

Grammatology in the Era of Digital Writing

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Abstract: This paper investigates Jacques Derrida's notion of grammatology in the context of contemporary digital writing technologies. It critically reassesses Ferdinand de Saussure's linguistics and his concept of phonocentrism, underscoring phonography's underestimated role in shaping the epistemological foundations of linguistics. Introducing original concepts such as the "logographic hiatus" and "grammatological polyphony," the paper challenges the limitations inherent in alphabetic linearity, particularly through the analysis of logographic writing systems like Chinese. Drawing on recent advancements in cognitive neuroscience, notably Stanislas Dehaene's Neuronal Recycling Hypothesis, the paper proposes a neuro-grammatological framework. It argues that the human brain repurposes pre-existing neural circuits for reading, aligning visual symbols with ecological and neurological constraints. Further, the study addresses Derrida's concept of "Mondialatinisation," examining the implicit cultural hegemony perpetuated through Latin-alphabet-based digital input methods (e.g., Romaji, Pinyin). This critical analysis highlights the subtle yet profound epistemological and cultural implications of imposing phonocentric and alphabetic models on traditionally logographic languages. Finally, the paper underscores the unresolved civilizational tensions emerging from the digital transformation of writing, emphasizing the urgent need for interdisciplinary dialogue bridging linguistics, semiotics, neuroscience, and cultural studies

Keywords: New Semiotics, Digital Writing, Neurogrammatology, Logographic Hiatus, Mondialatinisation

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“By a substitution which would be anything but verbal, one may replace semiology by grammarology in the program of the Course in General Linguistics: I shall call it [grammarology] Since the science does not yet exist, no one can say what it would be; but it has a right to existence, a place staked out in advance. Linguistics is only a part of [that] general science.... ; the laws discovered by [grammarology] will be applicable to linguistics . (p. 33) [p. 16]” (Jacques Derrida, *Of Grammarology*)¹

1. Linguistics and Grammarology

1.1 Linguistics and Grammarology

Derrida's proposition that Saussure's "semiology" should be replaced by "grammarology," cited in the epigraph, appears almost at the center of the second chapter, "Linguistics and Grammarology," which occupies a central place in the *first part of Derrida's work, Of Grammarology*, titled "Writing Before the Letter." According to Derrida, this first part constitutes the "theoretical matrix" of his text.

It is highly significant that this affirmation of the *grammatological* turn of semiology is precisely inscribed in this central location where the full gravity of the deconstruction project is concentrated. Indeed, in this second chapter, Derrida's main theoretical segments are presented, such as *writing[écriture]*, *arche-writing [archi-écriture]* , *différance*, *spacing [espacement]*, *trace*, and *arche-trace [archi-trace]*; it is through these concepts that the rewriting of the propositions of Saussurean semiology is pursued.

Reading this chapter is thus of decisive importance for accurately assessing and rigorously criticizing the scope and significance of the "grammatological turn" introduced by Derrida. We will examine in detail how the transformations of writing techniques of oral language and the mutations of knowledge they have engendered cast their shadow on his argument, taking into account the questions he leaves unresolved.

1.1.1 The Place of Phonology

As Derrida points out, at the time when structuralism dominated in early 1960's, linguistics was considered the pilot science among the human sciences. This scientificity was based on the central place of phonology:

[The] scientificity of that science is often acknowledged because of its phonological foundations. Phonology, it is often said today, communicates its scientificity to linguistics, which in turn serves as the epistemological model for all the sciences of man. Since the deliberate and systematic phonological orientation of linguistics (Troubetzkoy, Jakobson, Martinet) carries out an intention which was originally Saussure's, I shall, at least provisionally, confine myself to the latter. (*Of Grammarology*)²

¹ Jacques, Derrida. *Of Grammarology*, Translated by Gayatri Chakravorty Spivak. First edition 1967, Corrected edition 1997. (Baltimore and London: The John Hopkins University Press, 1997) , 51

² Derrida, *Of Grammagology*. 29

Derrida emphasizes that the science of language defines language as a tripartite unity composed of voice (*phonè*), vocal organ (*glossa*), and *logos*. It is precisely *phonology* that has operated the theoretical unity of these three dimensions and constituted the foundation of post-Saussurean linguistics. Indeed, phonology is the discipline that deals with the relationship between the vocal organ (*glossa*) and the voice (*phonè*), as well as the relationship between the sound form and the internal meaning of language (*logos*). In this configuration, *writing* [*écriture*] is relegated to an external position as a simple "sign of the sign" transcribing the phonic signifier.

The science of linguistics determines language- its field of objectivity in the last instance and in the irreducible simplicity of its essence, as the unity of the *phone*, the *glossa*, and the *logos*. [...] The immediate and privileged unity that founds significance and the act of language is the articulated unity of sound and meaning in phonic.[...] With regard to this unity, writing would always be derivative, accidental, particular, exterior, doubling the signifier: phonetic. "Sign of a sign, " said Aristotle, Rousseau, and Hegel. (*Of Grammatology*)³

1.1.2 The Double Orientation of Saussurean Linguistics

Derrida asserts that Saussure's linguistics presents a double contradictory orientation regarding the status of writing. On the one hand, it tends to subordinate writing and thereby grammatology by affirming that language is essentially oral, and that writing is only a tool serving this full and original oral language. On the other hand, it sketches an inverse gesture, liberating the adventure of grammatology and suggesting that phonology itself would only be a specific domain of this general grammatology, thus revealing a principle of *arche-writing* [*archi-écriture*] already operating within language itself.

In other words, Saussurean linguistics oscillates between a movement that relegates writing to the outside of language activity and another that discovers within it a principle of *arche-writing*. It is precisely through this intricate and broken relationship (*brisure*) between the outside and the inside that the relationship between linguistics and grammatology is articulated. By questioning this double contradictory gesture—on the one hand, the exclusion of writing by linguistics, and on the other hand, the implicit implication of writing in linguistic activity—Derrida challenges the *phonocentrism* inherent in linguistics.

However, beyond this critique, what we wish to question here, accompanying Derrida's reading, is the *technological problem* of writing that made phonology itself possible. In other words, *phonology*, which is supposed to found linguistics, was only made possible by *phonography* – a *phonographic writing technology* that allowed the voice to be inscribed and analyzed in a new form. However, it seems that the problematic of this another writing underlying phonology is left aside in Derrida's analysis. Yet, this is a decisive point: phonology could only emerge through the recording of the voice by *phonography*, that is, a *technological writing* of the voice that allowed its recording and systematic study. Thus this technological writing is the fondemental of the positivity of saussurean semiological linguistics.

³ Derrida, *Of Grammatology*. 29

1.1.3 The Phonocentrism and its Double

Before addressing in detail the economy of the argumentation of the Derrida's chapter "Linguistics and Grammatology," let's examine the internal articulation of the passages concerning Saussure. This chapter is structured in three main sections: "The Outside and the Inside" (p. 30 ff.), "The Outside *is* the Inside" (p. 44 ff.), and "The Hinge[La Brisure]" (p. 65 ff.).

The first section, "The Outside and the Inside," focuses mainly on Chapter VI, "The Representation of Language by Writing," of the first part of the *Course in General Linguistics*.⁴ It analyzes how Saussurean linguistics proceeds to exclude writing by relegating it to the outside of the linguistic system. This exclusion participates in the constitution of (phonic) language as an internal system, which thus becomes the proper object of linguistics.

The second section, "The Outside *is* the Inside," explores, in contrast to the first, Chapter IV of the second part of the *Course*, "Linguistic Value," where writing is evoked not as an object in its own right, but as a principle already operating within language. Derrida highlights the fact that it is precisely when Saussure describes the fundamental principles of language—namely *value* and *difference*—that the functioning of writing within language becomes manifest. What had been excluded as an external element to linguistics is thus found as a structuring principle already at work inside language.

Finally, the third section, "The Hinge[La Brisure]," broadens this problematic by articulating it with the process of spacing [*espacement*] that brings into play *différance* and *trace* in writing and language. Through this paper, we argue that Saussure's critique of writing should be understood on two distinct yet interrelated levels.

First, his critique reiterates a traditional epistemological gesture, namely, the critique of writing as alphabetic representation. In this respect, Saussure's position can indeed be situated within the framework of what Derrida calls "phonocentrism," a position that privileges speech over writing, following a long tradition in Western metaphysics.

However, at a deeper epistemological level, Saussure is significantly concerned with establishing and delimiting his internal and synchronic linguistics in opposition to experimental phonetics, which, at the time, had begun systematically recording and analyzing spoken language through phonographic technology. Thus, Saussure's critique of technological writing (phonography) is central to the constitution and delimitation of linguistics as a synchronic and internal science. This problematic focuses precisely on the epistemological and technological question of how modern linguistics was to be constituted in the era of analog media technology and in parallel with advances in brain and neural sciences. Indeed, this era saw not only the emergence of analog media technology but also critical developments in neurology, particularly regarding language centers in the brain—Broca's and Wernicke's areas—thus profoundly shaping modern linguistic thought.

⁴ Ferdinand de Saussure, *Cours de linguistique générale*, ed. Tullio De Mauro (Paris: Éditions Payot, 1995); Saussure, Ferdinand de. *Course in General Linguistics*. Edited by CHARLES BALLY and ALBERT SECHEHAYE In collaboration with ALBERT REIDLINGER Translated from the French by WADE BASKIN. (New York: THE PHILOSOPHICAL LIBRARY, 1959)

It is this critical concern—the epistemological stakes in the analog media technology era and concurrent neuroscientific developments—that we propose to identify and analyze under the rubric of "the epoch of technological writing."

In this regard, Derrida's own argument, too, involves a dual movement. On the one hand, he critiques the phonocentrism deeply rooted in Western metaphysics. On the other, he implicitly engages with the issue of technological writing, utilizing its conceptual framework without explicitly acknowledging the technological dimension of the debate. Indeed, Derrida's central theoretical concepts, such as arche-writing [*archi-écriture*] and *différance*, draw implicitly on this debate concerning writing technology and its epistemological implications. However, he leaves the technological conditions underlying phonography largely unaddressed, creating an ambiguity at the heart of his grammatological project. Through our analysis, we aim precisely to clarify these technological and epistemological conditions.

1.2 Phonetic Writing and Epistemology of Language

1.2.1 Phonetic Writing

Derrida argues that phonetic writing— i.e. the alphabetic system—implicitly shaped the epistemological foundations of Saussurean linguistics and Western thought. According to Derrida, the alphabet enabled language to be objectified as an internal, autonomous system, thus making linguistics possible as a scientific discipline. Yet linguistics paradoxically excluded writing as external and secondary supplement, even though its own scientific framework depended fundamentally on alphabetic writing.

In other words, phonetic writing served as the epistemological unconscious of linguistics, simultaneously constituting and repressed. Linguistics defined language through the voice, assuming an immediate presence of consciousness based on hearing oneself speak. Yet this very conception—central to Western philosophy and science—was conditioned by alphabetic *inscription*, thereby situating phonetic writing as both the condition of possibility and the suppressed technical foundation of phonocentric linguistics.

The grammatological unconscious of the phonetic writing is structural as Derrida analyzed it in *La Voix et le Phénomène* (1967).⁵ The writing is an passive and *active synthesis* – in husserlian sense -- of self-consciousness by hearing oneself speak in inner silent voice, while symmetrically the reading is a passive and active synthesis by reactivating of signs. In this writing and reading circuit, one cannot reduce phonemes, because the phoneme is the most ideal of the signs ("Le phonème est[...] le plus idéal des signes")⁶. This is the very transcendental condition of the inner voice in phonetic writing.

1.2.2 The Question of the Phoneme

The *phoneme* occupies a central position in the emergence of modern phonology. The phoneme is not simply positively transcribed by the alphabet; rather, the alphabetic system is

⁵ Derrida, Jacques. *La Voix et Le Phnomène*. Paris: Presses Universitaires de France, 1967.

⁶ Derrida, *La Voix et le phénomène*, 86

structurally homologous to the phonemic system itself. Since phonemes, as Saussure emphasizes, are purely differential and relational entities, the alphabetic writing system structurally mirrors this relational system of phonemes. In this sense, phonemes function as what Derrida calls *archi-écriture*, differentiating—indeed, "différance," as Derrida would say—the alphabetic system. This constitutes the essential characteristic of phonetic *writing* as an *epi*-phonetic system: it records not merely concrete sounds but the differential logic underlying linguistic phenomena. The alphabet doesn't "write" phonemes. Instead, it is by *writing* that phonemes externalize: the writing is a technological externalization of linguistic activity.

The term *phoneme* was introduced by Saussure in his *Mémoire* (1879)⁷, initially as an abstract sound unit distinct from concrete phonetic realizations, designed specifically to account for historical vowel transformations within Indo-European languages. Saussure adopted this term—originally proposed by Antoni Dufriche-Desgenettes (1873) and later promoted by the Romanist Louis Havet -- as « equivalent of *Sprach-laut* »⁸. At Leipzig University, under the strong methodological influence of the Neogrammarians (Leskien, Brugmann, Paul), and in particular their integration of experimental phonetics, Saussure developed this theoretical abstraction of sound as a crucial methodological tool for historical linguistics. However, It is not merely a neutral notation but a semiologically structured representation grounded in relational and differential phonemic system.

Thus, from the very outset, Saussure's concept of the phoneme embodies the structural tension between phonetic writing (*philological problematic*) and phonographic technology (*phonological problematic*), a tension which remains crucially overlooked in traditional analyses of linguistic epistemology.

1.2.3 Phonology and the Vocal Apparatus

For saussurean general linguistics to constitute itself, it was essential to establish phonology as an "auxiliary science." For Saussure, phonetics—such as he had known and practiced in his comparative studies—was "a historical science: it analyzes events, changes, and moves within time."⁹ In contrast, phonology lies "outside of time, for the articulatory mechanism never changes."¹⁰ It is auxiliary precisely because it pertains solely to speech (*parole*), specifically to its articulatory mechanisms, whereas linguistics itself is essentially a science of language (*langue*), whose seat is in the brain. The problem of the phoneme sits precisely at the intersection of these two domains.

Phonological analysis begins with acoustic data. According to Saussure, the phonatory act has two distinct but complementary aspects: the *articulatory side* (mouth, larynx) and the *acoustic side* (ear). However, traditional phonology often mistakenly privileges the articulatory side, neglecting the acoustic, even though it is precisely the acoustic-psychic impression that

⁷ Ferdinand de Saussure, *Mémoire sur le système primitif des voyelles dans les langues indo-européennes* (Leipzig: B. G. Teubner, 1879),

<http://catalogue.bnf.fr/ark:/12148/cb11967717f>.

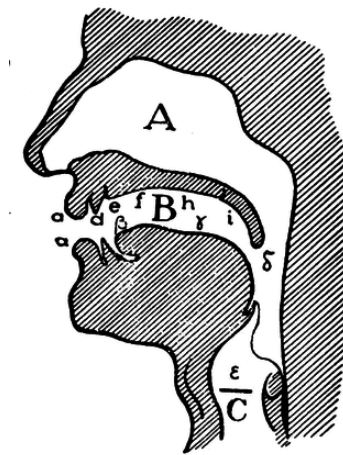
⁸ Roman Jakobson, "The Kazan' School of Polish Linguistics and Its Place in the International Development of Phonology," in *Selected Writings, II: Word and Language* (The Hague: Mouton, 1971), 397.

⁹ Saussure, *Course in General Linguistics*, 33

¹⁰ Ibid.

constitutes the primary data in the production of phonemes. This acoustic datum exists unconsciously prior to any phonatory act: it is through the *acoustic image*—that is, the internal psychic sound image—that we first know what a phoneme such as *p*, *b*, or *c* is, before the vocal organ articulates it as actual sound. To clarify this process, Saussure invokes the metaphor of the cinematograph, illustrating how the acoustic image precedes and conditions the articulatory execution of sound¹¹. This illustration echoes—in theoretical intent—Husserl’s contemporary attempt to describe the internal structure of temporal consciousness through the example of melody, likewise perceived as a continuous sound-flow prior to its segmentation into distinct notes.¹²

Saussure offers a schematic representation of the *vocal apparatus*¹³:



According to Saussure, the human vocal apparatus is composed primarily of three elements: the nasal cavity (a), the oral cavity (b), and the glottis (c). The exhaled air passes first through the glottis, where the vocal cords produce the laryngeal sound, then reaches the oral cavity, which acts simultaneously as a sound generator and resonator. The oral cavity can modulate sounds considerably through the actions of the tongue, lips, and cheeks, thereby creating extensive phonetic variety. The nasal cavity serves a complementary function by introducing nasal resonance, depending on whether it is open or closed. Thus, different linguistic sounds result from combinations of these articulatory and resonating factors, some of which (such as laryngeal vibration and nasal resonance) are variable.

The following diagram illustrates the articulatory positions of occlusive consonants, grouped into three families according to the degree of closure within the oral cavity:

(1) m, b, p (α); (2) n, d, t (α'); (3) ni, g, k (α'').¹⁴

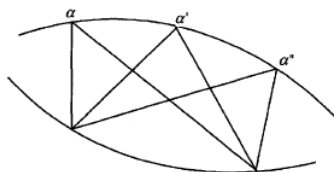
¹¹ In the original French text, « Si l'on pouvait reproduire au moyen d'un cinématographe tous les mouvements de la bouche et du larynx exécutant une chaîne de sons, il serait impossible de découvrir des subdivisions dans cette suite de mouvements articulatoires » (*Saussure, Cours de linguistique générale*, 64, my emphasis), the English translation renders this less faithfully as: “Even if all the movements made by the mouth and larynx in pronouncing a chain of sounds could be photographed” (*Saussure, Course in General Linguistics*, 33, my emphasis).

¹² Edmund Husserl, *On the Phenomenology of the Consciousness of Internal Time (1893–1917)*, trans. John Barnett Brough, *Husserliana: Edmund Husserl – Collected Works*, vol. 4 (Dordrecht: Springer, 1991)

¹³ Saussure, *Course in General Linguistics*, 41

¹⁴ Ferdinand de Saussure, *Premier cours de linguistique générale* (1907): d’après les cahiers d’Albert Riedlinger, ed. Eisuke Komatsu, trans. George Wolf (Oxford: Pergamon, 1996), 16.

- articulation
1. *m, b, p* α
 2. *n, d, t* α'
 3. *ni, g, k* α''



(Ce schéma représente le lieu articuloire pour chaque famille, soit le point d'appui de la langue contre le palais.) Les phonèmes d'une même famille ne se distinguent donc plus <entre eux> par l'articulation, mais par les concomitances (vibration laryngique, résonance nasale) dont l'absence est aussi bien <que la présence> un élément de différenciation <mais non pas de production>.

Phonème	<i>m</i>	<i>b</i>	<i>p</i>	<i>n</i>	<i>d</i>	<i>t</i>	<i>ni*</i>	<i>g</i>	<i>k</i>
Articulation	α	α	α	α'	α'	α'	α''	α''	α''
Son laryngé	---	---	[]	---	---	[]	---	---	[]
Résonance nasale	...	[]	[]	...	[]	[]	...	[]	[]

**ni* dans l'allemand *singen*

Each family shares the same point of articulation (point of contact of the tongue on the palate). The accompanying table clarifies that phonemes within each family are distinguished not by their point of articulation (α , α' , α''), but rather by additional acoustic features such as the presence or absence of nasal resonance and laryngeal vibration (voicing). Thus, it is precisely these concomitant acoustic traits that genuinely differentiate phonemes from each other.

The functioning of the vocal apparatus—the *glossa*—is the foundation upon which phonology builds its theory of phonemes. Saussure formulates the phoneme according to the schema:

$$F \text{ (acoustic time)} = f \text{ (articulatory time)}.$$

The phonetic units thus obtained are already complex units:

$$\frac{F}{f} = \text{phoneme} = \text{the sum of acoustic impressions and articulatory acts, the unity that is both heard and spoken, each conditioning the other.}^{15}$$

Since the phoneme, as a minimal phonological unit, is already a complex and differential unit composed of *acoustic impressions* (psychic level) and *articulatory acts* (physical and physiological level), this schema situates the *semiological interface* of speech (*parole*) precisely between *psychic time* and *mechanical and physiological articulatory time*. Thus, we observe that phonology as an auxiliary science forms the basis of a *semiological organology* within Saussurean linguistics.

Thus formulated, this semiological organology provides the epistemological and technological foundation for the analysis of Saussure's model of the *circuit of speech* (*le circuit de la parole*), which we shall now examine.

1.3 Grammatology and Phonography

¹⁵ Ferdinand de Saussure, *Premier cours de linguistique générale* (1907): d'après les cahiers d'Albert Riedlinger, ed. Eisuke Komatsu, trans. George Wolf (Oxford: Pergamon, 1996), 15.

1.3.1 The Circuit of Speech and Communication

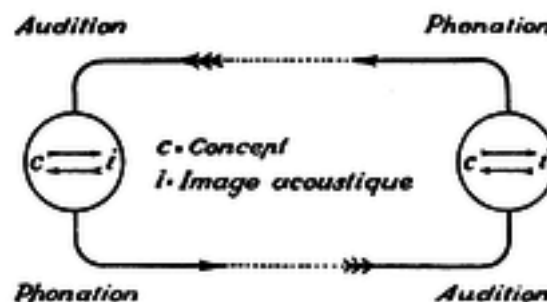
Saussure selects telephonic communication as an ideal illustration of his conceptual apparatus:

To locate within the entirety of language the sphere corresponding to *langue*, one must first consider two individuals engaged in conversation—let's call them A and B—as this represents the minimal condition for completing the circuit of speech.¹⁶



Saussure emphasizes the centrality of the brain as the locus of language (*langue*):

The starting point of the circuit lies in the brain of one person, for instance A, where the mental phenomena we call concepts become associated with the representations of linguistic signs, or acoustic images. This association, entirely psychic, initiates a physiological process whereby the brain transmits to the vocal organs an impulse corresponding to this acoustic image. Subsequently, sound waves propagate from A's mouth to B's ear—a purely physical process. In B, the circuit then continues in reverse order: from ear to brain, a physiological transmission of the acoustic image.¹⁷



This "circuit of speech" illustrates the technological externalization of the vocal apparatus and linguistic processes within the brain. It integrates multiple, interwoven processes: the physical transmission involved in phonation and audition corresponds to the domain of physics and engineering; the organic functions related to speech production and auditory perception pertain to physiology; and the cognitive dimension, including brain activities and linguistic processing, belongs properly to linguistics and semiology. Thus, Saussure situates semiology precisely at the intersection between physiological mechanisms and psychic processes.

We may further note that Saussure's concept of the acoustic image implicitly parallels contemporary neuroscientific insights, exemplified by Lichtheim's neuro-anatomical model,

¹⁶ Saussure, *Course in General Linguistics*, 11

¹⁷ Saussure, *Course in General Linguistics*, 12.

composed of the acoustic image (Wernicke's area), the concept center, and the motor image of words (Broca's area)¹⁸.

In this diagram, we can clearly observe an explicit phonographic illustration of linguistic activity. The diagram redefines, through phonographic technology, the mechanical action of phonation, while precisely delimiting the semiological sphere that Saussure situates at the cognitive and psychic level of the acoustic image. Consequently, it corrects not only the strictly phonetic (alphabetic) conception of language but also critiques the uncritical scientism associated with purely experimental phonetic approaches. Here emerges the properly *phonogrammatological* dimension.

1.3.2 The Epoch of Technological Writing

One cannot overstate the modernity of Saussure's diagram, clearly defining the technological and epistemological configuration within which the project of semiology should take shape. Acoustic image and concept in Saussure can be permuted into *Signifier (signifiant)* and *Signified (signifié)*, whose combination constitutes the *Sign (signe)*. Thus, this schema explicitly formulates the semiological project outlined by Saussure.

Yet, we must not overlook the role of the auxiliary science implied here, as the *phonological* and *phonographic* dimensions are integral to the semiological framework. This aspect introduces a properly *grammatological* dimension—indeed, a "phono-grammatological" dimension—as the *supplementary* science operating within this schema:

1. Telephonic communication depicted in the schema illustrates the technological externalization of the vocal and linguistic apparatus theorized by Saussurean phonology and linguistics. This can be understood as a grammatological manifestation of an epistemological shift marking the epoch of writing.
2. Phonology serves as an auxiliary -- or "supplementary" in derridian sense -- science because the study of speech (*la parole*) must support linguistics, a science of language (*la langue*), whose seat is the brain.

Saussure's epistemological insight lies precisely in his articulation and coordination of these two orders. He distances himself from purely empirical phonetics focused solely on speech production. Instead, phonology mediates empirical discoveries about the articulatory organs, connecting them with cognitive and psychic processes that contemporary neuroscientific research was beginning to reveal.

The schema thus inscribes the *semiological* logos underpinning the alphabetic writing system, implementing it explicitly through machinic phonographic writing. This illustrates the profound influence of the analog media revolution that deeply informs Saussurean semiology.

¹⁸ Paul J. Thibault, *Re-reading Saussure: The Dynamics of Signs in Social Life* (London: Routledge, 2013), 146.

2. Grammatology and Logography

In Part 1, we demonstrated how the epistemological conditions imposed by alphabetic writing fundamentally influenced linguistic and phonological assumptions, implicitly embedding phonocentric metaphysics, even though these phonocentric claims were actually enabled by phonogrammatological conditions. Now, our investigation must move further to explore alternative grammatological paradigms that reveal writing operations distinct from the phonocentric model.

Specifically, this part will examine whether grammatology can effectively deconstruct phonocentric linguistic claims to identify and articulate the specific level of the operations involving grammes, writing, and *différance*.

2.1 Saussure and Logography

2.1.1 Saussure on Logography

Saussure asserts the existence of two distinct writing systems:

There are only two systems of writing:

1. In an ideographic system each word is represented by a single sign that is unrelated to the sounds of the word itself. Each written sign stands for a whole word and, consequently, for the idea expressed by the word. The classic example of an ideographic system of writing is Chinese.
2. The system commonly known as "phonetic" tries to reproduce the succession of sounds that make up a word. Phonetic systems are sometimes syllabic, sometimes alphabetic, i.e., based on the irreducible elements used in speaking. Moreover, ideographic systems freely become mixtures when certain ideograms lose their original value and become symbols of isolated sounds.¹⁹

Today, the system described by Saussure as "ideographic" is generally referred to as logographic because it is actually the word or morpheme—and not the idea itself—that is represented. Indeed, Saussure's definition implicitly acknowledges this fact, although the conception of the "word" can vary significantly across different languages and writing systems.

Saussure's additional remark about the diversion ("détournement")²⁰ of certain ideograms from their "original value" is crucial. It highlights the inherent hybridity in all writing systems, as no writing system, including the Chinese one, is completely free from phonetic elements. Sinologists have consistently emphasized the persistence and problematic nature of the "ideographic myth."²¹

Further clarifying this point, Saussure elaborates:

¹⁹ Saussure, *Course in General Linguistics*, 25-26.

²⁰ « D'ailleurs les écritures idéographiques deviennent volontiers mixtes : certains idéogrammes, *détournés* de leur valeur première, finissent par représenter des sons isolés. » (Saussure, *Cours de linguistique générale*, 47. *my emphasis*)

²¹ John DeFrancis, *The Chinese Language: Fact and Fantasy* (Honolulu: University of Hawai'i Press, 1984)

“We have said that the written word tends to substitute itself in our minds for the spoken word; this is true for both writing systems, but this tendency is stronger in the first. For Chinese speakers, the ideogram and the spoken word equally represent the idea; writing functions as a second language. In conversation, when two spoken words have the same sound, speakers may resort to the written character to clarify meaning. However, this substitution, being potentially absolute, does not carry the negative consequences seen in our writing. Chinese words from different dialects corresponding to the same idea can be equally incorporated into the same graphic sign.” (ibid.)

Saussure’s observation regarding the practice of “writing in the air” (空書) by Chinese speakers underscores an important linguistic phenomenon: phonetic proximity leading to semantic ambiguity, resolved through recourse to writing. For example, the characters 画 (huà, “drawing”) and 话 (huà, “speech”) have similar pronunciations, causing potential confusion in spoken interaction. In such instances, speakers spontaneously draw the character in the air, visually disambiguating the intended meaning.

This example illustrates a significant limitation of phonetic writing: phonemic distinctions alone are insufficient to differentiate these “words.” However, through logographic disambiguation, meaning is immediately clarified. This effect arises precisely from the morphosyllabic nature of Chinese writing, which, as Sinologist John DeFrancis clearly defines, means that “each character is pronounced as a single syllable and represents a single morpheme.”²²

Therefore, the monosyllabic and morphemic nature of logographic characters significantly redefines the process of word identification compared to alphabetic writing. The symbolic economy of Chinese graphical signs does not function at the phonemic level. Given the monosyllabic and tonal structure of the Chinese language, phonetic distinctions emerge directly at the syllabic level, inherently semantic due to their morphemic nature. A telescoping effect thus occurs when relying exclusively on sequential, phonetic reading and writing methods.

Hence, we arrive at the concept we call the logographic hiatus.

2.1.2 Logographic Hiatus

Saussure limited his analysis of writing systems primarily to the phonetic system, exemplified by the Greek alphabet, because this system, according to him, “reflects language in a rather rational manner”:

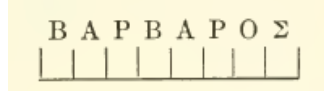
When first devised a phonetic alphabet—unless borrowed and already marked by inconsistencies—gives a fairly rational representation of language. With respect to logic, Greek is especially noteworthy (see p. 64). But the harmonious relation between writing and pronunciation does not last.²³

He further illustrates this point with the example of the word “*barbaros*” (“barbarian”):

²² Ibid, 125.

²³ Saussure, *Course in General Linguistics*, 27.

In the transcription of BAPBAPOS 'barbarian/ each letter corresponds to a homogeneous beat:



In the drawing above, the horizontal line stands for the phonetic chain, and the short vertical bars indicate passage from one sound to another.²⁴

This description idealizes a phonological, quasi-geometric alignment characteristic of the Greek system. If we recall the previously discussed schema F/f, temporal articulation F at the psychic level of the acoustic image corresponds exactly to articulation at the kinetic level of the articulatory chain, ensuring a homogeneous spatio-temporal correlation in verbal phonetic realization. From this idealized perspective, the Chinese writing system appears to disrupt—perhaps even to constitute a form of "barbarism"—the rational harmony envisaged by the Greek model.

We introduce the concept of "logographic hiatus" to designate this gap or discontinuity challenging the idealized phonographic linearity. The influence of suprasegmental factors makes it impossible to analyze language solely through sequential linear stages—from distinctive features → phoneme → morpheme → syntax, etc.

In the Chinese writing system, the logographic sign simultaneously synthesizes phonetic and semantic dimensions. Since the Chinese language is typologically *isolating* and *monosyllabic*, the semantic units are immediately bound to phonetic syllables. While the Greek alphabet differentiates and reduces word meaning to concatenations of discrete phonemic signs (phonemes without inherent meaning), Chinese writing distributes units of meaning without separating them from tonal syllabic units. Hence arises the polyphonic impression of Chinese writing; the graphic signs, largely composed of phonetic radicals (音符) and semantic radicals (意符), form square units spatially organized in a polyphonic rather than linear manner. This polyphony is multimodal, as the four-tone scalar system of the language sometimes incorporates gestures—at least virtually—in the act of writing/reading.

Consider the famous experimental poem by Zhao Yuanren: "The Lion-Eating Poet in the Stone Den" (Shī Shì shí shī shī)²⁵. Composed of 92 characters all pronounced "shi" with four different tones, the poem illustrates the complexity of Chinese homophony and the importance of tone distinctions. It narrates the story of a poet named Shi who loves eating lions, hunts ten of them, and returns to his stone den. This work serves as a linguistic demonstration of the limitations of phonetic transcription in Chinese.

The concept of logographic hiatus reveals a fundamental limitation of alphabetic linearity and offers a critical standpoint to reevaluate linguistic assumptions shaped by alphabetic phonocentrism.

2.1.3 The Grammatological Polyphony

Saussure's binary division of writing systems was categorical and abrupt, idealizing the Greek phonetic system by contrasting it sharply with the so-called "ideographic" Chinese

²⁴ Ibid, 39.

²⁵ "Shishi," Fa-Kuan Buddhist Monastery, accessed March 24, 2025, <http://www.fa-kuan.muc.de/SHISHI.RXML>.

system, as if these represented the only possible alternatives. Yet, as Saussure himself acknowledged, the reality of writing systems is inherently derivative: they are inevitably mixed and hybrid.

The logographic system indeed incorporates phonetic elements (more than 80% of Chinese characters are phonetic-semantic compounds, 形声文字)²⁶. Conversely, phonetic systems also develop internal logographic elements. Acronyms like C.L.G. (Cours de Linguistique Générale) operate logographically by indicating a unified meaning directly rather than through linear phonetic sequences. Similarly, Latin words such as EQUOS and ARBOR—used by Saussure to illustrate the concept of sign as the combination of signifier and signified—function as logographic markers, complemented by ideographic icons representing their signified meanings within phonetic systems. Regarding the reading of "common and ordinary word," Saussure himself states:

Reading is another issue. We read in two ways: a new or unknown word is spelled out letter by letter; but a common, ordinary word is embraced by a single glance, independently of its letters, so that the image of the whole word acquires an ideographic value. Here traditional orthography takes revenge. It is useful to distinguish between French *tant* 'so much' and *temps* 'weather'; 'et' and 'est' 'is,' and 'ait' 'have'; 'du' 'of the' and 'dû' 'had to'; *il devait* 'he owed' and *ils devaient* 'they owed,' etc.²⁷

How, then, should we reconsider the question of writing one century after Saussure? This calls for a redefinition of the semiological project as a whole. The grammatical impasse that motivated the initial split within Saussure's semiological linguistics must now be revisited. Overcoming this epistemological deadlock requires us to challenge both the entrenched ideographic conception of writing and the exclusively phonocentric conception of alphabetic writing.

This polyphonic characteristic of writing systems invites further investigation through contemporary neuroscientific perspectives, as we will explore next.

2.2 Logographic Brain

2.2.1 Logographic Brain

Saussure questioned the reading process itself, which fundamentally alters how written signs function. He observed that reading unfamiliar words letter-by-letter constitutes a phonological approach, whereas common and familiar words are grasped instantly at a glance. Modern neuroscience, especially research presented in Stanislas Dehaene's *Reading in the Brain*, provides detailed insights into this process:

Written word processing starts in our eyes. Only the center of the retina, called the fovea, has sufficient resolution to recognize small print. Our gaze must therefore constantly move across the page. With each eye fixation, we recognize only one or two words. Each word is fragmented by retinal neurons into myriad elements and must be recomposed before recognition. Our visual

²⁶ John DeFrancis, *The Chinese Language: Fact and Fantasy*, Chapter 4: "Ideographic Myth," 89–90

²⁷ Saussure, *Course in General Linguistics*, 34.

system progressively extracts graphemes, syllables, prefixes, suffixes, and word roots. Eventually, two primary parallel processing routes become active: the phonological route, converting letters into speech sounds, and the lexical route, providing direct access to a mental dictionary of word meanings.²⁸

Even during Saussure's time, neurological studies on alexia or agraphia attempted to identify cerebral centers responsible for writing activities, notably Déjerine's work on the Visual Centre for letters and H. Grashey's model. Today, we recognize the "Visual Word Form Area (VWFA)," which Stanislas Dehaene refers to as "the brain's letter box." This functional region, located in the left fusiform gyrus and surrounding cortex (the right-hand side being part of the fusiform face area), is hypothesized to identify words and letters from lower-level visual shapes prior to their association with phonology or semantics. Although distinct neural routes exist for phonetic and logographic reading systems, the VWFA is universally recognized as the cerebral center for scriptural activity across writing systems.

2.2.2 The Chinese Letter Box

Dehaene's reading model, known as the "Neuronal Recycling Hypothesis," suggests reading repurposes existing brain structures evolved for visual object recognition—particularly the VWFA located in the left fusiform gyrus. He identifies two primary neural pathways involved: a dorsal phonological route (occipital-temporal-parietal-frontal), crucial for phoneme-level decoding, and a ventral semantic route (occipital-temporal-frontal), enabling direct visual-semantic access among skilled readers.

This model aligns partially with the reading processes in Chinese. Studies confirm the central role of the VWFA in recognizing Chinese characters. While both phonological and semantic routes are active, Chinese readers rely heavily on direct visual-to-semantic processing due to the opacity of phoneme-grapheme correspondence. Additionally, phonological processing in Chinese occurs at the morpheme level, predominantly engaging the left middle frontal gyrus (MFG) to integrate phonological and semantic information²⁹.

Furthermore, due to the visual complexity of Chinese characters, the right hemisphere, responsible for shape and spatial analysis, plays a more significant role (Tan et al., 2005)³⁰. Thus, adapting Dehaene's model to Chinese reading must emphasize the semantic pathway, highlight the role of the left MFG, and acknowledge increased right-hemisphere involvement:

Writing Gesture: Understanding the critical role of motor systems in writing enhances our grasp of the cognitive mechanisms involved in logographic reading and writing. Neuropsychological studies on languages employing Chinese characters (hànzì/kanji), such as Chinese and Japanese, underscore the significant involvement of motor systems associated with handwriting movements in character recognition. Unlike alphabetic letters, kanji possess complex spatial structures that require precise motor skills during writing, thereby activating

²⁸ Stanislas Dehaene, *Reading in the Brain: The New Science of How We Read* (New York: Penguin Books, 2010). 11.

²⁹ Wu, C.-Y., Ho, M.-H. R., & Chen, S.-H. A. (2012). A meta-analysis of fMRI studies on Chinese orthographic, phonological, and semantic processing. *NeuroImage*, 63(1), 381–391. <https://doi.org/10.1016/j.neuroimage.2012.06.047>

³⁰ Li Hai Tan, Angela R. Laird, Kang Li, and Peter T. Fox, "Neural Systems of Second Language Reading Are Shaped by Native Language," *Human Brain Mapping* 25, no. 1 (2005): 39–47, <https://doi.org/10.1002/hbm.20134>.

motor-related brain regions including the left premotor cortex and supplementary motor area. Research indicates that motor memory from handwriting strongly integrates with visual memory during hànzì/kanji learning, establishing robust neural representations. Consequently, native speakers tend to activate these motor patterns during kanji recall and recognition. Additionally, the practice of "air writing" (kūsho 空書)—tracing characters in the air without physical writing—enhances kanji recognition and memory by stimulating the motor cortex. Clinical studies on Japanese patients with agraphia (writing disorders) further illustrate that relearning kanji through handwriting significantly facilitates the recovery of reading and recognition skills. Thus, motor actions integral to handwriting are critically intertwined with cognitive processes underlying kanji perception and memory.

Phonetic-Semantic Compound Characters: Analyzing the neural activation patterns of semantic and phonetic radicals helps us understand the integrative nature of logographic processing. Hànzì/Kanji characters, widely used in Chinese and Japanese, predominantly consist of phonetic-semantic compounds, comprising distinct semantic and phonetic radicals. Neuropsychological studies demonstrate these two components activate separate neural pathways during hànzì/kanji recognition.

Firstly, semantic radicals mainly activate semantic processing regions such as the posterior left temporal cortex, anterior-to-middle fusiform gyrus, and inferior temporal gyrus. In contrast, phonetic radicals strongly stimulate phonological processing regions including the superior temporal gyrus, superior temporal sulcus, and the left inferior frontal gyrus near Broca's area.

Secondly, event-related potential (ERP) studies reveal distinct temporal processing dynamics for semantic and phonetic radicals.³¹

Thirdly, functional MRI studies support these findings: semantic-radical tasks significantly activate semantic processing areas such as the posterior middle temporal and fusiform gyri, whereas phonetic-radical tasks activate phonological processing regions, particularly the left inferior frontal and superior temporal gyri.

Fourthly, clinical studies involving dyslexic individuals highlight differential impairments: semantic processing deficits often impair recognition of semantic radicals, while phonological deficits hinder the reading of kanji containing phonetic radicals.

Finally, psycholinguistic research indicates both native and non-native kanji learners employ strategies involving both radical types. Native speakers, however, integrate semantic and phonetic information more efficiently during hànzì/kanji acquisition.

Therefore, distinguishing between semantic and phonetic radicals is vital for understanding the cognitive and neural mechanisms underpinning kanji reading.

Tonal Language: Investigating tonal processing provides essential insights into how auditory and semantic information jointly shape the neural processing in tonal languages like Mandarin Chinese. Numerous neuropsychological studies on Mandarin Chinese, a tonal language, explore phonological reading. Lexical tones—pitch variations distinguishing word meanings—activate different neural pathways than non-tonal phonological elements

³¹ Chun-Hsien Hsu, Jie-Li Tsai, Chia-Ying Lee, and Ovid J.-L. Tzeng, "Orthographic Combinability and Phonological Consistency Effects in Reading Chinese Phonograms: An Event-Related Potential Study," *Brain and Language* 108, no. 1 (2009): 56–66, <https://doi.org/10.1016/j.bandl.2008.09.002>.

(consonants and vowels)³². Lexical tone processing prominently engages the left inferior frontal gyrus (Broca's area) and right hemisphere frontal and temporal regions. Non-tonal elements primarily stimulate left-hemisphere language regions, highlighting hemispheric functional specialization. ERP studies demonstrate rapid lexical tone discrimination (~200 ms) with notable right-hemispheric involvement. Functional MRI studies confirm tone processing activates frontal-temporal networks. Dyslexic Chinese readers show specific tone discrimination impairments linked to right-hemispheric dysfunction, contrasting with left-hemispheric deficits related to non-tonal phonological processing. Neuropsychological evidence thus underscores the unique neural mechanisms involved in tonal versus non-tonal processing in Chinese reading.

2.3 Towards a Neuro-Grammatology

Integrating insights from cognitive neuroscience and grammatology, this final section outlines a novel theoretical framework—neuro-grammatology—that addresses fundamental questions raised by Saussure's legacy from a contemporary neurological perspective.

Changizi et al.'s Universal Distribution Hypothesis³³ and Stanislas Dehaene's Neuronal Recycling Hypothesis offer complementary insights into how and why human writing systems have acquired their specific forms and structures.

According to Dehaene's *Neuronal Recycling Hypothesis*, reading is a relatively recent cultural invention—only a few thousand years old. Consequently, the human brain has not evolved neural circuits explicitly dedicated to reading. Instead, it has repurposed or "recycled" pre-existing neural circuits originally evolved for object recognition. In particular, Dehaene identifies the Visual Word Form Area (VWFA), located in the fusiform gyrus, as optimally adapted for recognizing object shapes and contours. Human writing systems, therefore, evolved culturally into shapes that precisely match these pre-existing neural constraints, enabling efficient visual processing.

Changizi et al.'s *Universal Distribution Hypothesis* complements Dehaene's theory by demonstrating that the visual shapes of symbols, letters, and writing systems have culturally evolved to reflect contour patterns commonly found in natural environments. Human visual symbols are thus not arbitrary; their structures closely align with topological patterns the human visual system evolved to detect and efficiently process in nature. Changizi et al. thereby provide an ecological explanation for the universal recognition and efficient processing of certain visual forms by the human brain.

Additionally, Changizi et al. emphasize that these foundational visual shapes are notably simple, typically comprising no more than three strokes. This constraint underscores another significant dimension of human writing systems: motor practicality or stroke economy. In other words, the basic graphemes that underpin written symbols are visually efficient and also simple and practical to execute manually, further facilitating their cultural adoption and transmission.

³² Yue Wang, Joan A. Sereno, Allard Jongman, and Joy Hirsch, "fMRI Evidence for Cortical Modification during Learning of Mandarin Lexical Tone," *Journal of Cognitive Neuroscience* 15, no. 7 (2003): 1019–1027.

³³ Mark A. Changizi, Qiong Zhang, Hao Ye, and Shinsuke Shimojo, "The Structures of Letters and Symbols throughout Human History Are Selected to Match Those Found in Objects in Natural Scenes," *The American Naturalist* 167, no. 5 (May 2006): E117–E139, <https://doi.org/10.1086/502806>.

Together, these theories converge toward a comprehensive understanding of human literacy. The forms of human writing systems arise from the intersection of multiple factors:

Ecological adaptation, reflecting culturally prevalent contour configurations found in natural environments (Changizi et al.).

Neurological efficiency, adapting to pre-existing brain circuits specialized for visual object recognition (Dehaene).

Motor efficiency, utilizing simple, easily executable shapes comprising three or fewer strokes, thereby facilitating manual production (Changizi et al.).

Consequently, the shapes of human letters and symbols represent an optimal solution resulting from the intricate interplay of visual, ecological, neurological, and motor constraints. This interplay vividly illustrates the profound interconnectedness among the brain, body, culture, and environment in shaping human literacy.

These theories together offer a comprehensive neuro-cognitive explanation of human literacy, which emerges at the intersection of ecological adaptation, neural efficiency, and motor practicality. This integrated framework vividly illustrates the profound interconnectedness between brain, body, culture, and environment in shaping human literacy.

The integration of cognitive neuroscience into grammatological and semiological studies invites a fundamental reconsideration and renewal of theoretical research. It allows for a universal, neurologically-grounded theory of graphemes. Thus, *neuro-grammatology* represents a pivotal development, opening promising interdisciplinary pathways that significantly expand our understanding of language, writing, cognition, and culture.

The emerging perspective of neuro-grammatology not only grounds theoretical approaches in linguistic and semiotic research on neuroscientific findings but also opens innovative avenues for future interdisciplinary studies in language, culture, and cognition.

3. Grammatology and Digital Writing

« *La mondialatinisation est une alliance étrange du christianisme, comme expérience de la mort de dieu, et du capitalisme télé-technoscientifique.* » (Jacques Derrida *Foi et Savoir*)³⁴

3.1 Assisted Writing

For example, in the Japanese writing system, digital writing mobilizes all scriptural resources through a dual-layered assisted writing system. At the human-linguistic processing stage, my input begins at the phonemic level using Roman *romaji* characters, which are converted by the word processor into syllabic *kana* script. Subsequently, these *kana* are integrated with logographic *kanji* characters to form morphemes, words, syntagms, and eventually complete sentences. This reflects a complex, multi-tiered encoding process transitioning from phonemic representation through morphemic and syntactic structures.

³⁴ Jacques Derrida, *Foi et Savoir, suivi de Le Siècle et le Pardon* (Paris, Seuil, 1996), 34.

At the computational machine-processing stage, keyboard input, initially encoded in ASCII or Unicode, undergoes a layered abstraction. The input handling and text encoding first occur at a high-level source code stage, followed by a transformation into assembly language for low-level operational instructions, finally culminating in execution at the binary machine language level. This systematic reduction moves from symbolic complexity towards executable computational instructions.

Thus, assisted writing represents a complex semiotic operation where human writing systems (natural language) and machine languages (formal digital languages) interact. This interplay occurs as a form of *semiotic translation*, crossing multiple levels of linguistic encoding (phonemic, syllabic, logographic) and computational encoding (symbolic, logical, and binary structures), which can neither be purely phonographic nor logographic.

Machine language, therefore, structures the operations of digital writing by abstracting meaning into formal computational instructions, thereby enacting a *semiotic reduction*. This process results in a universal reduction of meaning, described as an *Epoché of Writing*, where symbolic systems from both Western phonocentric traditions and Eastern logographic traditions are equally subject to suspension of their intrinsic meanings. Ultimately, digital writing enacts an *Epoché of Universal Semiosis*, suspending meaning across all symbolic systems through computational abstraction.

When considering auto-completion and generative AI, the assisted writing system expands into a three-stage process: (1) human input, (2) AI prediction and generation, and (3) machine execution. In this extended framework, digital writing transitions from a purely assistive role into a generative and predictive interaction, significantly altering its semiotic and epistemic dimensions. Writing becomes a hybridized dialogue, where the AI anticipates and generates textual units before human authors fully inscribe their intentions.

Generative AI introduces probabilistic meaning, suspending human intentionality and traditional semiotic reference. Text emerges from statistical inference based on existing corpora rather than solely from human cognitive processes, deepening the Epoché of Universal Semiosis. AI-generated text acts neither fully phonographically nor logographically; instead, it occupies a liminal space characterized by predictive generation, transcending traditional semiotic boundaries.

This evolution toward predictive and generative writing implicates broader epistemological shifts. The role of the human writer transitions from active originator to curator and validator of AI-generated content. Consequently, digital writing moves toward a *post-authorial semiotics*, where meaning is perpetually suspended, reshaped, and reconstituted through computational prediction. Ultimately, generative AI extends and intensifies the Epoché of Writing, potentially leading to either a universal semiotic system devoid of human-centric intentionality or the collapse of writing as a distinct epistemic act, leaving behind a closed circuit of self-referential probabilistic inscription.

As demonstrated, digitally assisted writing processes involve complex semiotic translations between human language and machine language. As these semiotic interactions deepen, language processing technologies such as NLP and ASR increasingly highlight new challenges inherent to digital writing systems. These challenges are precisely what we will examine in the following section.

3.2 Natural Language Processing and the Problem of Writing

Typing on keyboards and Automatic Speech Recognition (ASR) are two distinct yet structurally related methods of text input. Both processes share fundamental stages, despite their different input modalities.

First, at the input stage, typing uses physical or virtual keyboards, whereas ASR involves capturing and analyzing audio signals as waveforms. Next, during phoneme and character conversion, in Japanese case, typed text moves from romaji to kana scripts (hiragana or katakana) using Input Method Editors (IME), while ASR converts audio signals into phonemes, and subsequently into written text through speech-to-text processes.

Both methods then rely on morphological analysis and word recognition. In typing, kana characters are converted into kanji characters, aided by part-of-speech tagging. In ASR, textual output undergoes morphological segmentation and context-based analysis to identify correct words.

At the syntactic parsing level, typing often uses auto-completion to suggest or complete phrases (e.g., expanding "hello" into "hello, how are you today?"). Similarly, ASR employs syntactic parsing to organize recognized text into coherent sentence structures (e.g., transforming "I saw a movie yesterday" into "I saw a movie, yesterday."). Finally, both typing and ASR systems perform semantic analysis and prediction, with typing providing context-sensitive text suggestions via AI, and ASR applying language models to enhance accuracy and clarity.

However, significant differences remain between typing and ASR, presenting unique challenges for speech recognition. ASR must address the ambiguity of word boundaries, especially in languages without clear word separations like Japanese, Chinese, or Korean. Typing explicitly resolves such ambiguities through deliberate user actions (e.g., pressing the conversion key).

Moreover, ASR must navigate phonological variations, such as elision, liaison, or Japanese sound shifts (onbin 音便), distinguishing subtle differences like "itte" versus "行っ て." Typing does not typically encounter these complexities. The application of language models also differs significantly between the two. While typing closely follows user intent, ASR relies heavily on language models to correct recognition errors and produce coherent textual outputs.

Advancements in generative AI and auto-completion technologies are increasingly blurring the lines between typing and ASR. Predictive text capabilities, such as those offered by models like GPT-4, enhance the precision and efficiency of both typing and ASR by predicting subsequent words and phrases.

These technological advancements are transforming traditional writing practices. Previously, writing was a fully intentional act, requiring manual input of each word. Now, AI-driven auto-completion enables text generation that blends voice commands with automatic text completions, creating a new, hybrid form of writing.

Additionally, AI integration may reduce the significance of specific script systems, potentially making the choice between alphabets (Latin, kanji, hangul) less critical. Adaptive ASR combined with AI-generated text could allow for fluid and flexible transitions between various writing systems.

In conclusion, typing and ASR, historically separate methods of input, are converging through AI developments. As AI-driven technologies become increasingly sophisticated, distinctions between manual typing and voice input diminish, transforming both into starting points for AI-enhanced text production. This integration suggests a move toward a universal, multilingual textual output driven by spoken language, potentially giving rise to a fundamentally new culture of writing.

The semiotic and semantic challenges posed by digital technologies extend beyond technical considerations alone; they carry significant cultural and epistemological implications. In particular, the cultural and civilizational impacts resulting from digital semiotic processes warrant further exploration. The next section delves into these issues through the lens of Derrida's concept of "Mondialatinisation".

3.3 Mondialatinisation and Digital Writing

The issues previously discussed in digital writing technologies fundamentally relate to the cultural and semiotic dominance rooted in Western-derived alphabetic systems. This section explores 'Mondialatinisation,' highlighting how digital writing systems perpetuate and reinforce cultural and civilizational hegemonies.

① Latin Script and the Dominance of Writing Systems

What Derrida critically engages with through the concept of "Mondialatinisation" is the global dominance and universalization of Western, Latin-based writing systems, particularly the Latin alphabet. This dominance is evident in languages such as Japanese and Chinese, traditionally reliant on logographic scripts (Kanji, Hanzi), now increasingly mediated through Latin-script input systems:

Japanese: Kanji/Kana → Romaji (Latin alphabet) input

Chinese: Hanzi → Pinyin (Latin alphabet) input

Such linguistic mediation through the Latin alphabet has created structural dependencies on Western writing paradigms, reshaping linguistic practices and their epistemic foundations.

② Writing Systems and Cognitive Mediation

Romaji and Pinyin are not merely practical solutions; rather, they hold the potential to fundamentally reshape linguistic thought and cognitive processes. Derrida asserts that "écriture" (writing) is never a neutral medium but profoundly influences modes of thought and perception. Habitual reliance on Latin-based transcription methods for Japanese and Chinese subtly aligns these languages and cultures with Western logocentric and phonocentric conceptual frameworks. This exemplifies the cultural violence implicit in Mondialatinisation.

③ Phonocentric Implications

Both Romaji and Pinyin function fundamentally as phonetic transcription systems. Derrida, particularly in *Of Grammatology*, critiques Western logocentrism for its intrinsic phonocentric biases—the prioritization of speech and sound over visual and semantic representation. The Latin alphabet seeks an ideal alignment of sound and letter, presupposing speech as language's

essence. Conversely, Japanese and Chinese writing historically emphasize semantic and pictographic elements within characters. Romaji and Pinyin methods inherently privilege phonetic representation, diminishing the multidimensional semantic richness embedded in East Asian logographic scripts. Thus, these input methods inadvertently impose a phonocentric Western paradigm, epitomizing the unconscious hegemonic homogenization Derrida critiques.

④ **Romaji and Pinyin as Illustrations of Mondialatinisation**

Therefore, Romaji input for Japanese and Pinyin input for Chinese embody Derrida's notion of Mondialatinisation. By mediating East Asian languages through Western alphabetic systems, these practices risk subtly subordinating linguistic diversity and cultural specificity to Western epistemological and linguistic frameworks. Thus, Romaji and Pinyin represent far more than technical conveniences—they signify broader cultural and ideological hegemonies characteristic of Mondialatinisation.

3.4 Digital Culture Gap and the Logographic Hiatus

① **The Concept of the Logographic Hiatus**

Languages such as Japanese and Chinese inherently contain rich visual-semantic information deeply embedded within their logographic scripts (Kanji, Hanzi). However, when mediated through phonetic input systems, such as Romaji or Pinyin, users lose direct access to this inherent semantic content. This semantic gap—defined here as the "logographic hiatus"—highlights the fundamental disconnect between phonetic representation and logographic meaning.

② **Generalizing the Logographic Hiatus**

Beyond Japanese and Chinese, the concept of the logographic hiatus raises broader questions about the relationship between written scripts and languages more generally. It challenges the assumption that linear phonetic models characteristic of alphabetic writing systems can adequately capture and support the rich semantic and cultural specificity inherent in diverse global writing traditions. The logographic hiatus thus symbolizes a broader issue: the inadequacy of linear phonetic paradigms to universally represent the semantics and cultural identities embedded in various forms of writing.

③ **Computational Attempts to Bridge the Hiatus**

Contemporary computational methods attempt to address this hiatus using probabilistic techniques, including:

- N-gram language models
- Neural network-based contextual inference
- Advanced deep learning approaches (e.g., Transformers, BERT)

However, these statistical methods merely predict semantic meanings and morphological structures probabilistically. They do not directly access the intrinsic visual-semantic cultural knowledge uniquely embedded within logographic and diverse global writing systems.

④ **Dependence of ASR on Orthographic Mediation**

Current Automatic Speech Recognition (ASR) systems fundamentally rely on orthographic mediation, converting spoken language initially into phonetic forms (e.g., Romaji, Pinyin) and subsequently into logographic representations. Consequently, semantic comprehension remains contingent upon character-level textual mediation, underscoring the essential limitation posed by the logographic hiatus.

⑤ **Data Processing and Parallel Distributed Computing**

The issue of the logographic hiatus extends into broader considerations of data processing. Cultural archives increasingly accumulate as digital data, indicating the potential for computational parallel distributed processing models fundamentally different from traditional linear models associated with alphabetic writing systems. The visual and simultaneous parallel processing inherent in logographic scripts like Kanji or Hanzi exemplifies potential non-linear information processing principles previously unexplored in computational contexts. Thus, the logographic hiatus may reveal novel computational methodologies better aligned with the inherent complexity and non-linearity of cultural data representation.

⑥ **Broader Cultural and Technological Implications**

The logographic hiatus transcends technological concerns, encapsulating broader issues such as:

- Cultural specificity embedded within distinct writing systems (*écriture*)
- Inherent linkage between orthographic representation and semantic meaning
- The broader implications for linguistic and cultural diversity in an increasingly digital and globalized world

Effectively bridging this hiatus requires not only advancements in probabilistic inference but also innovative multimodal approaches explicitly integrating the visual-semantic content of diverse writing systems. Until these technologies emerge, ASR and related digital writing systems will continue encountering fundamental limitations symbolized by the logographic hiatus, underscoring the necessity for culturally sensitive and technologically innovative solutions.

4. Conclusion Remark: The Future of Digital Writing

Throughout Part III, we have explored the profound transformations in writing systems prompted by digital technologies, examining their semiotic, technical, and cultural dimensions. Finally, we revisit the underlying cultural and civilizational issues embedded within digital writing environments through the concept of 'Mondialatinisation,' clarifying fundamental challenges and outlining future perspectives and considerations.

① **Persistence of Mondialatinisation in the Digital Era**

Even within a globally connected digital landscape enabled by AI and computational technologies, underlying standards of linguistic representation remain dominated by Western alphabetical and phonocentric paradigms. For logographic-based languages particularly,

reliance on alphabetic input methods perpetuates the semantic and cultural gaps symbolized by the logographic hiatus.

② **Aporia of Digital Universalism**

Contemporary digital universalism thus contains a fundamental contradiction: while technological interfaces aspire toward universality and neutrality, they remain inherently anchored in specific cultural and linguistic traditions. Despite claims to universality, digital media inadvertently reproduce linguistic, cultural, and epistemological hegemonies.

③ **Mondialatinisation as a Comprehensive Civilizational Issue**

This condition exemplifies Derrida's central critique of Mondialatinisation, highlighting broad civilizational challenges across multiple dimensions:

- Linguistic: Dominance of phonocentric writing systems
- Cultural: Frictions between Asian traditions and Western models
- Political: Reproduction of cultural imperialism through digital globalization
- Religious and epistemic: Universalization of Western-derived categories
- Geopolitical: Shifts in global power dynamics mediated by digital infrastructures

In conclusion, even within the ostensibly universal digital communication framework enabled by advanced computational technologies, Derrida's critique of Mondialatinisation and its inherent aporias persist. These issues raise profound civilizational questions requiring critical examination across linguistic, cultural, political, religious, and geopolitical dimensions, underscoring the continuing need for rigorous engagement with digital media, language technologies, and their broader cultural implications.

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