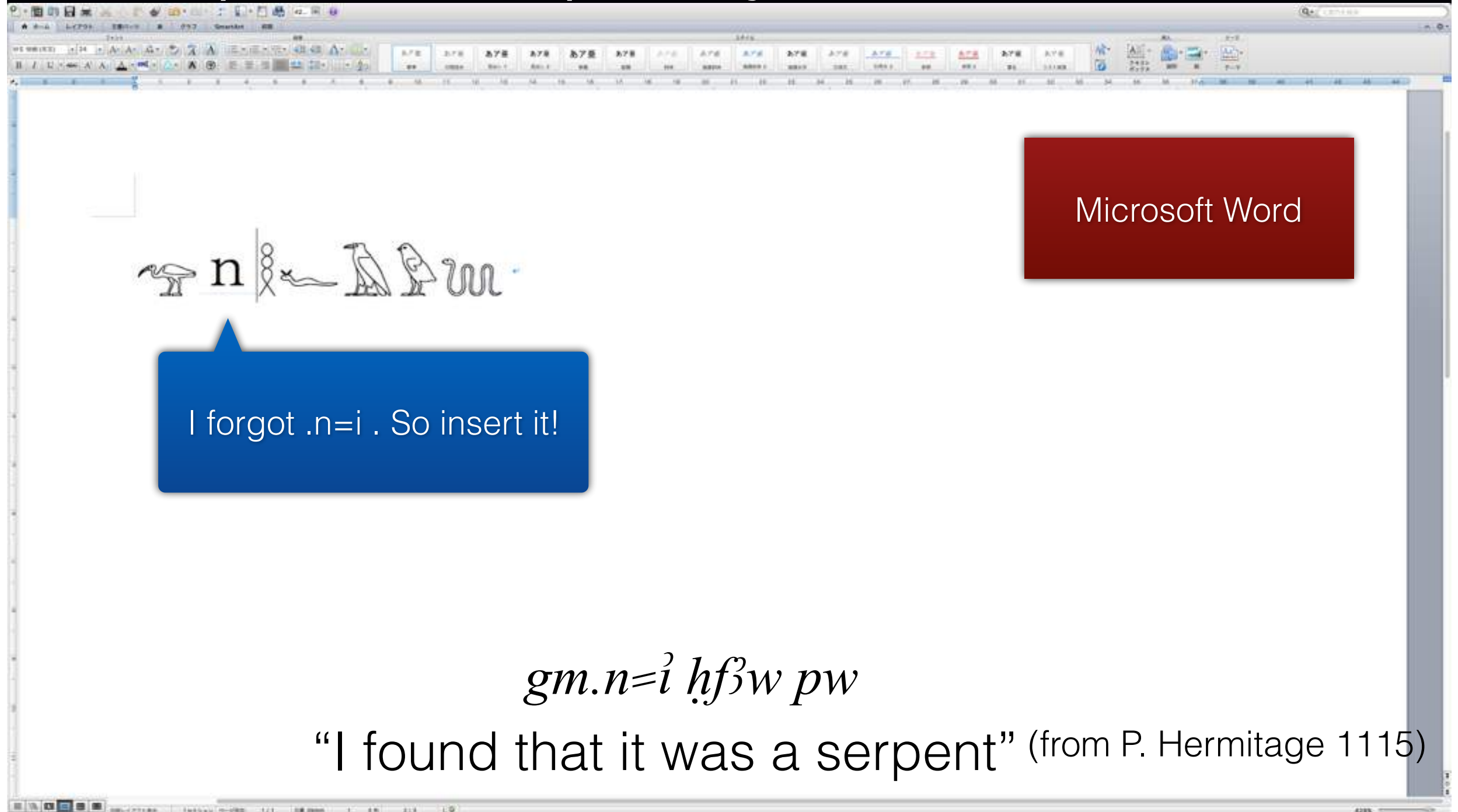
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Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



The screenshot shows a Microsoft Word document with a Japanese input system interface. The interface includes a toolbar with various icons and a text area containing the following hieroglyphs: a bird, the letter 'n', a vertical line, a snake, a papyrus plant, a lotus flower, and a snake. A blue callout box points to the 'n' and contains the text: "I forgot .n=i . So insert it!". A red box in the upper right corner of the document area contains the text: "Microsoft Word".

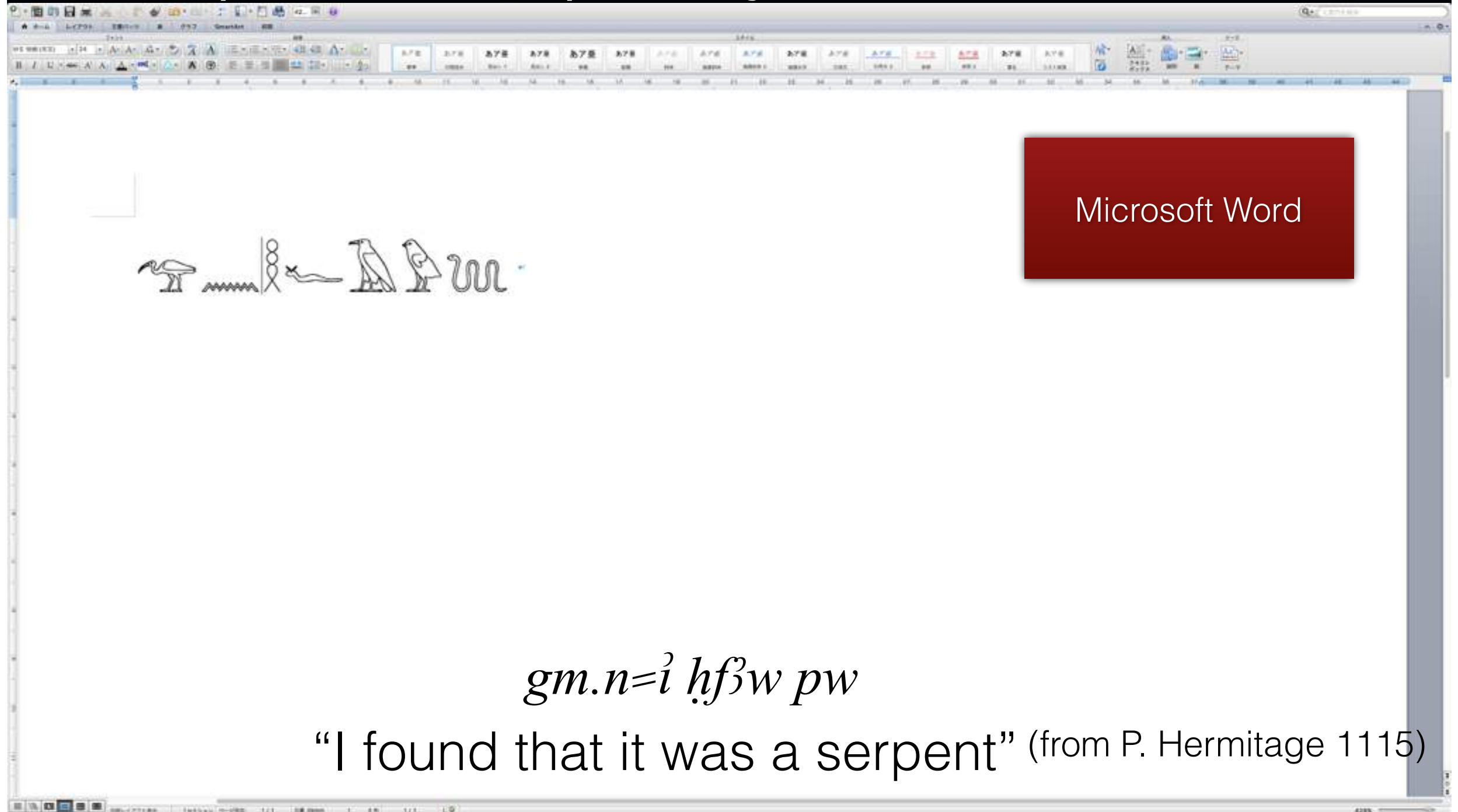
Microsoft Word

I forgot .n=i . So insert it!

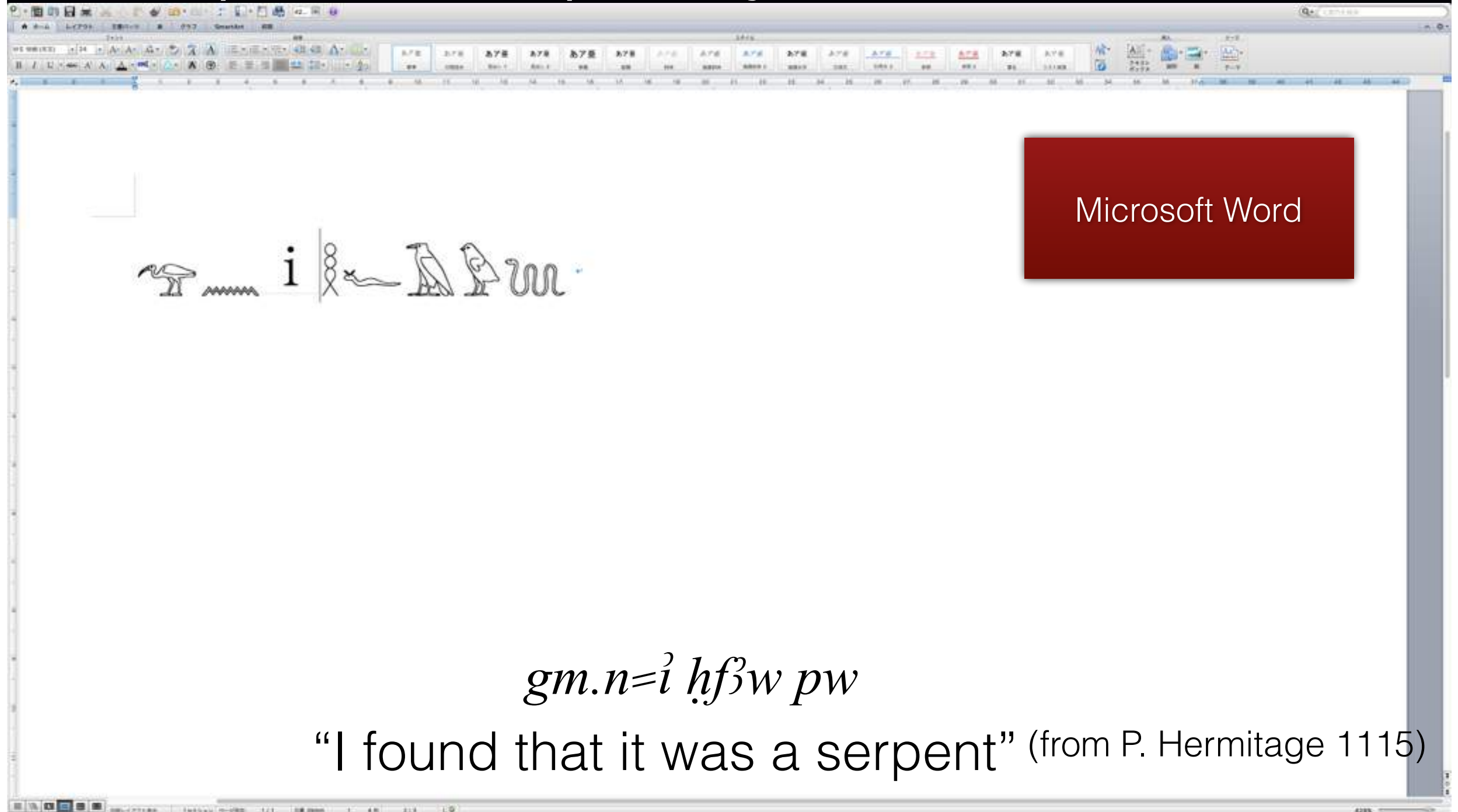
gm.n=i hf³w pw

“I found that it was a serpent” (from P. Hermitage 1115)

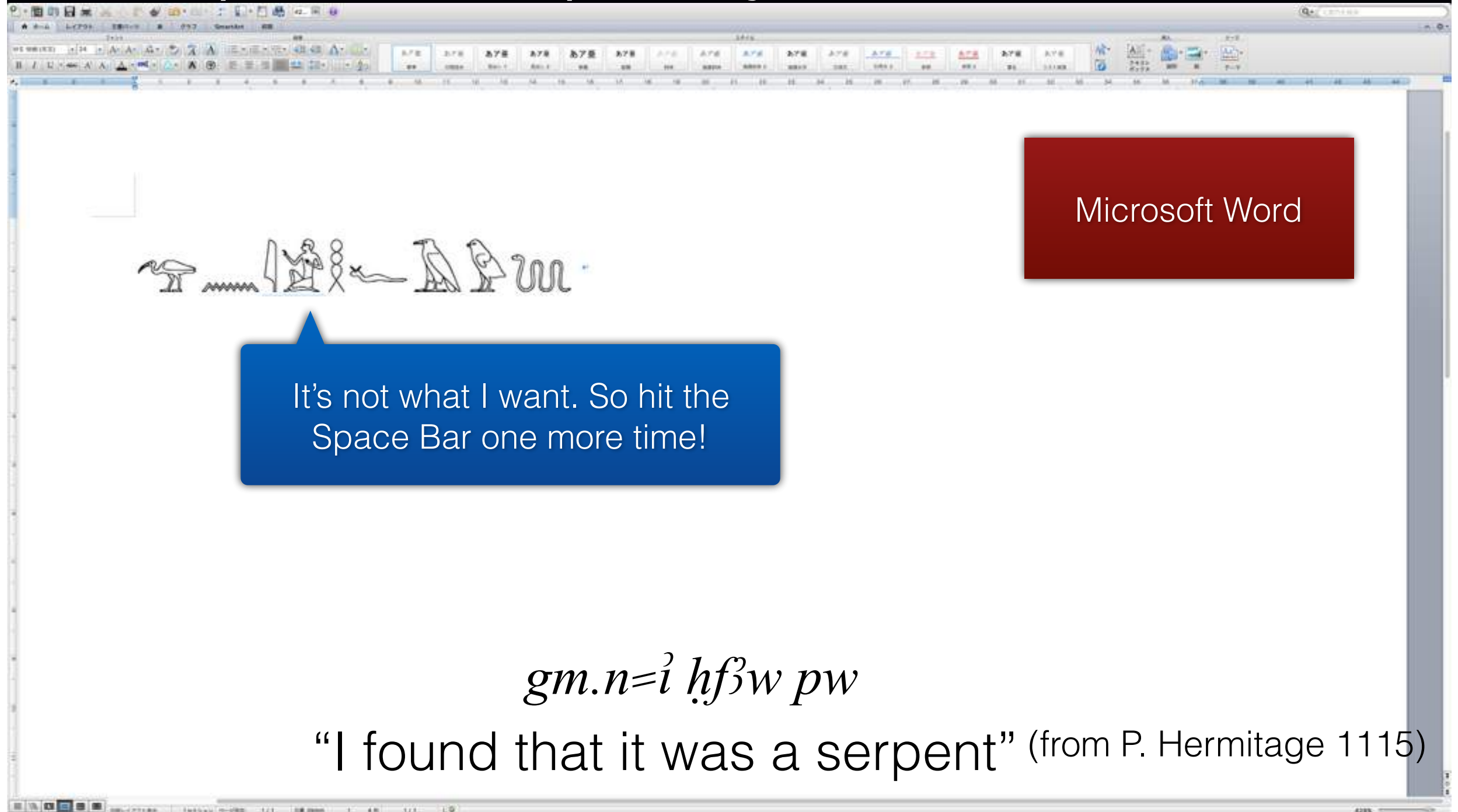
Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



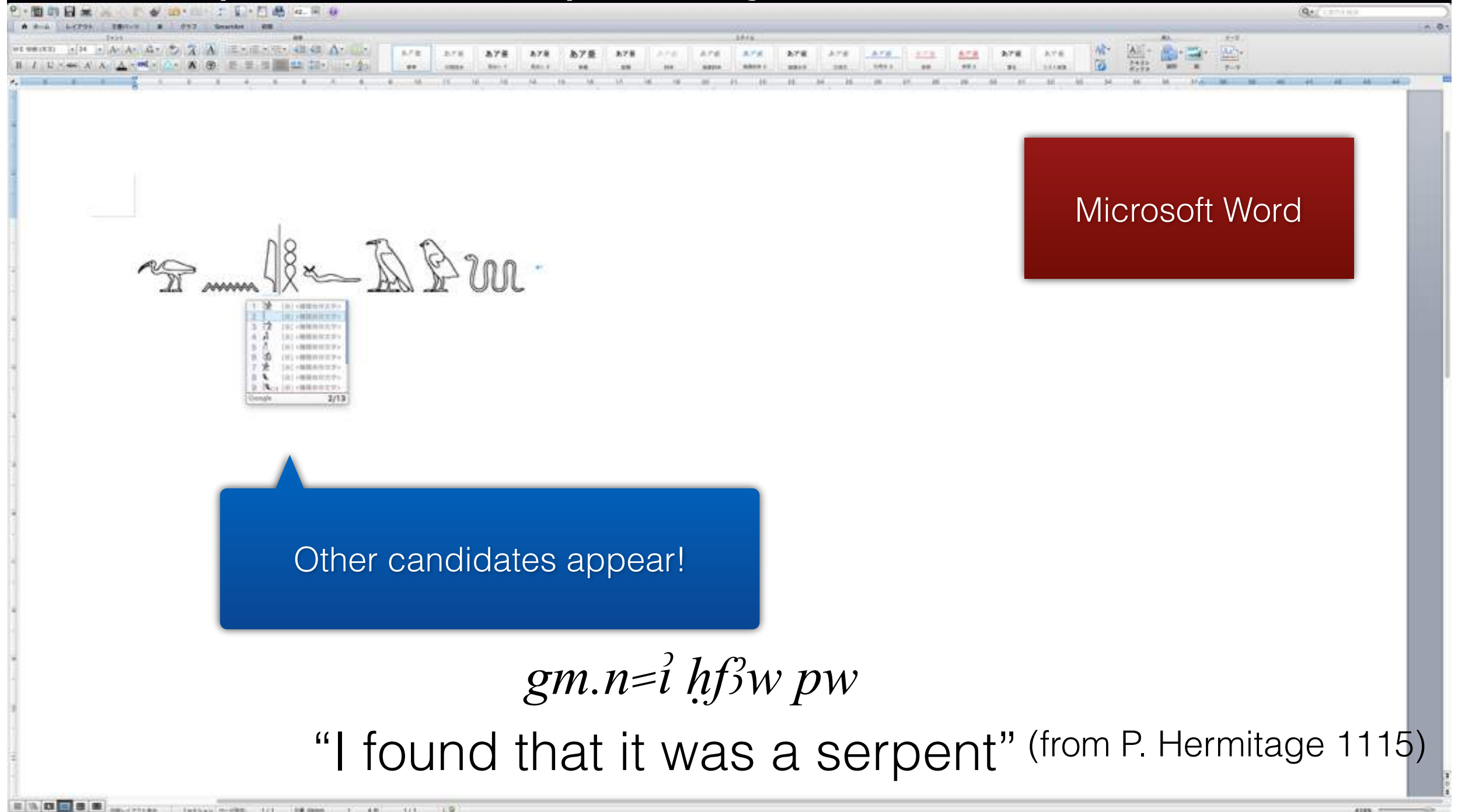
Microsoft Word

It's not what I want. So hit the Space Bar one more time!

gm.n=i hf3w pw

“I found that it was a serpent” (from P. Hermitage 1115)

Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



The screenshot shows a Microsoft Word document with a series of Egyptian hieroglyphs: a bird, a lotus, a staff with a loop, a snake, a penguin, and a wavy line. A candidate list is displayed below the snake hieroglyph, showing various options. A red box labeled "Microsoft Word" is positioned to the right of the hieroglyphs. A blue box with the text "Other candidates appear!" points to the candidate list. Below the hieroglyphs, the text *gm.n=i hf3w pw* is displayed, followed by the translation "I found that it was a serpent" (from P. Hermitage 1115).

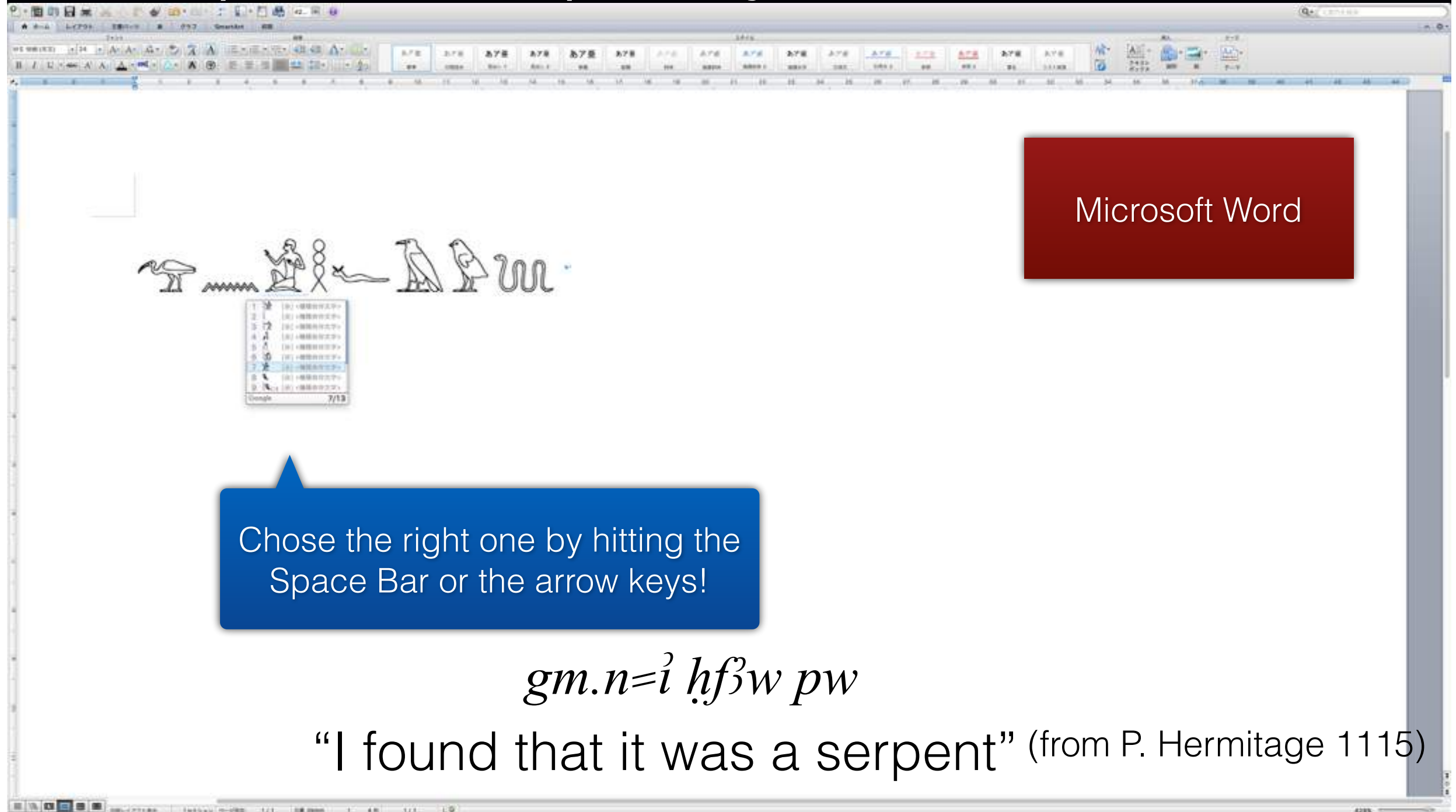
Microsoft Word

Other candidates appear!

gm.n=i hf3w pw

“I found that it was a serpent” (from P. Hermitage 1115)

Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



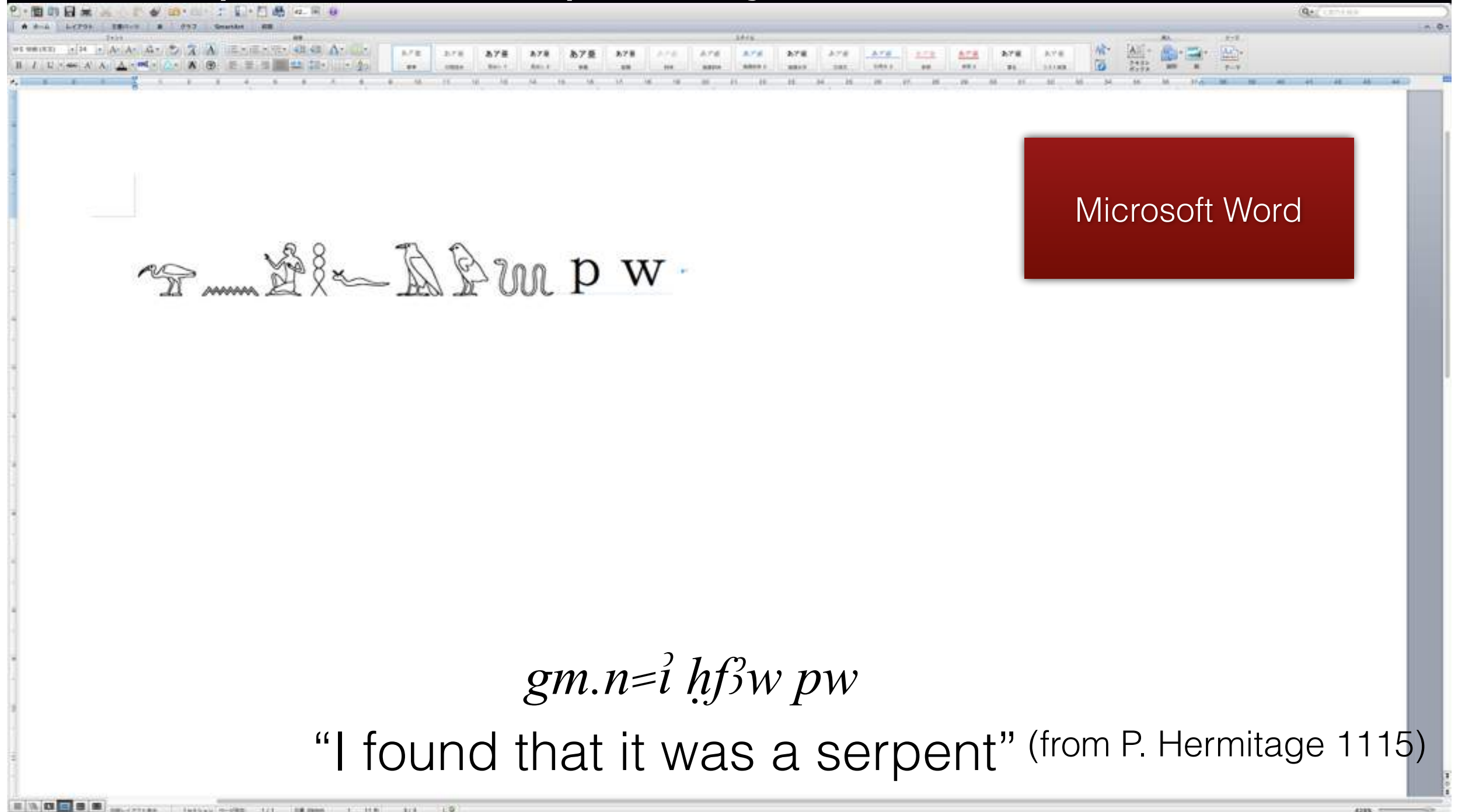
Microsoft Word

Chose the right one by hitting the Space Bar or the arrow keys!

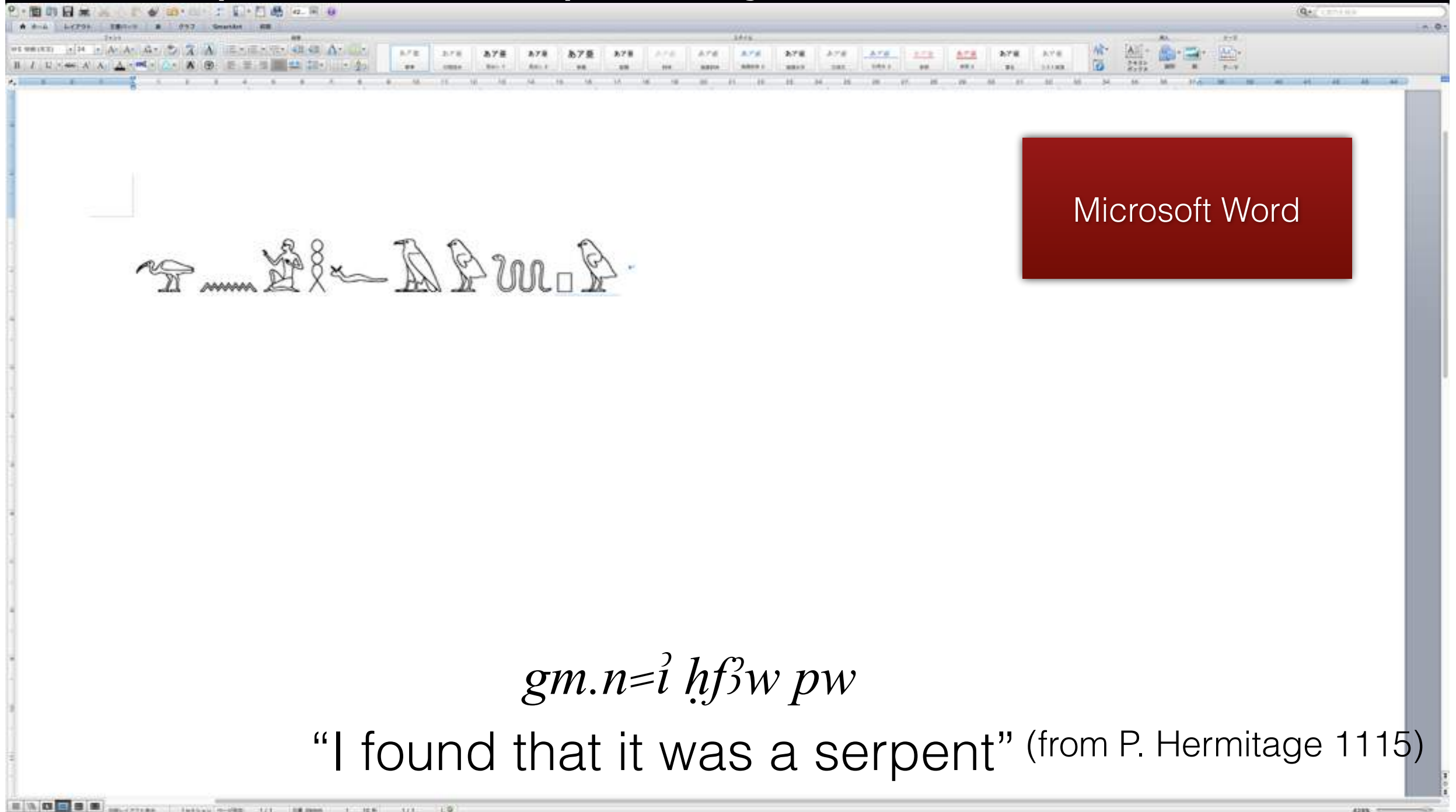
gm.n=i hf3w pw

“I found that it was a serpent” (from P. Hermitage 1115)

Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Egyptian Hieroglyphic Input Using Japanese Input System (Hiero-JIS)



Mechanism of Hiero-JIS

Type transliteration of a whole Egyptian word,
transliteration of phonograms, Gardiner code or
English description

nTr MAMMAL A1 ...



Hit Space Bar twice



Choose combination of glyphs from the small pull-down window using the tab and enter key.



Other EH Input Tools with MS Office

JSesh	doesn't allow you input hieroglyphs directly on MS Office	Serge Rosmorduc
HieroTeX	doesn't allow you input hieroglyphs directly on MS Office	Serge Rosmorduc
RES and RESLite	doesn't allow you input hieroglyphs directly on MS Office	Mark-Jan Nederhof
MacScribe	doesn't allow you input hieroglyphs directly on MS Office	E. Aubourg
Glyphomat	doesn't allow you input hieroglyphs directly on MS Office	H. Wodtke
...

Difficulties of Existing Tools

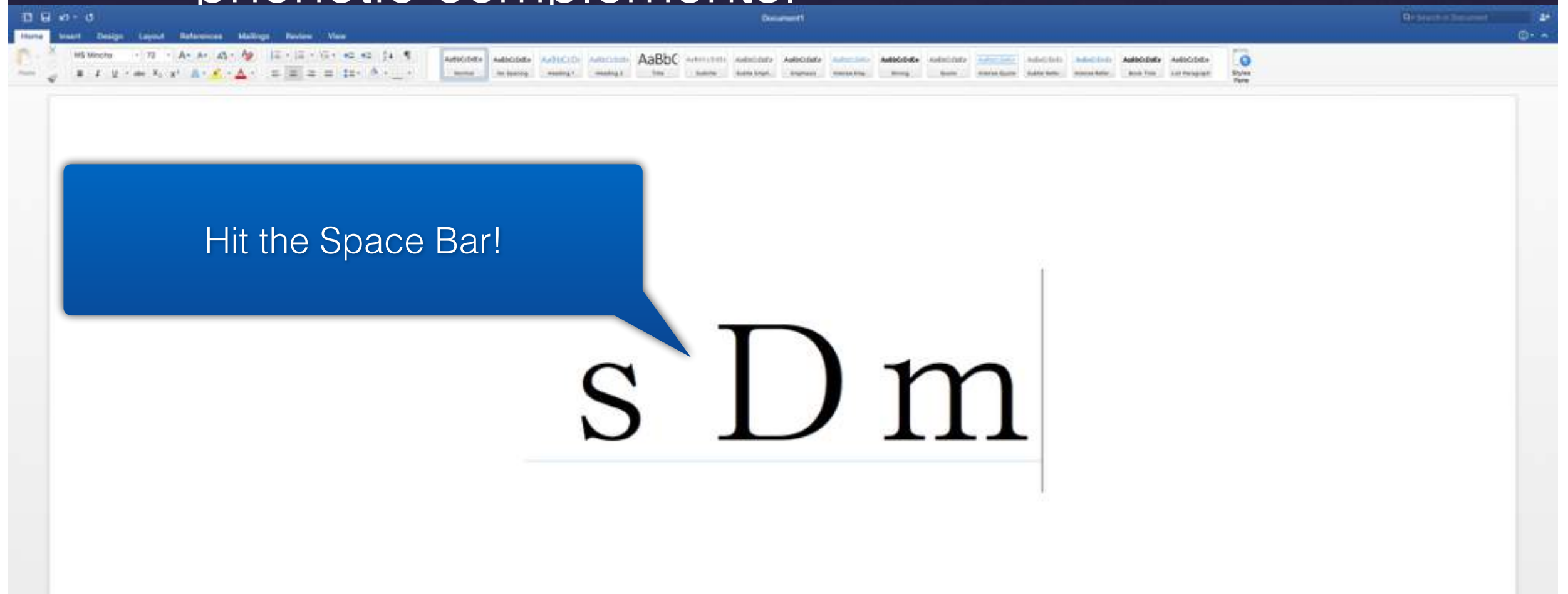
- It takes time for beginners to learn Gardiner Codes and Manuel de Cordage (or an equivalent encoding system).
- It takes time to export glyphs as an image file and insert it in another program like MS Word.
- These programmes do not allow the input of Egyptian hieroglyphs directly on Word, Powerpoint, Excel, web browsers and so on.

Type Hieroglyphs Faster

- Existing software of Hieroglyphic typeset is slow to make Egyptian texts in hieroglyphs compared with other typing systems like English, German, Arabic, Japanese, Chinese, Korean...
- HieroJIS makes it possible to type Egyptian hieroglyphs quickly like East Asian languages!!!

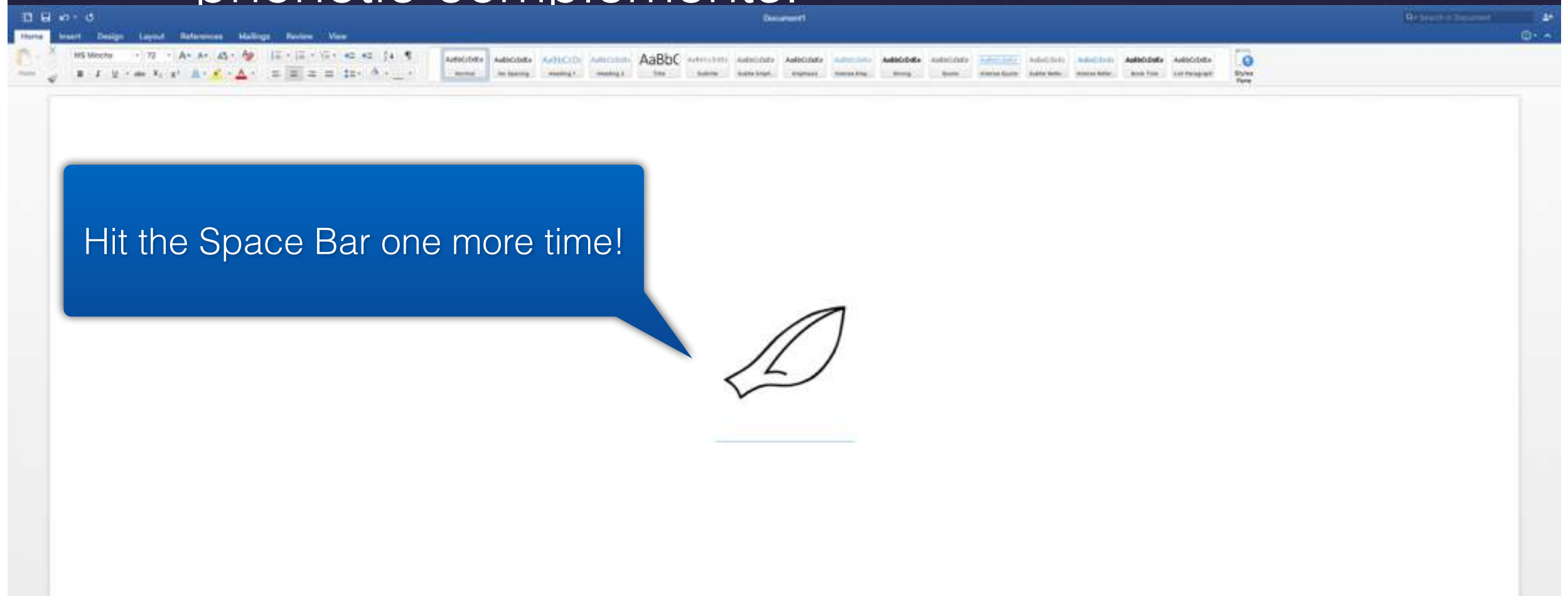
Word-To-Word Input

- You can choose from candidates on the Pull-Down Window
- Thus, you have the choice of determinatives and phonetic complements.



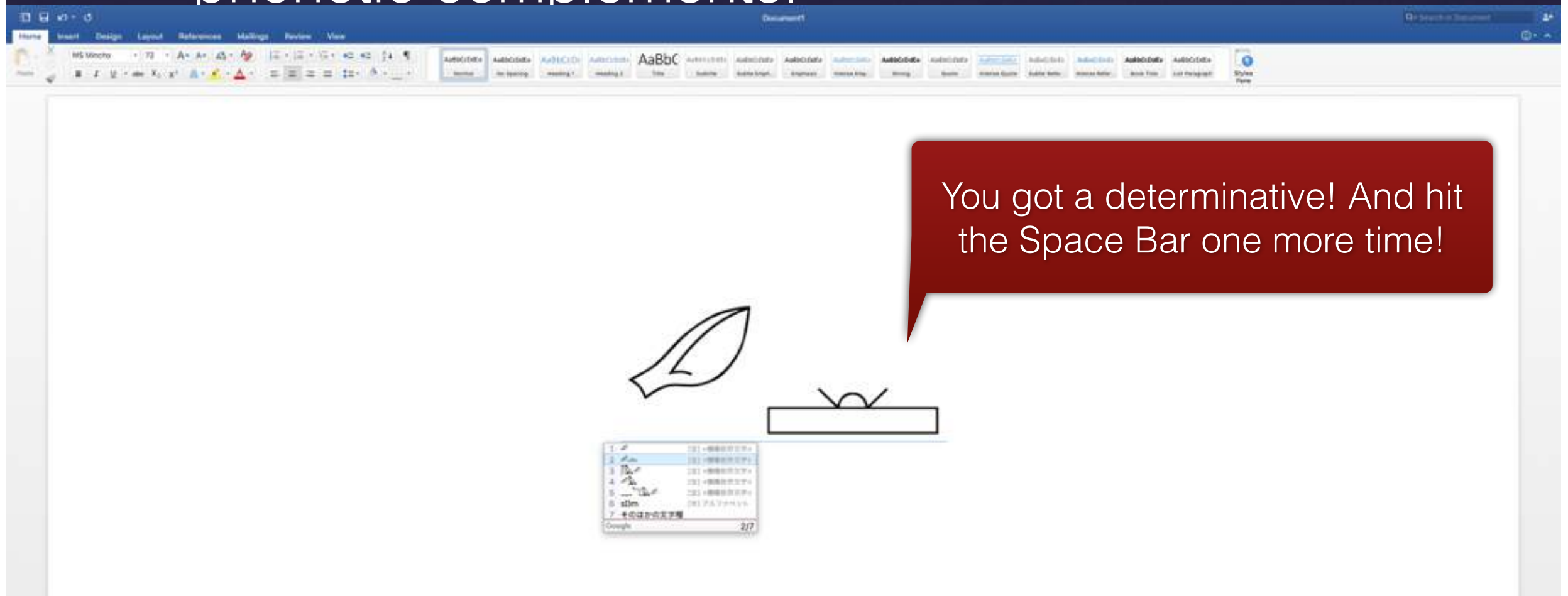
Word-To-Word Input

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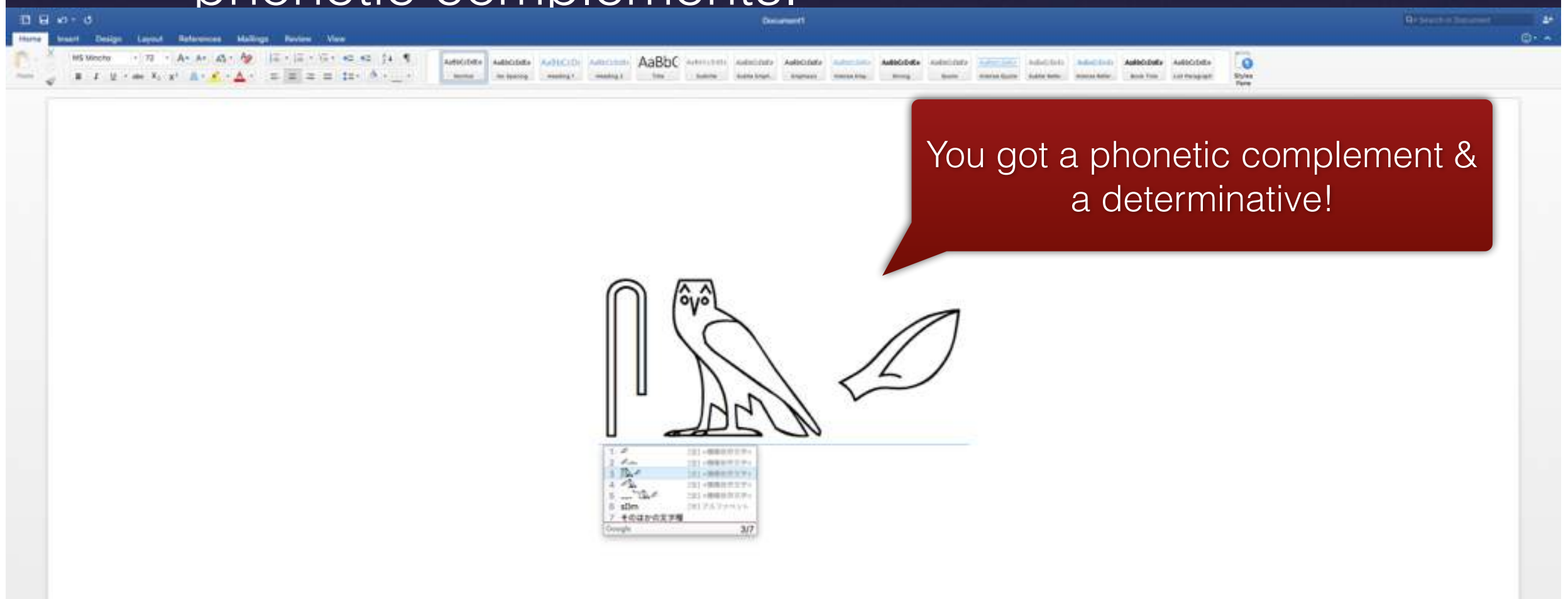
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Word-To-Word Input

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Category Input

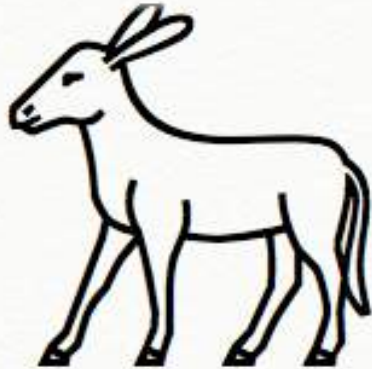
January 31, 2016, 15:54

MAMMAL

Type the category of the glyph in caps and hit the Space Bar.

Category Input

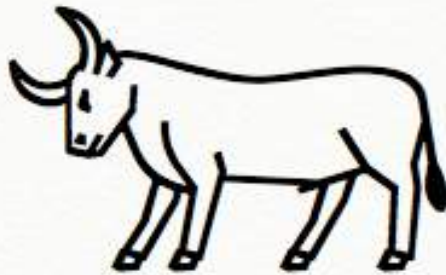
January 31, 2016, 15:54



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Google 2/46		

Category Input

January 31, 2016, 15:54



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9		[全] <機種依存文字>
Google		6/46

Category Input

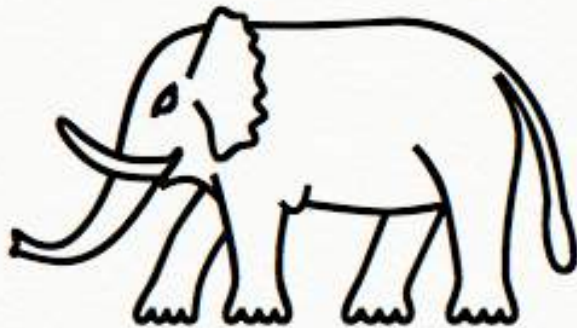
January 31, 2016, 15:54



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Google		8/46

Category Input

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9		[全] <機種依存文字>
Google		11/46

Auxiliary Gardiner Code Input

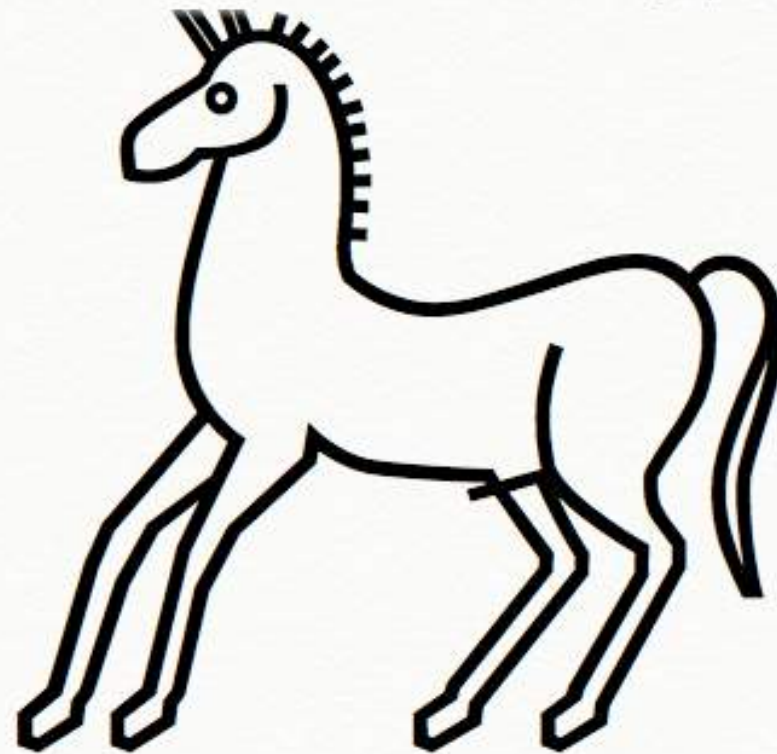
January 31, 2016, 16:03

E6






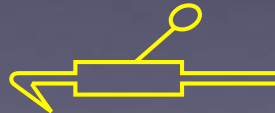


Type the Gardiner Code of the
glyph in caps and hit the Space
Bar.

Auxiliary Gardiner Code Input

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Phonogram Input

- $mi \rightarrow$ , $y \rightarrow$ , $A \rightarrow$ ,
- $g \rightarrow$ , $A \rightarrow$ ,
- $wa \rightarrow$ , $s \rightarrow$ , $w \rightarrow$ 

Hiero-JIS has 4 ways of Inputting

1. Basics: transliteration of a word → the word in hieroglyphs including determinatives and so on Main

Ex. **sDm** →  **nTr** →  **aprw** → 

2. Romanization of consonantal phonemes → hieroglyphs (Mnemonics; Mark-Jan Nederhof in p.c.)

Ex. **n** →  **gm** →  **nfr** → 


Auxiliary

3. Gardiner Code → hieroglyphs Ex. **A1** → 

4. Category in English caps → hieroglyphs Ex. **MAN** → 

Combination and Modification

- If you have a glyph combination which are not on HieroJIS entries, you can modify it using Category Inputting or Gardiner-Code inputting.

- If you want to type  *swšj* “Sushi” for fun,

-  is not among the entries.

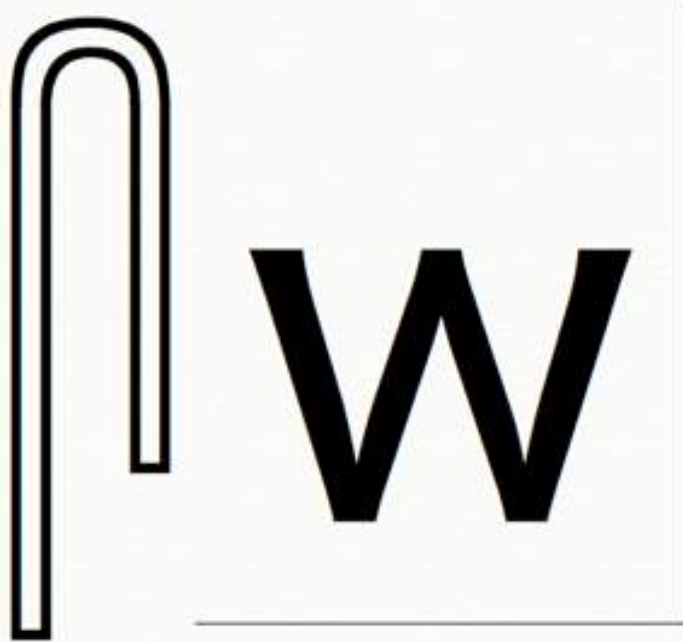
- You can type *s* → , *w* → , *S* → , *i* → , *FISH* → ,
MAN →  or with Gardiner codes



January 31, 2016, 16:29

S

January 31, 2016, 16:29

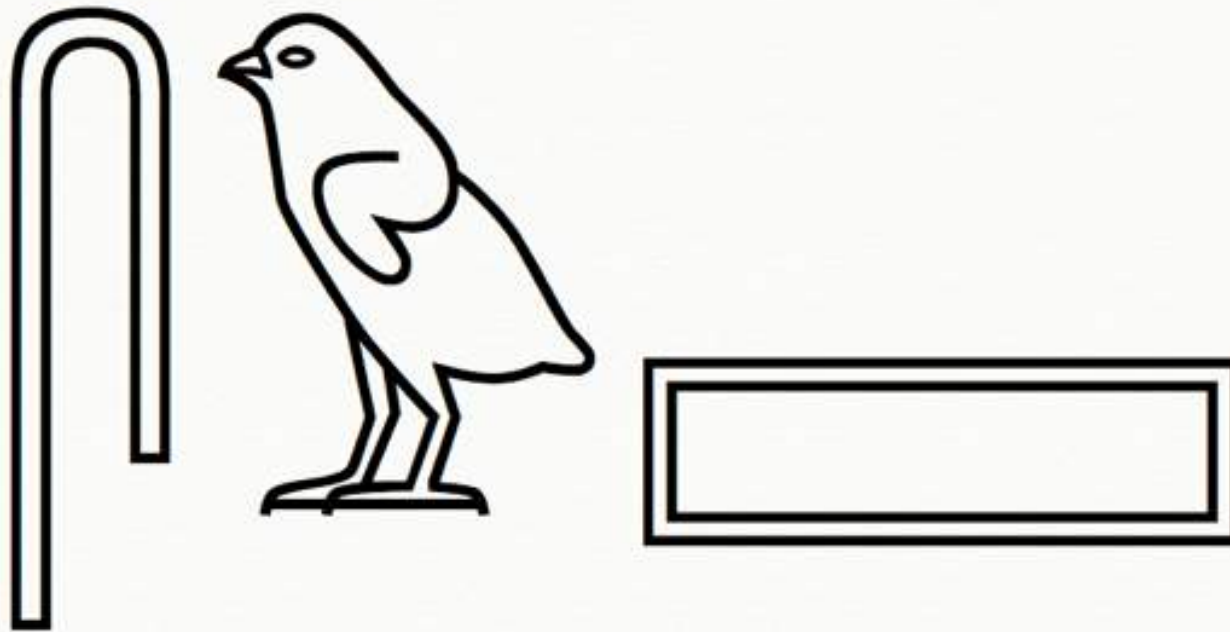




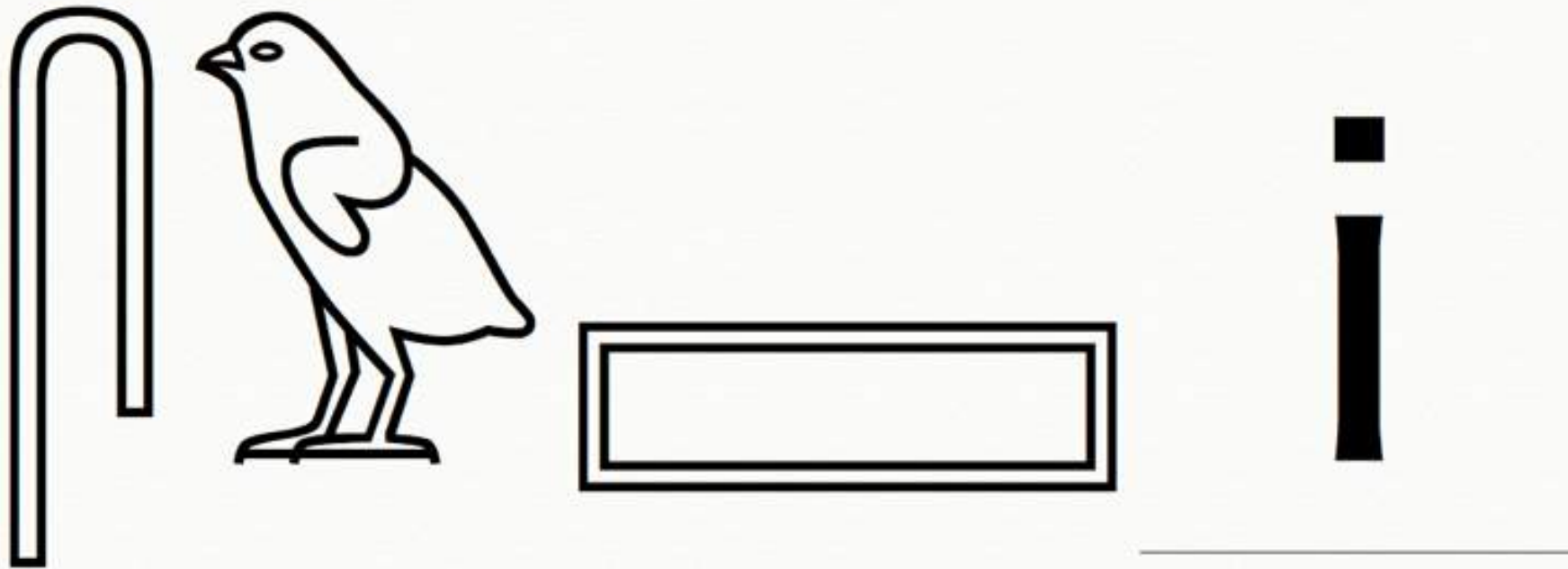
January 31, 2016, 16:51



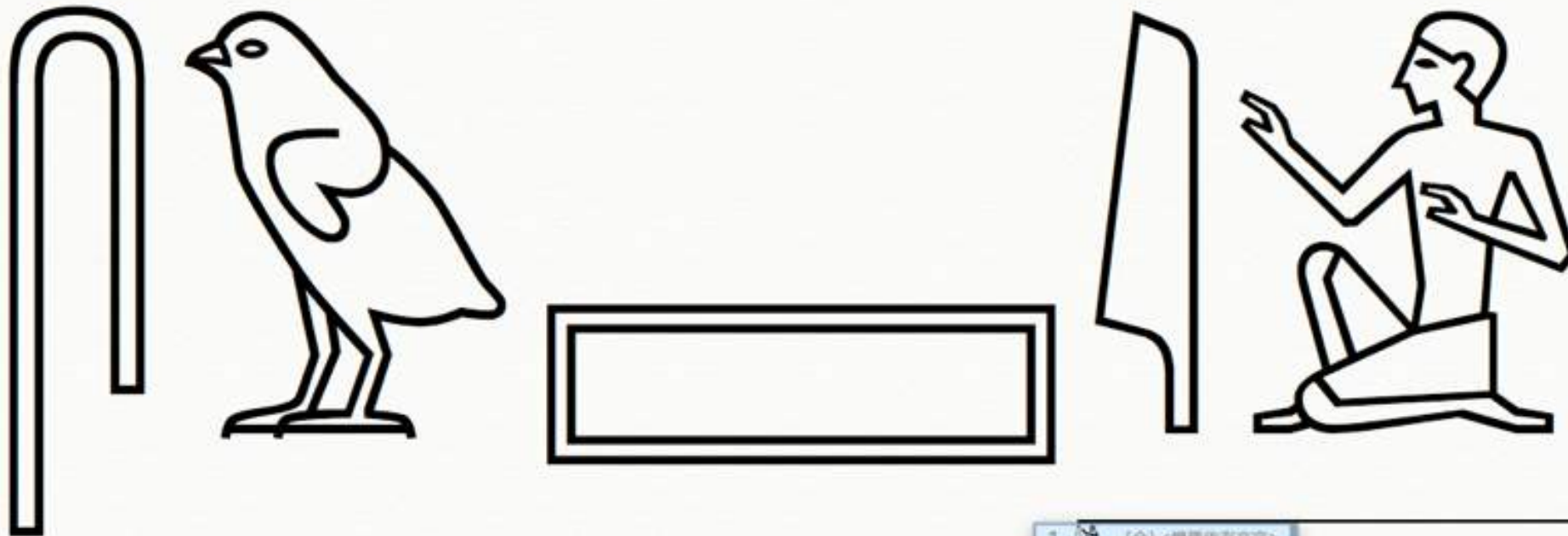
January 31, 2016, 16:51



January 31, 2016, 17:15

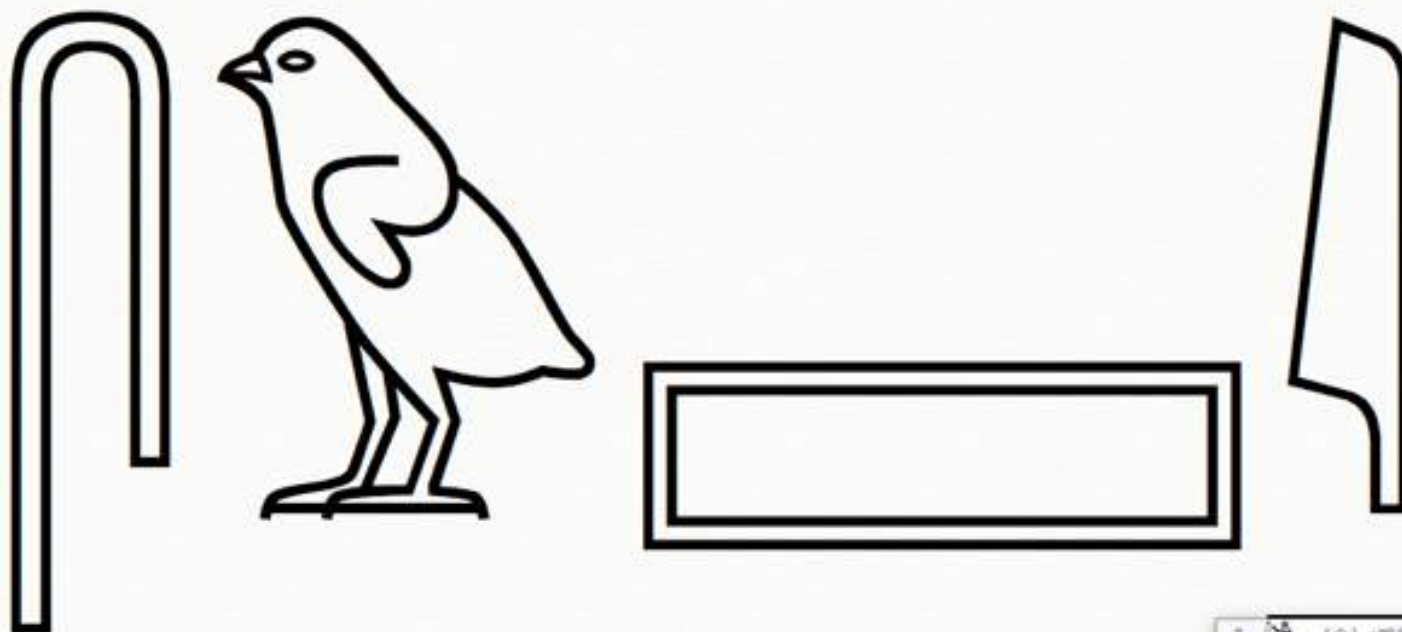


January 31, 2016, 17:15



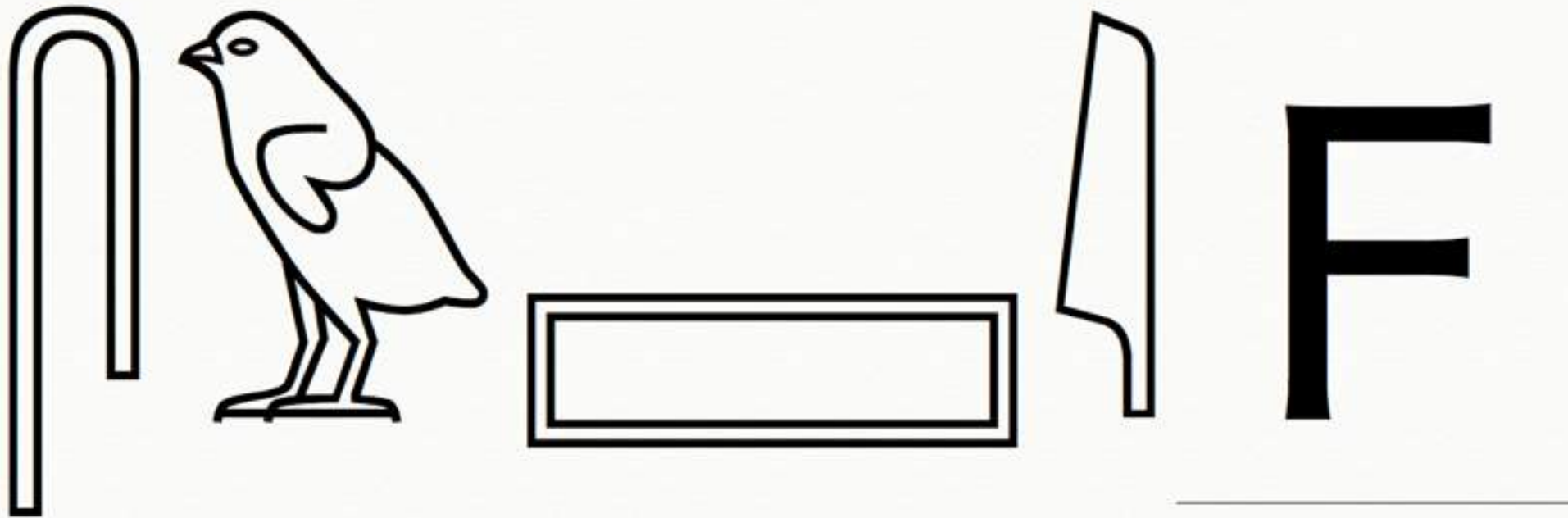
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Google		1/13

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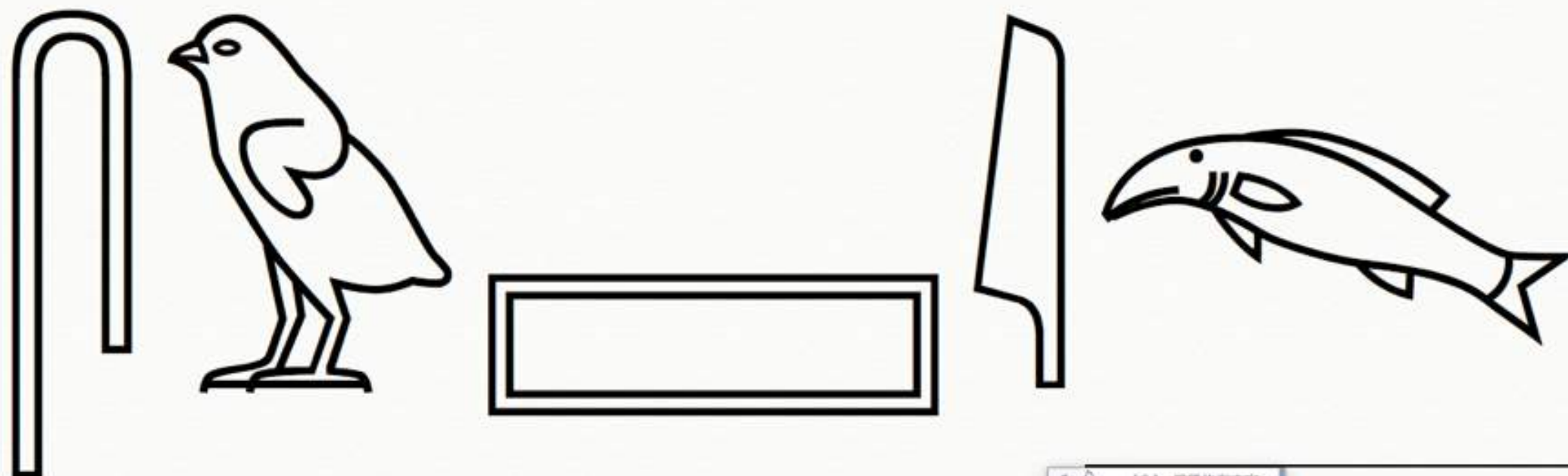
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Google		2/13

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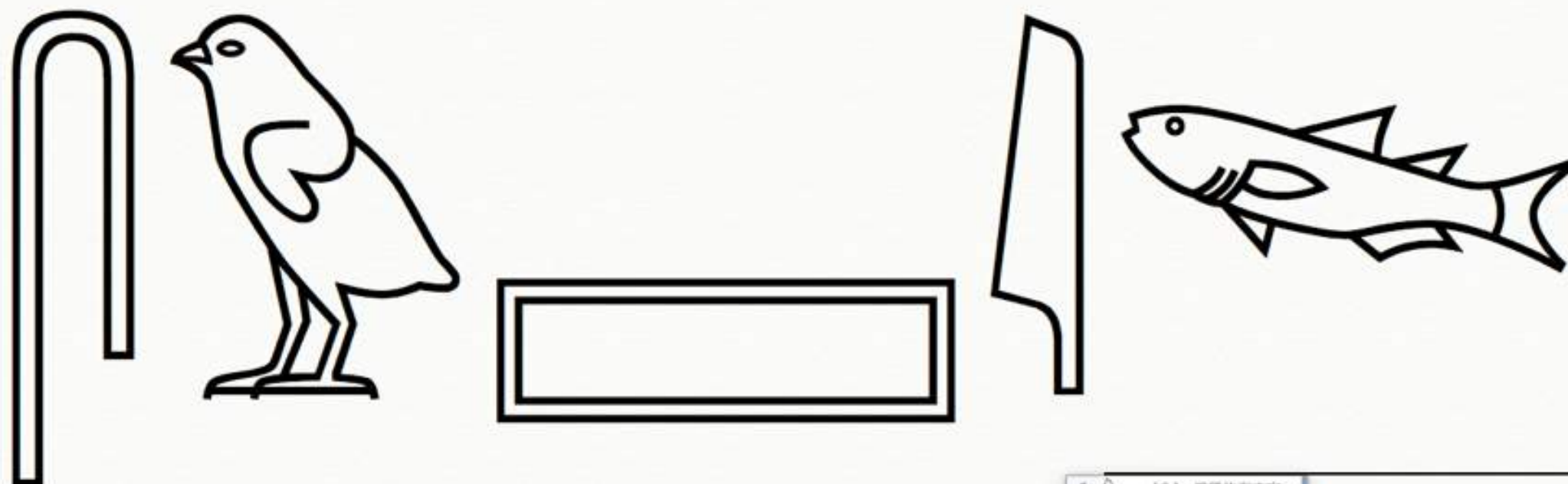
I S H

January 31, 2016, 16:51



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9	FISH	[半] アルファベット
Google		2/10

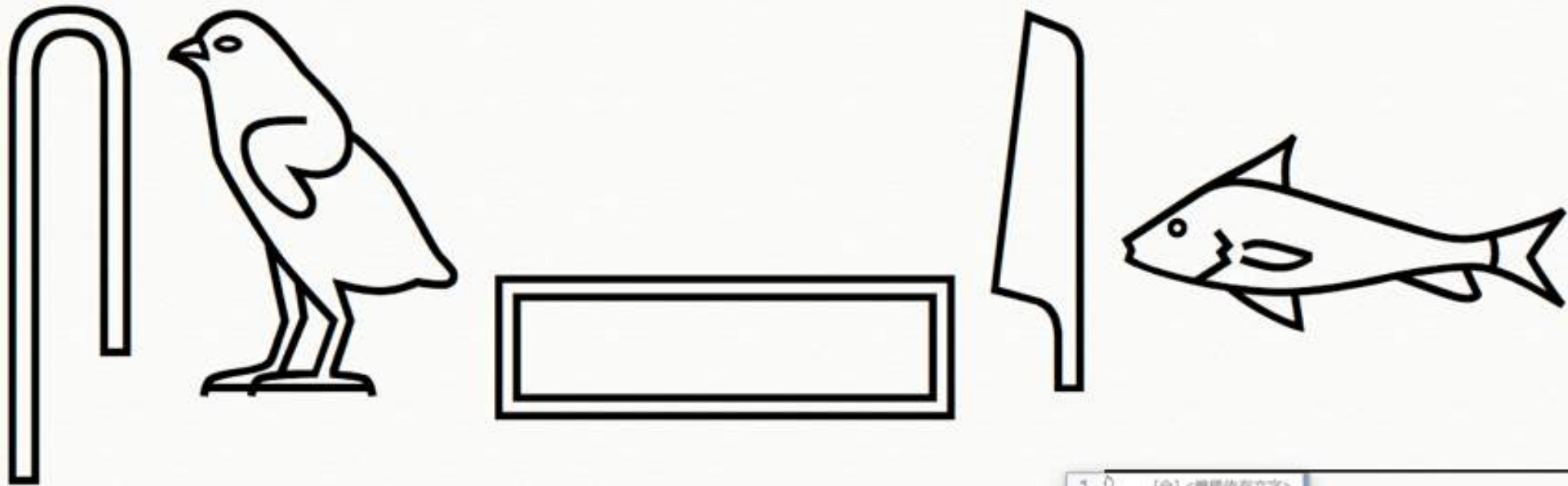
January 31, 2016, 16:51



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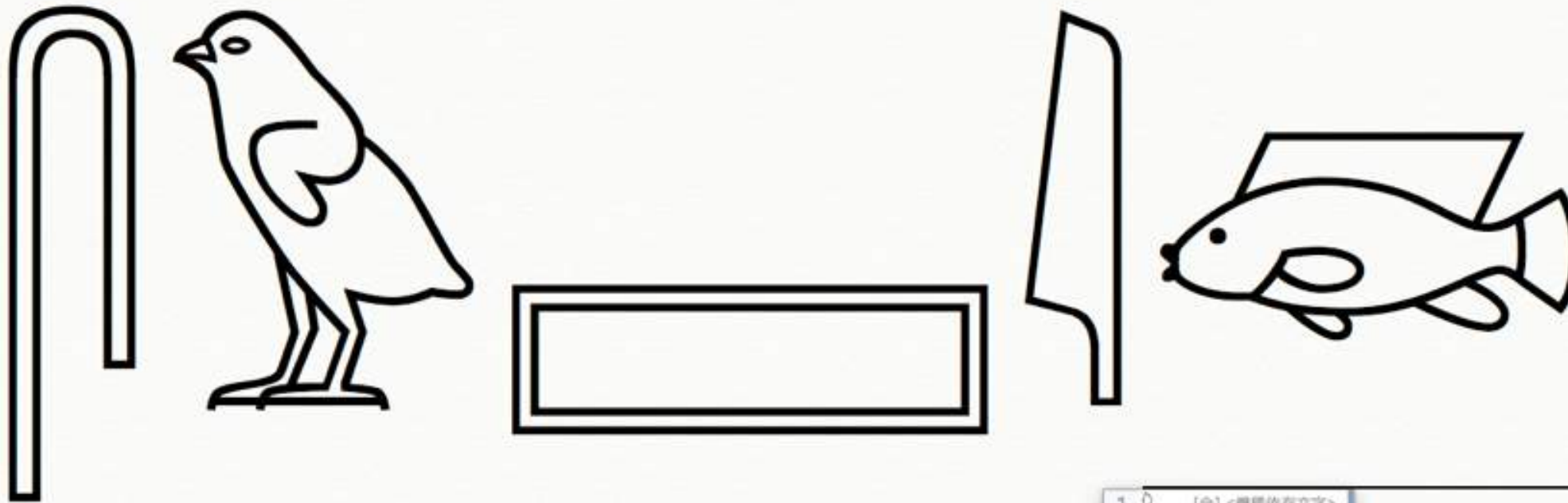
Google 3/10

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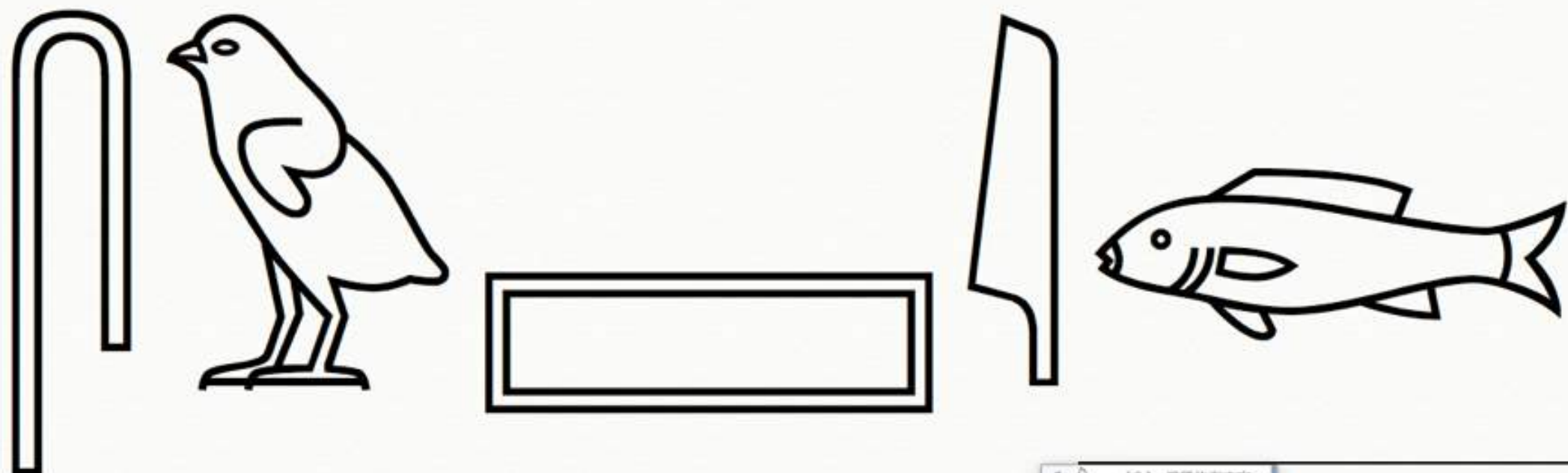
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- Google 4/10

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- Google 5/10

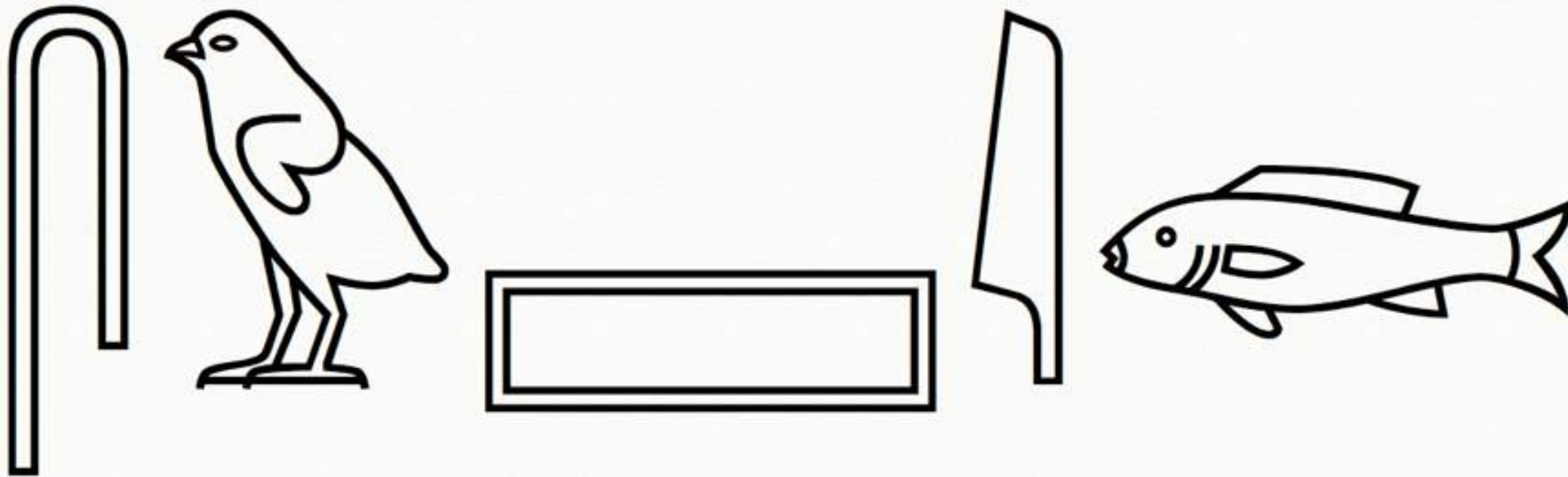
January 31, 2016, 16:52



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9	FISH	[半] アルファベット

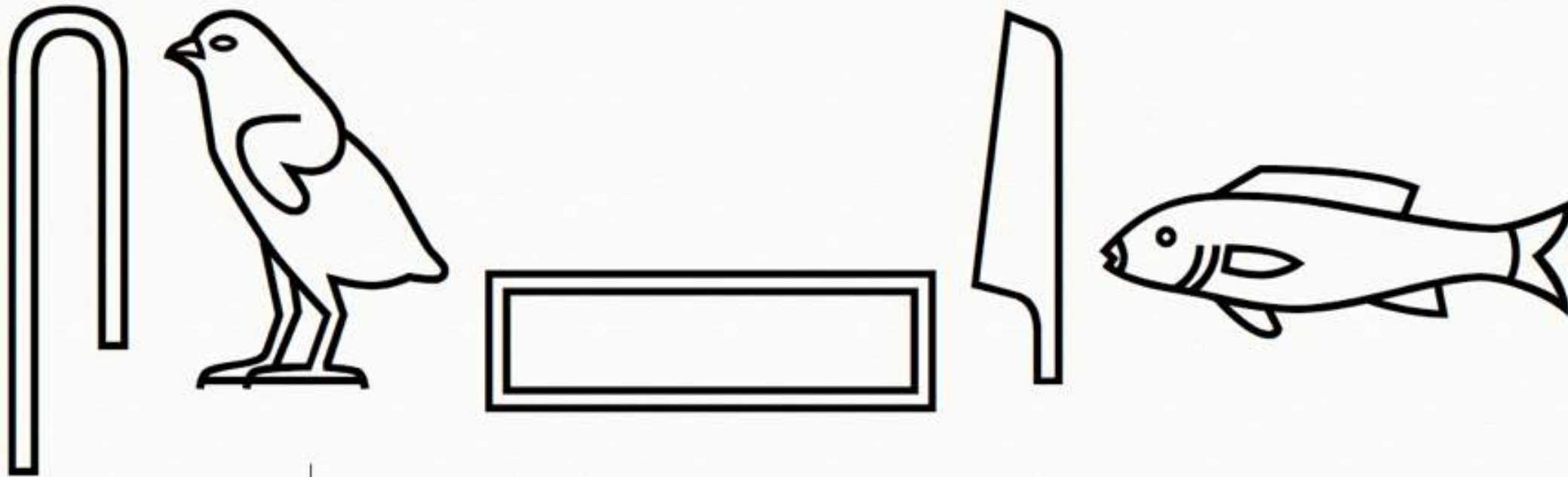
Google 6/10

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A 2

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Ancient Egyptian Unicode

- In 2009, based on Michael Everson and Bob Richmond's "Proposal to encode Egyptian Hieroglyphs in the SMP of the UCS" (L2/07-097; N3237), which was submitted a few years earlier, Ancient Egyptian Hieroglyphs are added to Unicode characters. It was 3 years later than Cuneiforms were added.
- 10 years later than Ogham and Runic.

Applying Japanese Input System to Egyptian Hieroglyph (Hiero-JIS)

- Hiero-JIS is using Egyptian Hieroglyphic Unicode Characters Full-width Alphanumeric Input of [Google Japanese Input \(GJI; Freeware\)](#) and its User-Dictionary Extension Tool.
- Japanese Input System is able to input the mixture of **logograms**, different **phonograms** (hiragana, katakana, Roman alphabet and Greek alphabet) and **emojis**.
- The number of internet users who are Japanese citizens is ca. **100,440,000** (Ministry of Internal Affairs and Communications, Japan. 第2部 情報通信の現況・政策の動向, 2014, <http://www.soumu.go.jp/johotsusintokei/whitepaper/ja/h26/html/nc253120.html>, accessed on 2015-11-04) Most of them are Japanese speakers.

Japanese = mixture of different types of graphemes

- 漢字 *kanji* (Chinese Characters) . . . Logographic. a) Most of them are compounds of 部首 *bushu* radicals (determinatives) and phonograms of the rebus principle in a square. b) A few are ideographic. Total number of Unicode chars.: more than 30,000. Ex. 森鷗外
- 部首 *bushu* radicals . . . indicating the category, equivalent to determinatives
- ひらがな *hiragana* . . . syllabic phonograms, ca. 85 (55+25+1+4) Ex. もりおうがい
- カタカナ *katakana* . . . syllabic phonograms, ca. 85 (55+25+1+4) Ex. モリオウガイ
- Roman Alphabet . . . phonemic phonograms, 52 (26x2) Ex. Mori Ōgai
- 絵文字 *emoji* . . .  some are logographic, some are ideographic.

	Phonograms	Logograms	Determinatives	Others
Modern Japanese	i) Phonemic Parts of Chinese characters, ii) Hiragana Syllabary iii) Katakana Syllabary, iv) Roman Alphabet	Chinese Characters (Ideograms and combination of phonograms and determinatives)	Parts of Chinese Characters called radicals	emoji
Egyptian Hieroglyph	monoconsonantal, biconsonantal, triconsonantal	more ideographic	not incorporated into logograms	

Double Conversion

Input: Romanization (Romaji)

fausutohaakumamefisutoferesuakumatoraiputihinos
akabaniitta



First Output: Hiragana

ふあうすとはあくまめふいすとふえれすとらいぷち
ひのさかばにいった。



Second Output: Mixture

ファウストは悪魔メフィストフェレス👹とLeipzigの
酒場に行った。

“Faust went to a pub in Leipzig with Mephistopheles
the Devil.”

October 30, 2015, 8:25 PM

ファウストは悪魔メフィス
トフェレス👹とLeipzigの酒
場に行った。ɪ





January 31, 2016, 18:43

f



January 31, 2016, 18:43

ふあ



January 31, 2016, 18:43

ファウストh



January 31, 2016, 18:43

ファウストは



January 31, 2016, 18:43

ファウストはあくま

あくまで

Tab to select predicted words

January 31, 2016, 18:43



ファウストは悪魔





ファウストは悪魔め
ふいすとふえれす

January 31, 2016, 18:44



ファウストは悪魔メ
フィストフェレス

January 31, 2016, 18:59



ファウストは悪魔メ
フィストフェレスあ
くま

あくま 【悪魔】

- ① 悪・不義・闇が人間化されたもの。人を悪に誘い、滅ぼすもの。
- ② ユダヤ教・キリスト教では、神の敵対者（サタン）。悪天使。
- ③ 仏道を妨げる悪神。魔衆。
- ④ 悪魔人。

1	アクマ	Katakana	
2	あくま	Hiragana	🔍
3	悪魔		
4	🐱		⚠️
5	あくま		
6	アクマ		
7	阿久魔		
8	開く間		
9	🐱		⚠️
25/100			
読み 部首 名前 記号			

January 31, 2016, 18:44




ファウストは悪魔メ
フィストフェレス悪
魔



January 31, 2016, 18:44



ファウストは悪魔メ
フィストフェレス 

- 1 あくま Hiragana
2 悪魔
3  
4 あくま
5 アクマ
6 阿久魔
7 開く間
8  
9 悪魔
マカ
- 読み 部首 名前 記号



ファウストは悪魔メ
フィストフェレス👹
とらいぷちひ



ファウストは悪魔メ
フィストフェレス👹
とライプチヒ

January 31, 2016, 18:44



ファウストは悪魔メ
トフェレス👹
とLeipzig

- Hiragana
- 1 らいぶちひ
 - 2 ライブチヒ
 - 3 Leipzig
 - 4 ライ
 - 5 ライブ
 - 6 らい
 - 7 ライブチ
 - 8 来ブチ
 - 9 頼
 - 10 𑖀𑖄𑖅𑖆
- 読み 部首 名前 記号



ファウストは悪魔メ
フィストフェレス👹
とLeipzigの



ファウストは悪魔メ
フィストフェレス👹
とLeipzigのさかばに
いった。



ファウストは悪魔メ
フィストフェレス👹
とLeipzigの酒場に
行った。

Conversion Options

- Input: `akuma` => Output: 😈、悪魔、アクマ、阿久魔、開く間、あくま、akuma、a k u m a、etc.
- Input: `raiputahi` => Output: ライプチヒ、らいぷちひ、Leipzig、ライプツヒ、r a i p u t i h i、raiputahi、来プチ日、etc.
- (Pre-installed Japanese Input of Mac OS El Capitan)

I applied this to Egyptian Hieroglyphs

Input

gmniHfAwpw



Output



“I found it was a serpent.” (P. Hermitage 61-62)

So far,

Google Japanese Input Dictionary Tool

Tools ▾ Add Remove

User Dictionary 1	Reading	Word	Category	Comment
Hiero	aba	𐀀𐀁𐀂	名詞	
あ s d f	abA	𐀀𐀁𐀂	名詞	
Ἡερογλυπη	abA	𐀀𐀁𐀂	名詞	
HieroGuRiFU	abA	𐀀𐀁𐀂	名詞	
asdf	abab	𐀀𐀁𐀂𐀃	名詞	
GuRiFu	abab	𐀀𐀁𐀂𐀃	名詞	
Seikokumoji	abab	𐀀𐀁𐀂𐀃	名詞	
	abab	𐀀𐀁𐀂𐀃	名詞	
	AbAb	𐀀𐀁𐀂𐀃	名詞	
	ababyt	𐀀𐀁𐀂𐀃𐀄𐀅	名詞	
	abb	𐀀𐀁𐀂	名詞	
	abb	𐀀𐀁𐀂	名詞	
	Abd	𐀀𐀁𐀂	名詞	
	Abd	𐀀𐀁𐀂	名詞	
	Abd	𐀀𐀁𐀂	名詞	
	Abd	𐀀𐀁𐀂	名詞	
	AbDw	𐀀𐀁𐀂𐀃	名詞	
	AbDw	𐀀𐀁𐀂𐀃	名詞	
	AbDw	𐀀𐀁𐀂𐀃	名詞	
	AbDw	𐀀𐀁𐀂𐀃	名詞	
	AbDw	𐀀𐀁𐀂𐀃	名詞	
	abH	𐀀𐀁𐀂𐀃	名詞	
	Abi	𐀀𐀁𐀂	名詞	
	Abi	𐀀𐀁𐀂	名詞	
	abS	𐀀𐀁𐀂𐀃	名詞	

Seikokumoji: 10933 entries

- Word-To-Word Input entries were over 10,000 in November 2015. But as a result of the collaboration with TLA (Thesaurus Linguae Aegyptiae, <http://aaew.bbaw.de/tla/>, accessed on 2016-01-31), it has now over 50,000 entries.

Collaboration

- Importing MdC of other major projects.
- Thesaurus Linguae Aegyptiae (<http://aaew.bbaw.de/tla/>, accessed on 2016-01-31), over 40,000 entries.
- Le Projet Ramsès (<http://ramses.ulg.ac.be/>, accessed on 2016-01-31), over 80,000 entries.
- HieroJIS Word-To-Word entries will be over 130,000 entries.

The Problem: How to manage with the group writing

- The group (quadrat) writing is not only used for Egyptian hieroglyphs.
- It is also used in the Chinese characters (used in Chinese, Japanese, Korean), the Korean alphabet and the Mayan hieroglyphs.
- Chinese compound logograms have a structure that resembles the group writing.
- The Korean alphabet, too. A group of Korean alphabetical letters that makes a syllable is written in a square.

Group Writings



Various positions of 木 “wood” in Chinese Characters



Various positions of Korean

ㅁ /m/

- Left: **ㅁ**ㅏ /ma/ = **ㅁ** /m/ + **ㅏ** /a/
- Top: **ㅁ**ㅜ /mu/ = **ㅁ** /m/ + **ㅜ** /u/
- Bottom: **ㅁ**ㅏㅏ /ham/ = **ㅎ** /h/ + **ㅏ** /a/ + **ㅁ** /m/
- Top left: **ㅁ**ㅏㅑ /mag/ = **ㅁ** /m/ + **ㅏ** /a/ + **ㅑ** /g/
- Bottom right : **ㅁ**ㅏㅑㅑ /g^jalm/ **ㅑ** /g/ **ㅏ** /a/ **ㅑ** /l/ **ㅁ** /m/
- Top left small:
 - ㅁ**ㅏㅑㅑㅑ /mwelg/ (/muɔilg/) = **ㅁ** /m/ + **ㅜ** /u/ + **ㅑ** /ɔ/ + **ㅣ** /i/ + **ㅑ** /l/ + **ㅑ** /g/
- Top small: **ㅁ**ㅏㅑㅑㅑㅑ /m^juls/ = **ㅁ** /m/ + **ㅜ** /u/ + **ㅑ** /l/ + **ㅑ** /s/

Korean Example

Input:

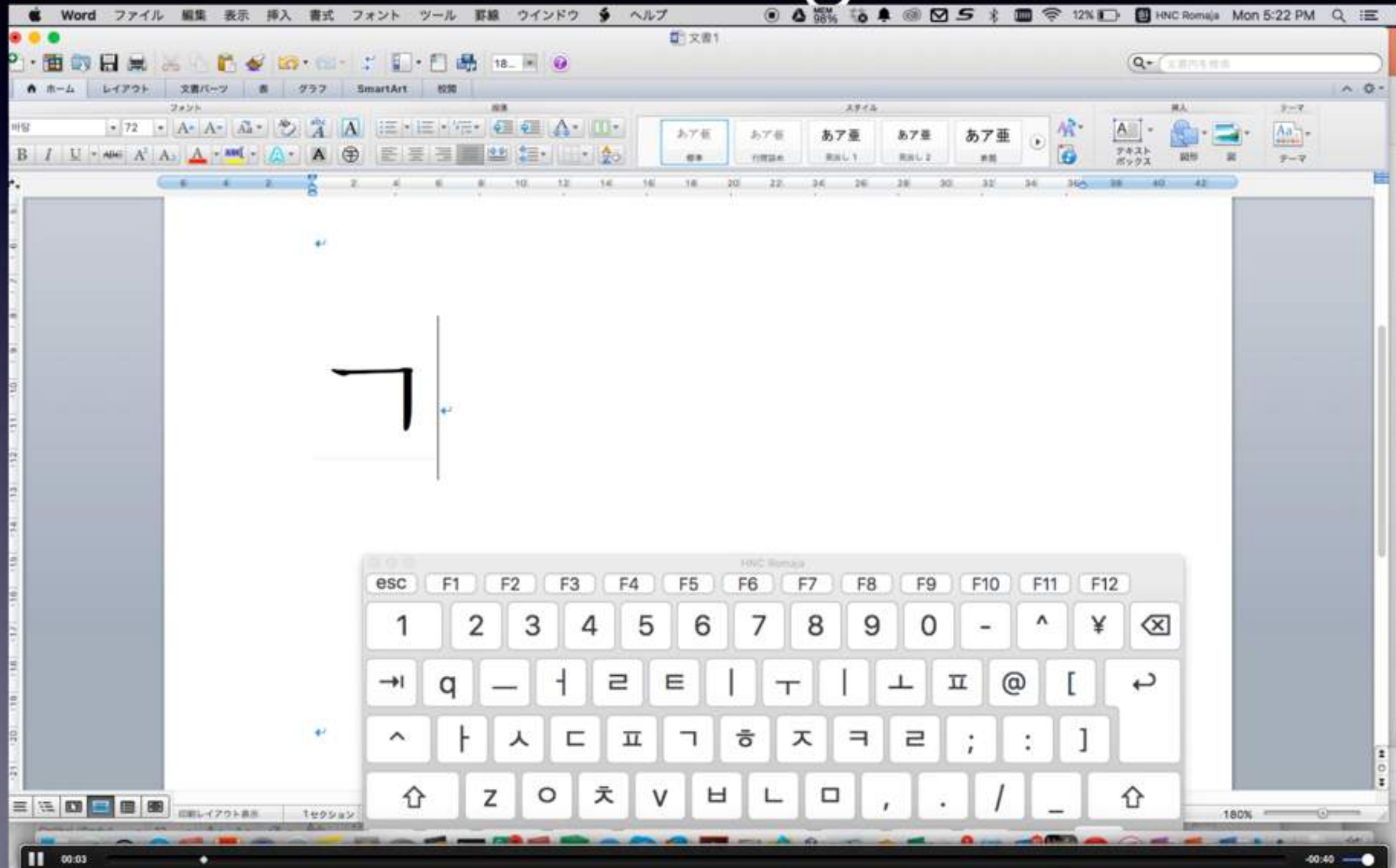
갸ㅏㅓㅏㅓㅏㅓㅏㅓㅏㅓ
(g a m s a h a m n i d a)



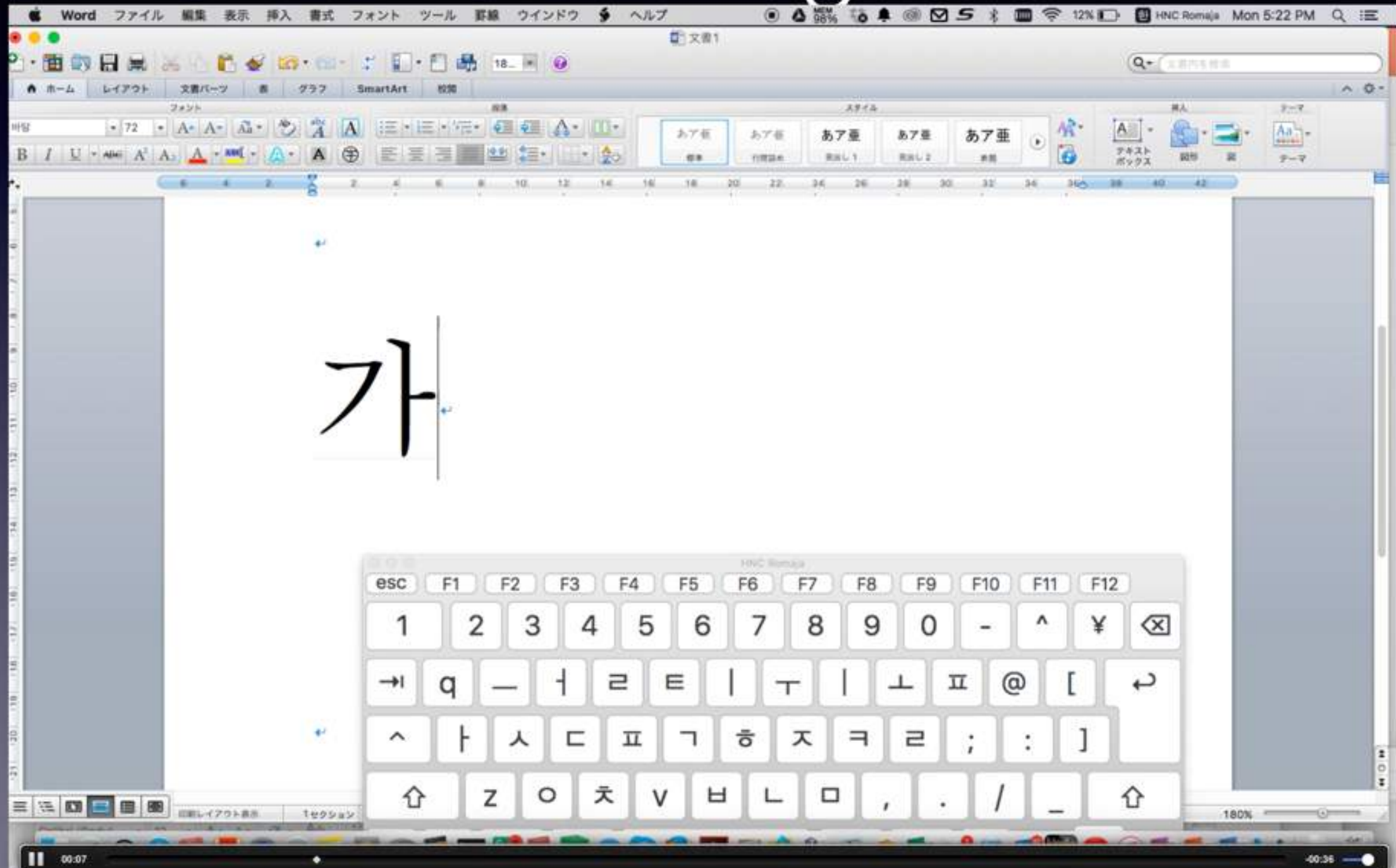
Output:

감 사 함 니 다
(g a m s a h a m n i d a)

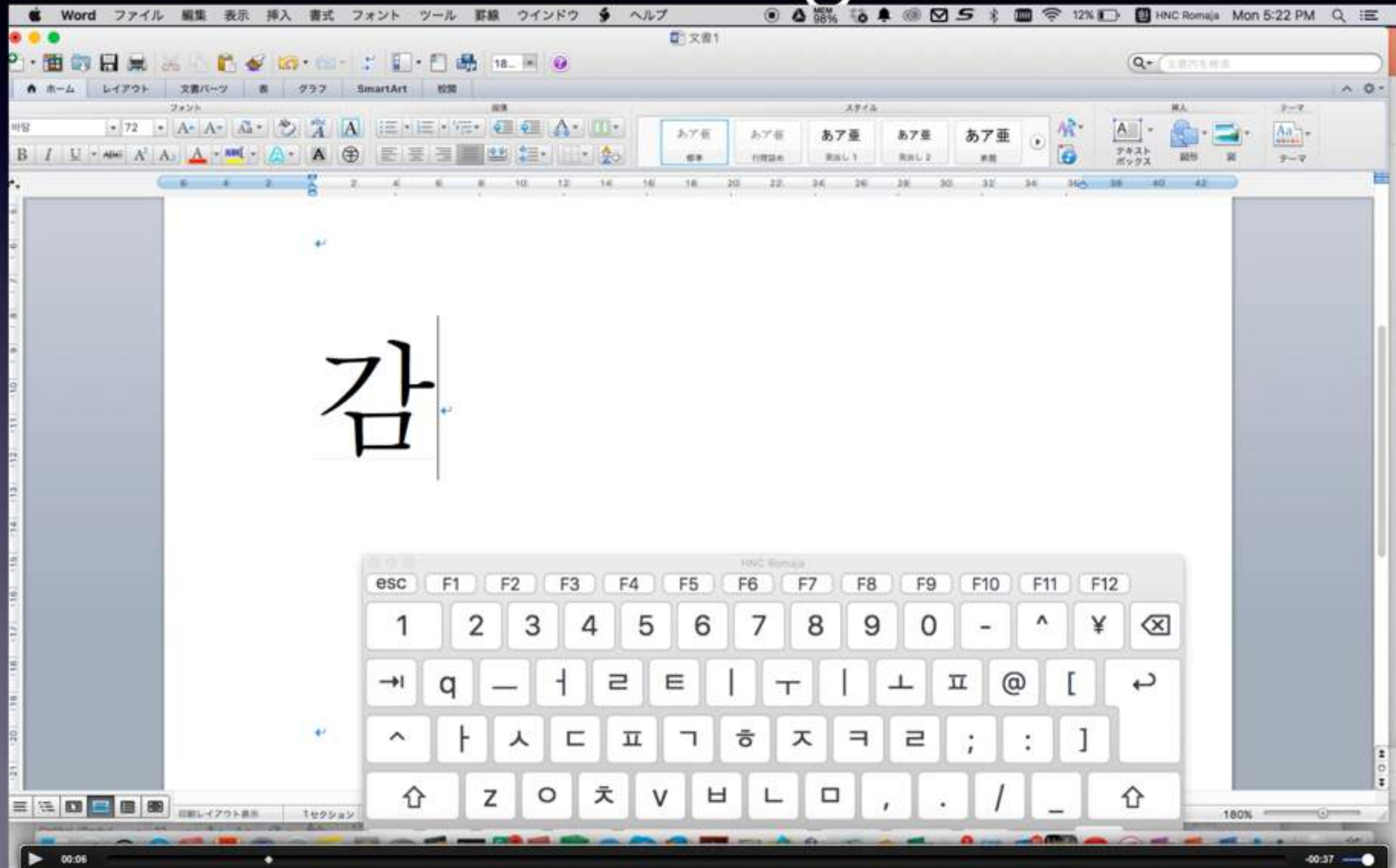
Inputting Korean Group Writing



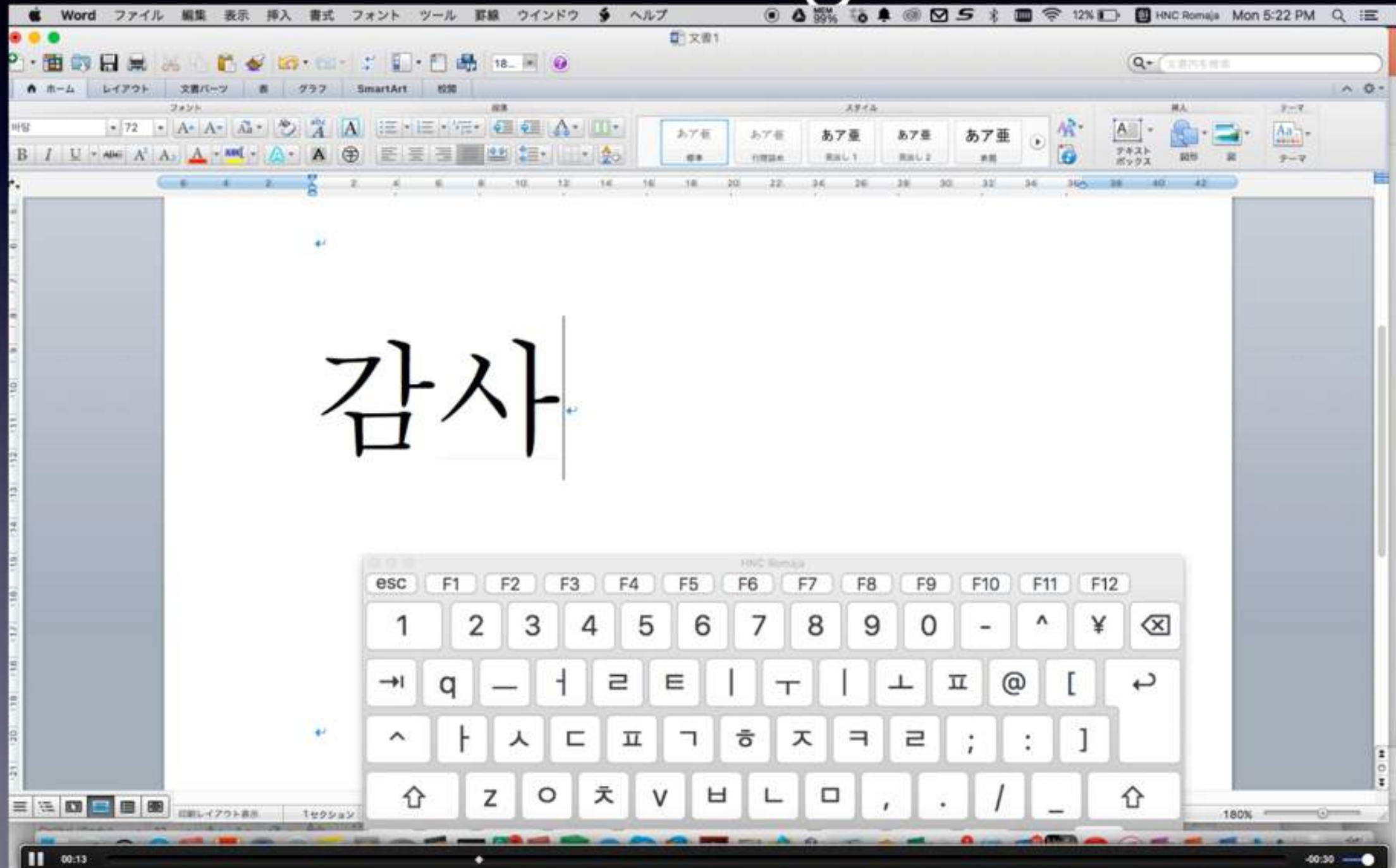
Inputting Korean Group Writing



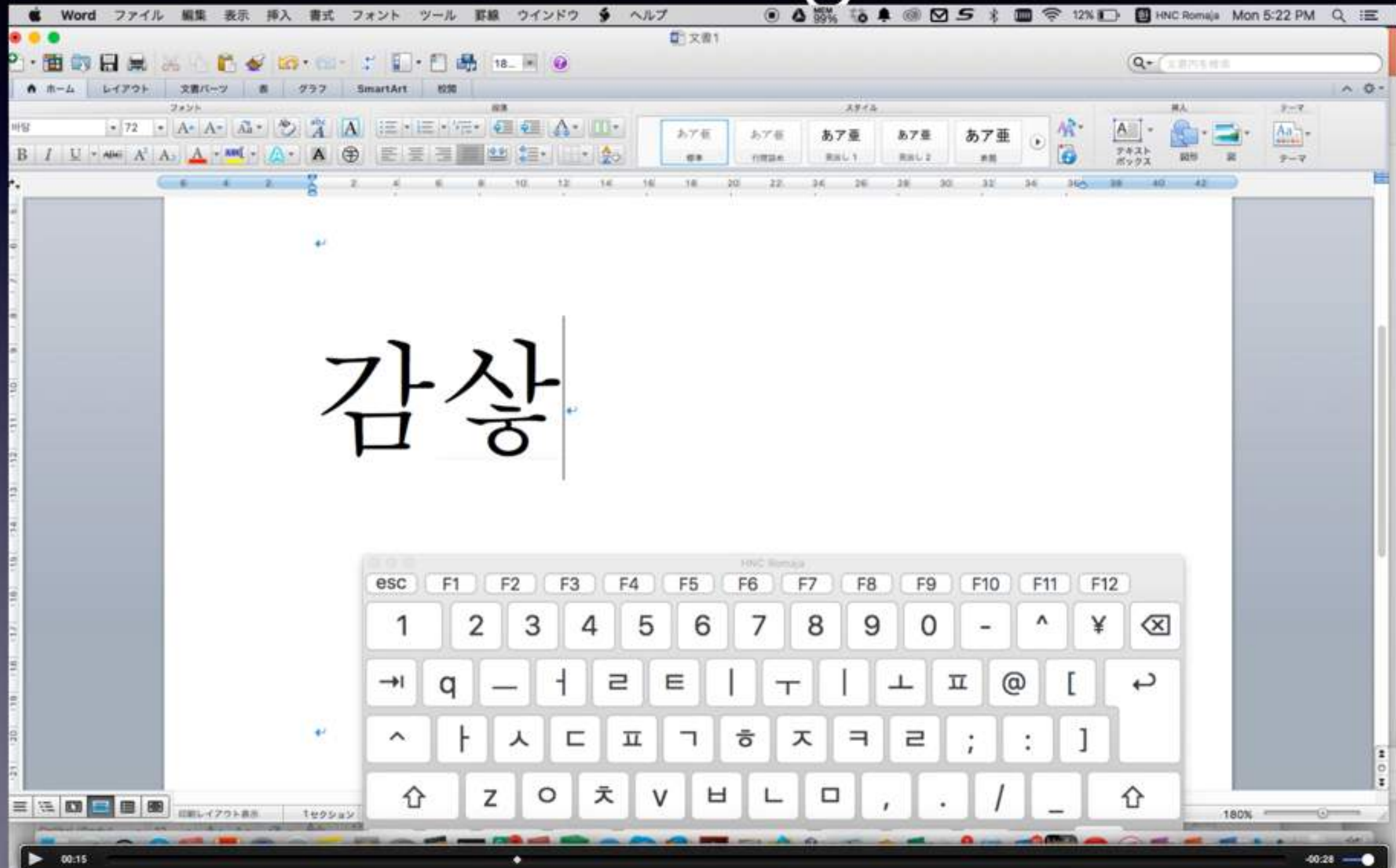
Inputting Korean Group Writing



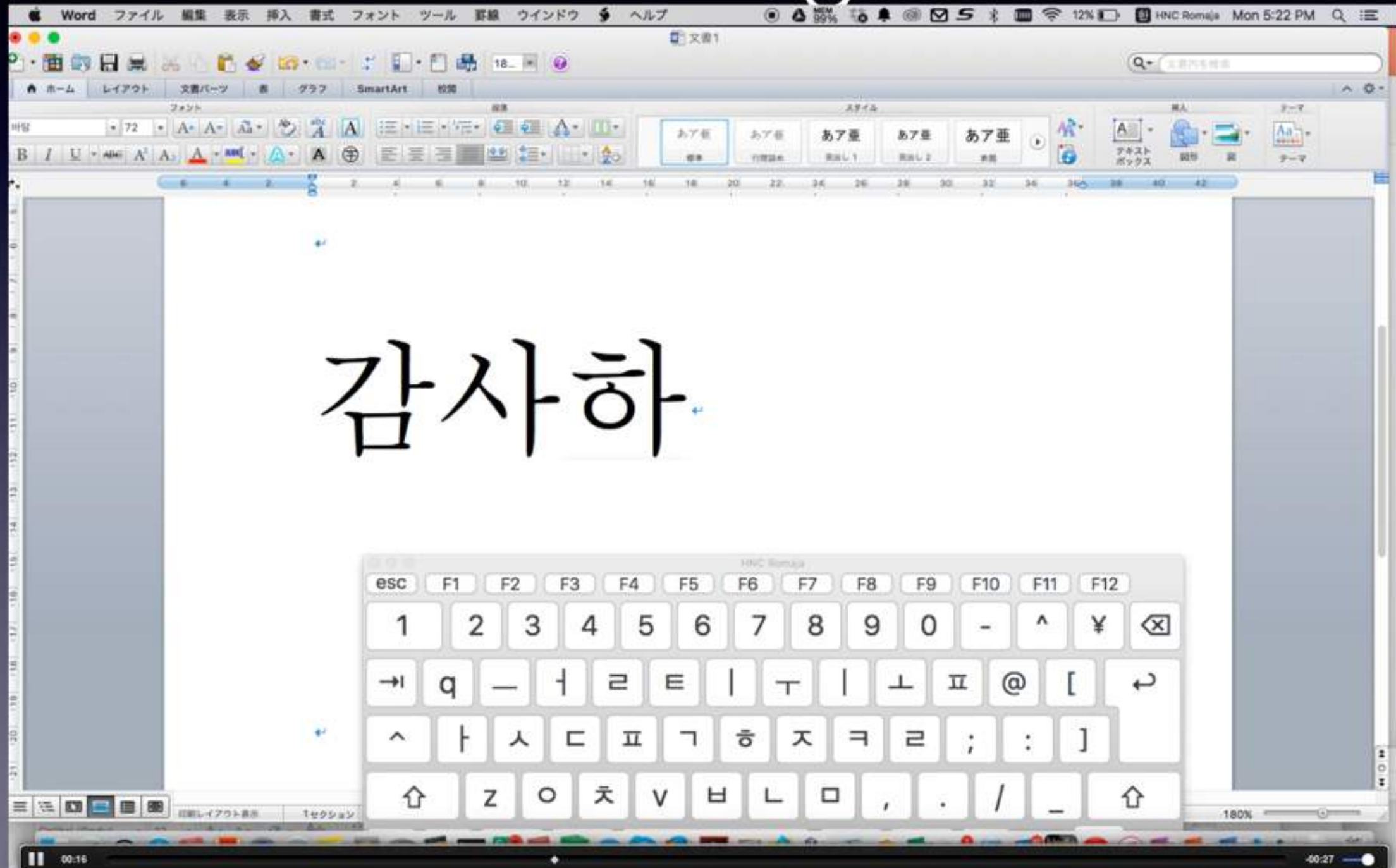
Inputting Korean Group Writing



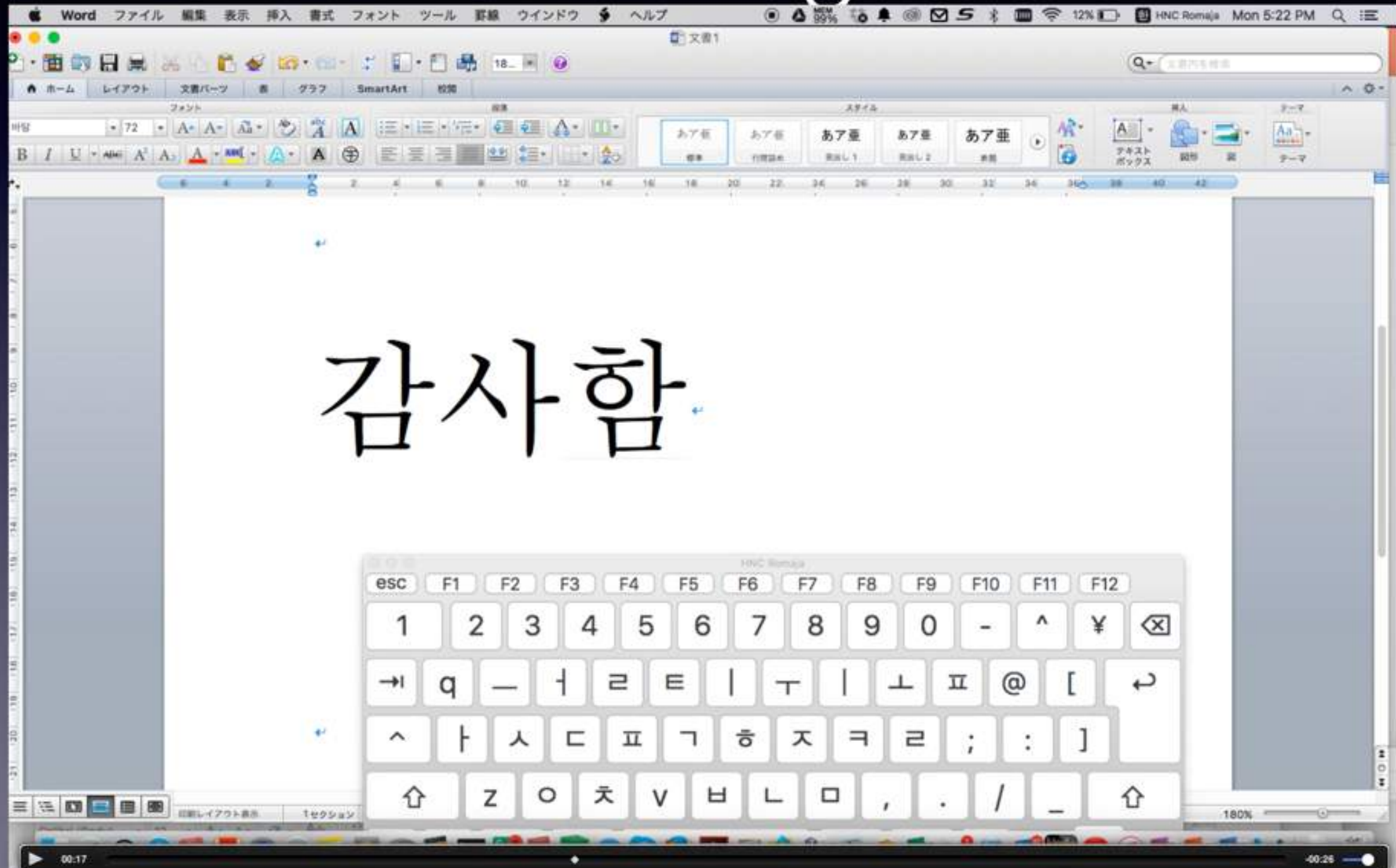
Inputting Korean Group Writing



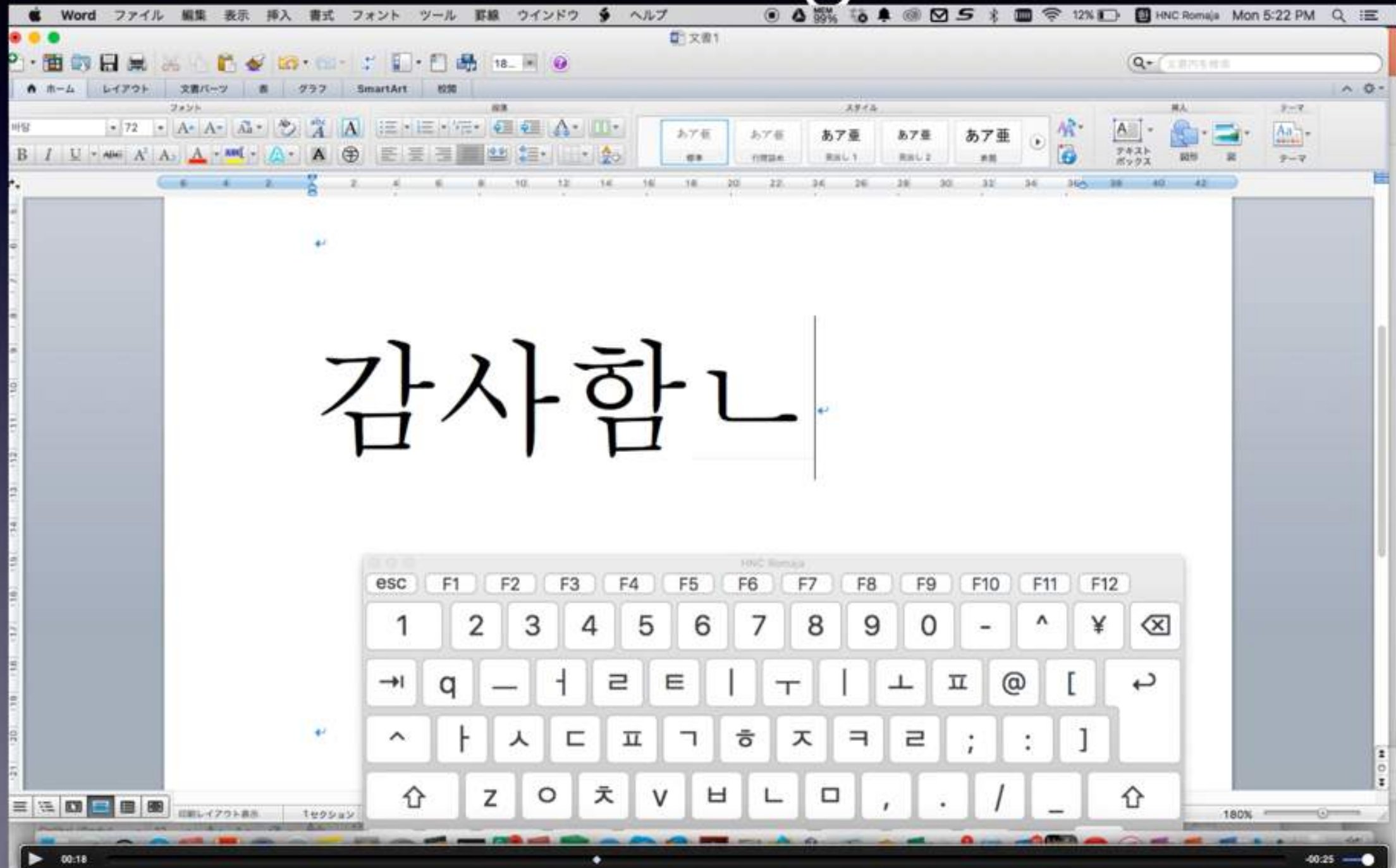
Inputting Korean Group Writing



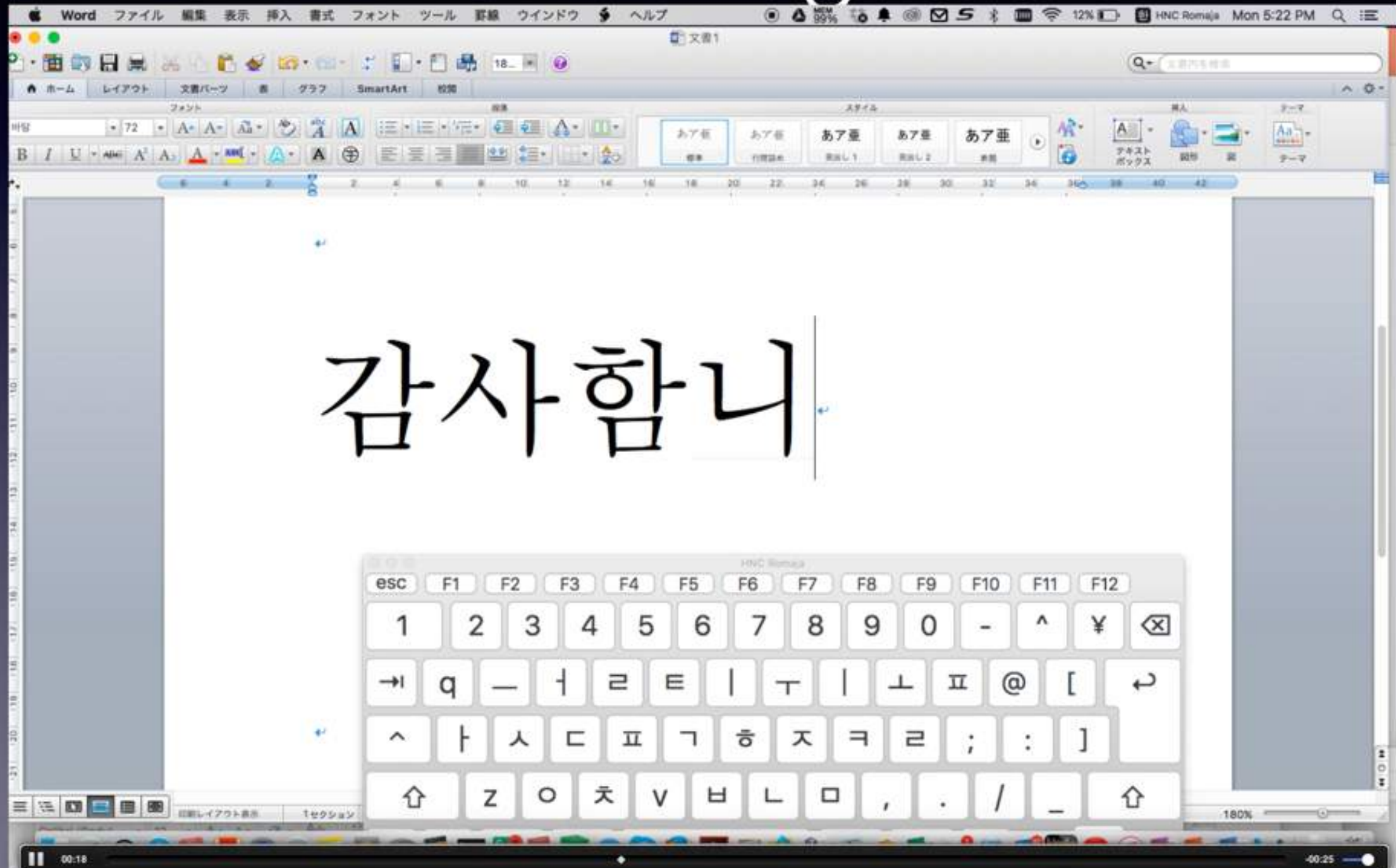
Inputting Korean Group Writing



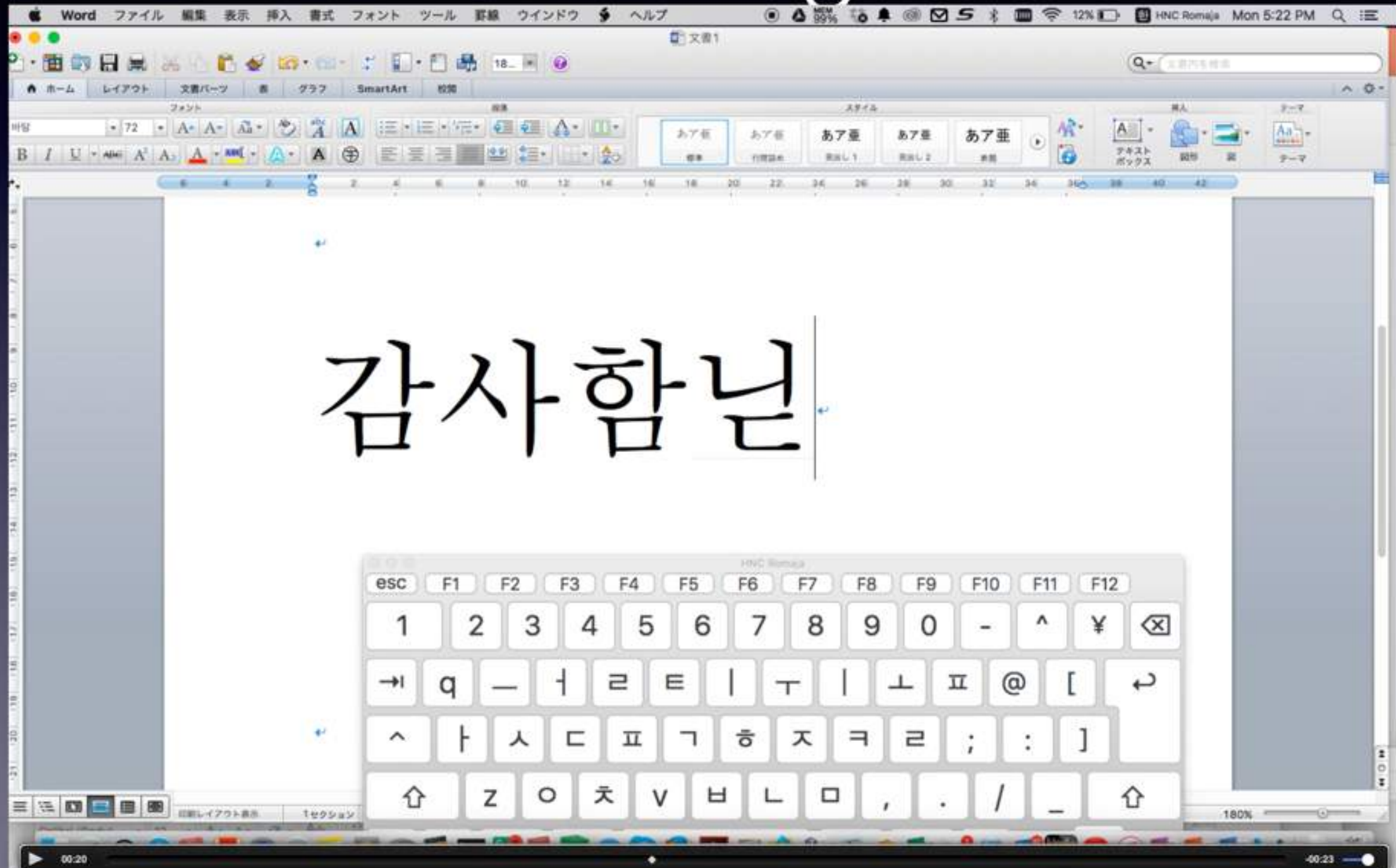
Inputting Korean Group Writing



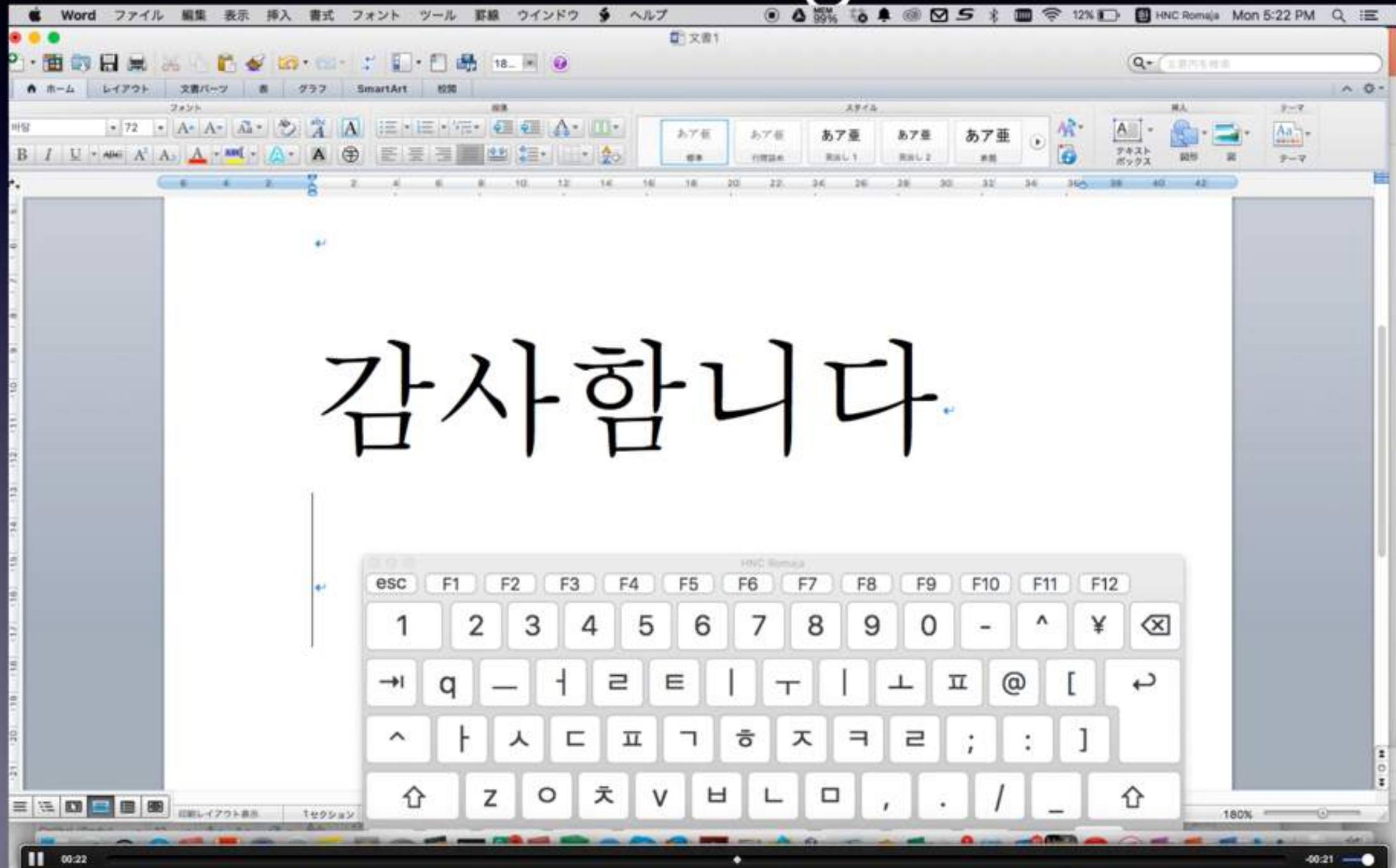
Inputting Korean Group Writing



Inputting Korean Group Writing



Inputting Korean Group Writing



- These are all the combinations of Korean alphabetical letters, forming **squares**.
- The total number of these Unicode characters is over **10,000** in Unicode 8.0.

[illegible]

Chinese Cangjie (Tsang Chieh) Input

- Input: 日 + 火 → Output: 𤇗



- A combination of Unicode characters of radicals generates a complex Chinese character (one Unicode character).
- The number of the CJK Unicode characters (Chinese, Japanese and Korean) in Unicode 8.0 is over 80,000.

Chinese Cangjie (Tsang Chieh) Input



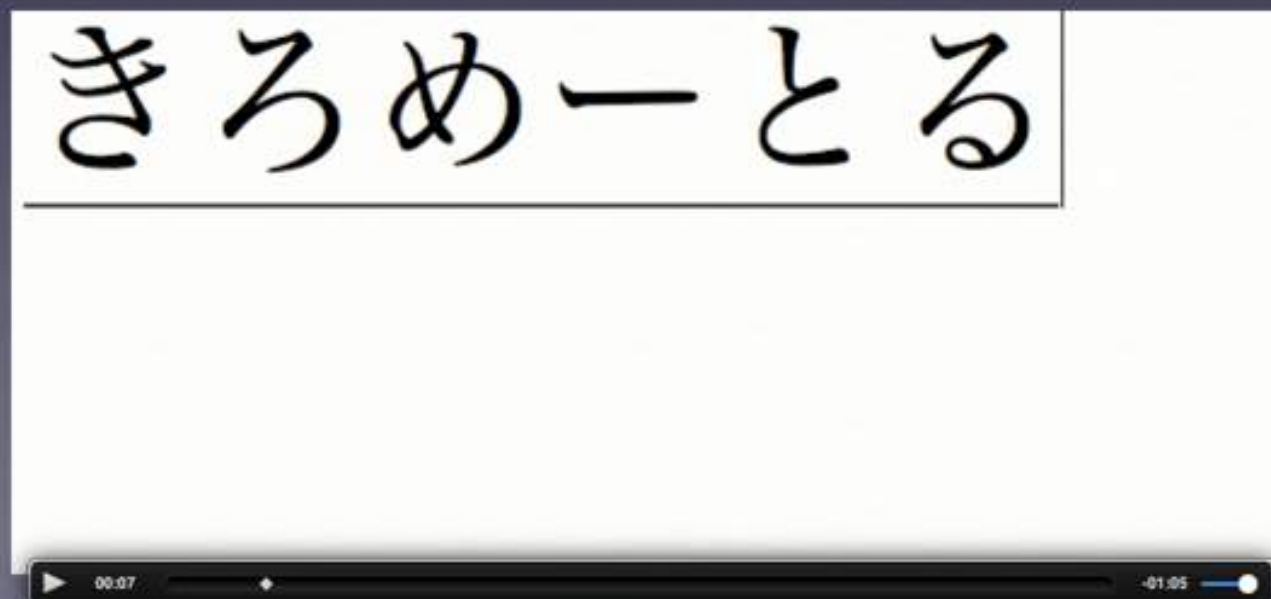
- Input: 日 + 火 → Output: 炅
- A combination of Unicode characters of radicals generates a complex Chinese character (one Unicode character)
- The number of the CJK Unicode characters (Chinese, Japanese and Korean) in Unicode 8.0 is over 80,000.

- More applicable conversion system to Hiero-JIS

- Double conversion

Japanese キロメートル

- Input: **kirome-toru** (10 Unicode chars) →
1st Output: **きろめーとる** (6 Unicode chars) →
2nd Output: キロメートル (1 Unicode char)
- キロメートル is the group writing of キロメートル “kilometer”



- More applicable conversion system to Hiero-JIS

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Japanese キロメートル

- Input: **kirome-toru** (10 Unicode chars) →
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- **キロメートル** is the group writing of キロメートル “kilometer”



Mechanism of the Double Conversion

Key of Conversion (transliteration of a word etc.)



1st Conversion



Individual Hieroglyphic Unicode Characters

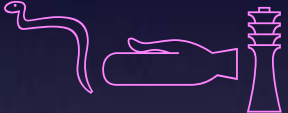







2nd Conversion



One Unicode Character of a Group Writing Unit



Using the Japanese Double Conversion

- Input: **Dd** → 1st Output:  → 2nd Output: 
- Input: **anX** → 1st Output:  → 2nd Output: 
- Input: **ntt** → 1st Output:  → 2nd Output: 

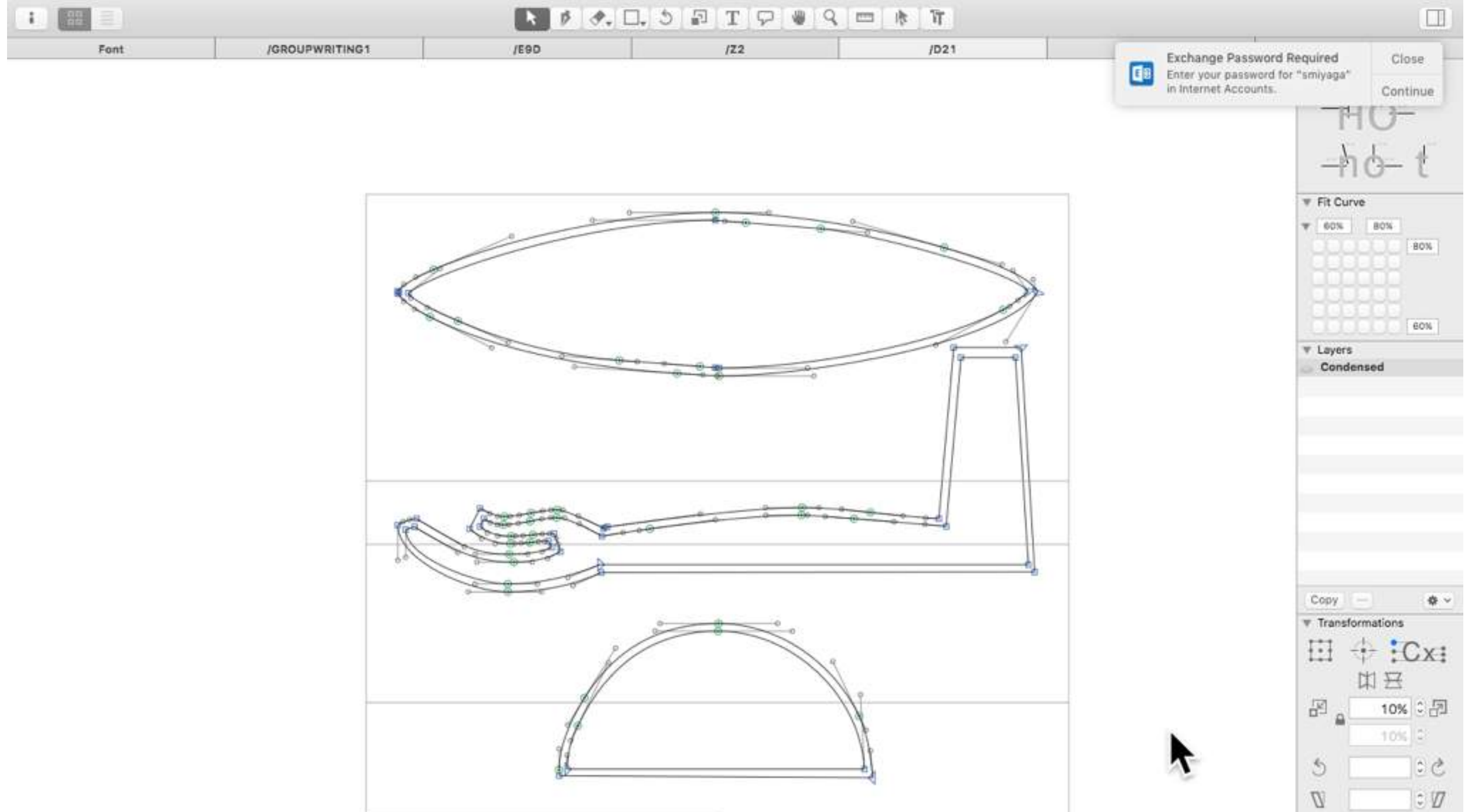
Egyptian Group (quadrat) Writing in Unicode

- Unicode Standard 8.0 has only individual hieroglyphs which are on the Gardiner's sign list (The Unicode Standard 8.0, 2015, <http://unicode.org/charts/PDF/U13000.pdf>, accessed on 11-4-2015).
- This is like putting just **parts of Chinese characters** separately but not Chinese group writing characters themselves.
Ex. 氵 (related to water) 先 (/sen/), but not 洗 (/sen/ “wash”)
- Or putting Korean alphabetic letters separately and not combining them to form a group writing square.
Ex. ㄱ (/g/) ㅏ (/a/) ㅓ (/m/), but not 감 (/gam/)

Problem of Unicode Area

- Unicode Consortium should expand Egyptian Hieroglyphic Area in Unicode. It should include group writing as one character like Korean Syllable Signs or Japanese 
- This could be a base of Demotic or Hieratic Unicode characters
- Until they expand Egyptian Hieroglyph Unicode Characters, I use Unicode Supplementary Private User Areas (U+F0000-FFFFF Supplementary Private Use Area-A & U+100000-10FFFF Supplementary Private Use Area-B) or other script areas and make their font using Glyphs. Ex.  = U+F0030. I guess it will be over 10,000 Unicode characters.

Making Fonts of Group Writing



EGPZ Project by Bob Richmond

- EGPZ Project - This is the project to make and add Hieroglyph Unicode characters to be used practically.
- He's making "Group (Quadrat) Writing" Unicode Characters according to his analysis of frequency.
- But it seems that EGPZ is not available right now (2016, Jan). The website says this will be released in the future. (<http://egpz.org/Page/Fonts>)
- Richmond & Everson made Unicode Consortium add Egyptian Hieroglyphs into Unicode in 2009.

EGPZ's Quadrant Unicode Characters



U+ec63 Z1&D36



U+ebfa P6&D36&N5&Z1



U+ebf9 P5&Z2d&G43



U+ebc0 I10&S43&M17&N35



U+ebbc I10&O34&I9

Photos are from Richmond, Bob. 31st August 2007. EGPZ 1.0 BETA Specification,
[http://citeseerx.ist.psu.edu/viewdoc/
download;jsessionid=16FFD7C8DC879E483A2B2A0E5E0E811D?
doi=10.1.1.182.4847&rep=rep1&type=pdf](http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=16FFD7C8DC879E483A2B2A0E5E0E811D?doi=10.1.1.182.4847&rep=rep1&type=pdf), accessed on 2016-01-21.

FULL HIEROGLYPH UNICODE GROUP WRITING CHARACTERS



FAST & EASY HIEROGLYPH INPUT SYSTEM



It is easier
for OCR
software; ex.
OCRopus

OUR FUTURE!!


Searchable
Web Corpus
based on
Unicode

Conclusions

- Hieroglyphs Input using Japanese Input System (Hiero-JIS) makes it easier and faster even for beginners to input Hieroglyphs on computers.
- It will have ca. 130,000 entries
- 1 Macro Input and 3 Micro Input Methods
 - Macro: transliteration of a word → a whole word in Hieroglyphs
 - Micro: transliteration of a phonogram → a phonogram (Mnemonics)
 - a Gardiner code → a hieroglyph
 - an English Word → a hieroglyph
- Hiero-JIS makes you input Hieroglyph directly everywhere, because it uses Unicode characters.
- Testing to make it possible to input group writing units, by regarding a group writing unit as one Unicode character. If this group writing Unicode is available, HieroJIS can be fully used as an alternative of existing Hieroglyphic programmes.



ΩΕΠΞΜΟΤ



Thank you for your comments, in person, in emails or on Facebook, Serge Rosmorduc, Simon Schweizer, Camilla Di Biase-Dyson, Heike Behlmer, Heike Sternberg-el Hotabi, Uwe Sikora, Stephane Polis, Franziska Naether, Dietrich Raue, Maxim Kupreyev (Максим Купреев), Mark-Jan Nederhof, John Billman, Father Maximous (μαξιμος) of the Monastery of St. Anthony, Shih-Wei Hsu (徐詩薇), Dave Robbins and so on...

And thank you so much, George Douros for your awesome font, Aegyptus (<http://users.teilar.gr/~g1951d/Aegyptus.zip>, accessed on 2016-01-31). I used Aegyptus for Egyptian Hieroglyphs throughout these slides. Finally, thank you, Monica Berti and Franziska Naether, for your great organizing skills.