

Takeluma: An Exploration of Sound, Meaning, and Writing



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0. Abstract

Modern linguistic theory suggests that the sign is arbitrary, that the relationship between signifier and signified has no discernible pattern. (“Dog” could mean cat, and vice versa.) Marketing experts and advertisers, those who create names for new products, think otherwise, that the sounds of words and neologisms can evoke images which elicit an emotional impact. Different sounds can “feel” sharp or dull, for example; they can give a phenomenological response. Poets, of course, realize that the sounds words make can be used towards expressive means. While morphemes—roots, prefixes and suffixes—have generally been considered the base level of meaning, some studies suggest that phonemes can influence meaning on a subconscious level, perhaps resulting from the physiology of how we produce different sounds in speech.

In this paper and accompanying project, I am interested in the relationship between spoken and written language and will look at examples in which meaning plays an integral role in how speech and writing are represented. I will be looking at cases in which the signifier and signified connect in ways Saussure would not have expected. I am especially interested in what might be considered a synaesthetic result: sound and vision are tightly coupled, tied together through meaning. This paper will explore the relationships among issues of sound, writing, meaning, the machine, the line, and the body, by considering previous explorations including invented alphabets, phonetic writing systems, machines for automatic transcription of speech, among others.

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1. Introduction

The roots of human speech are the sound correspondences of powers which in their combination and interaction make up the universe.

—A.E. (George Russell, 1867-1835)

Each Letter is a strictly individual world, a symbolic concentration which gives us an exact definition of internal and external essence.

—Vasily Kamensky (1884-1961)

Ferdinand de Saussure's influential theory of semiology clearly states in Principle I: "The bond between the signifier and the signified is arbitrary."¹ Modern linguistics is built upon this presupposition—that the relationship between the signifier (or sound-image) in a language and the signified, or concept, has no direct, discernible pattern. According to Saussure, these relationships are based solely on convention and collective behavior. This preliminary assumption of the Saussurean model, however, has been complicated and challenged in a number of ways since the time it was published. Poets and writers, of course, realize that the sounds words make can be used towards expressive means beyond their purely symantic content. The sounds of words can "feel" sharp or dull, for example; they can give a phenomenological or kinesthetic response. Marketeers and advertisers, those who create names for new products, use this knowledge to great effect, seeking the ways spoken words (and neologisms) can evoke images and elicit an emotional impact. While morphemes—roots, prefixes and suffixes—are generally considered the foundation of meaning, some evidence shows that phoneme sounds, situated at a lower level, can influence meaning subconsciously. This influence comes in some part from other words in the given language which contain the same phonemes or sequences of phonemes, but it may also be related to the physiology of how we produce different sounds in speech. Recent research into sound symbolism finds that sound and meaning can be related in several ways: by onomatopoeia, the imitation of sounds in speech; by clustering, the concentration of concepts around specific phonemes; or by iconism, the direct, unmediated, visceral effect of a sound on a listener.

In Saussure's view, speech is the locus of the language system, with writing

playing a secondary role: “Language and writing are two distinct systems of signs; the second exists for the sole purpose of representing the first. The linguistic object is not both the written and the spoken forms of words; the spoken forms alone constitute the object.”² While his linguistic theories deal primarily with the spoken word, Saussure recognizes that for literate people, the written word carries power and influence: “People attach even more importance to the written image of a vocal sign than to the sign itself.”³ In his exploration of literary and oral cultures, Walter Ong elaborates on this point, discussing how the technology of writing has transformed consciousness because of its visibility and relative stability: “Writing makes ‘words’ appear similar to things because we think of words as the visible marks signaling words to decoders: we can see and touch such inscribed ‘words’ in texts and books.”⁴ Writing plays an integral part in how we think about language—we find it difficult to imagine or contemplate a word in our minds without also picturing the word in its written form.

Writing, like speech, can carry meaning at a level beyond the symbolic letters and words that appear on a surface. A hastily written note could reveal a person’s agitated state, or if we trust graphology—the study of handwriting and its connection to behavior, personal information and other human traits—a handwritten statement can reveal aspects of the writer’s personality. A printed typeface can appear solid and classic, light and ephemeral, or fashionable and contemporary. Moving typography adds yet another dimension to the written message. Comparing written and spoken language, however, we find that these examples may be more akin to how tonality or inflection, the different ways words might be spoken, affect a message, rather than relating to hidden meanings intrinsic within the written marks themselves. A writing analog to the theory of sound symbolism would ask whether the letterform shapes themselves might carry meaning beyond what words they spell. This line of inquiry points toward some historical examples, for instance ancient runes that represented oracles or tools for divination.

In this paper and accompanying project, I am interested in exploring the relationship between spoken and written language. The accompanying project involves the creation of an alternative writing system to represent the spoken English language. Graphic and dynamic in nature, the system draws from ideas of

sound symbolism. In my research into the historical and theoretical background for this work, I will explore examples in which meaning plays an integral role in how speech and writing are represented. I will be examining cases in which the signifier and signified connect in ways Saussure would not have expected. I am especially interested in what might be considered a synesthetic result: sound and vision tightly coupled, tied together through meaning. Throughout the paper, I will discuss the creative possibilities for interrogating the relationships among writing, speech, and meaning, especially different artists' strategies for putting assumptions about these interrelations to question.

In chapter two, I will discuss the theory of sound symbolism, looking at recent linguistic research and other empirical studies into the emotional power of different speech sounds. I will explore the different ways sounds can carry meaning below the word or morpheme level. In this section I will also look at artistic inquiries into speech and meaning, for example works of sound poetry by Dadaists Hugo Ball and Kurt Schwitters.

Chapter three deals with phonetic writing systems, specifically the alphabet. Histories of the alphabet are often tied up with hypotheses and myths about the origin of letterforms. During Greek and Roman times, written words were believed to have magical powers, "the power to curse, to heal, to empower, and to constrain."⁵ The letterforms of Hangul, the Korean alphabet developed in the mid-1400s, a major influence on my project, were constructed using two very different schema: consonants originated from physical morphology as illustrations of how sounds are produced, and vowels were based on philosophy about man, heaven, and earth. I will also discuss historical trends to rationalize the Roman alphabet through typographic design or linguistic and literary study. Artists, writers, and designers as diverse as Herbert Bayer, George Bernard Shaw, and Eric Gill have made various proposals for a universal or phonetic alphabet as a logical evolution of how we read and write. In this section, I will also refer to examples of inventive alphabets in the visual arts, particularly works by Henri Michaux.

As a work of media art, the accompanying project must also be evaluated within a context of computer and technological mediation. In chapter four of this paper,

I will examine historical examples of machines that connect speech to the visible or physical domains, either through mechanized inscription and sound production. Phonography and sound recording, pioneered in the late 1800s, represent the inscriptive and reproductive side of these technological developments. I will look at how the line has been used by graphic recording instruments to represent sound. Speaking machines, beginning as early as 1771 with an invention by Erasmus Darwin, represent another aspect of technological advancement, that of sound generation. A present-day media artist, Martin Riches, has used speaking machines in some of his works. I will extend this discussion of sound the machine with an exploration of different ways sound, machine, line, and body can relate to one another in historical examples, our daily lives, and the arts.

In the fifth chapter, I will describe the accompanying project, detailing the sound-visual system and the work as installation, and in the final chapter, I will present concluding remarks and thoughts for future exploration. Walter Ong describes the “pre-emptiveness of literacy,” stating that though “words are grounded in oral speech, writing tyrannically locks them into a visual field forever.”⁶ The literate individual cannot retain a purely oral text without resorting to picturing its written representation. The exercise of creating an alternative writing system when we already have one so engrained in our consciousness can be seen only as an exploratory and expressive undertaking. I am not proposing an alphabet to replace the twenty-six letters; rather, I am suggesting an alternative system which questions how we view the relationships among spoken language, meaning, and writing.

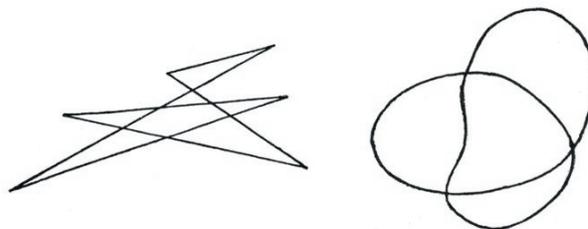
2. Sound Symbolism

A letter added or left out—the sound of a vowel or consonant modified—and a host of associations is admitted within the gates.

—James Joyce, *Finnegan's Wake*

Sound symbolic research, the study of the relationship between the sound of an utterance and its meaning, has become a matter of interest in a number of fields, including linguistics, marketing, and artistic practice. The suggestion of the possible direct connection between sound and meaning (also called phonosemantics) appears in work as early as Plato's dialogue *Cratylus*. Several twentieth century scholars since Saussure have been interested in this field. A notable example is the Danish linguist Otto Jespersen, who believed that sound symbolism not only accounts for the etymology of some words but operates continuously to make words more appropriate to their meaning: "Sound symbolism, we may say, makes some words much more fit to survive."⁷ While an engaging topic for practitioners and scholars of language, sound symbolism research, it is important to note, falls into a descriptive rather than a predictive or explanatory realm. For many modern linguists, particularly followers of Saussure and Noam Chomsky, the fact that sound symbolism, as it has been studied to date, cannot be used to explain or predict new patterns in language is reason enough to discredit the topic as serious, academic study. In this discussion, however, I am interested not so much in a systematic approach to the topic but rather in exploring how the sound-to-meaning connection in language can exhibit itself in different ways and how these relationships can be employed both practically and artistically.

Several cognitive psychology studies have demonstrated a seemingly natural mapping between sound and image. An experiment first developed in 1929 and often repeated, asks subjects to match images like the ones below to the nonsense words "maluma" and "takete" (in other instances, "bouba"/"kiki").⁸



These studies show that 95% of respondents connect the left image with “takete” and the one on the right with “maluma.” The sharp changes in the visual direction of lines on the left correspond to the sharp phonemic inflections of the sound “takete,” while the smooth lines of the right-hand figure mimic the fluid sound of “maluma.” In Ramachandran’s discussion of these experiments, the author writes that the result “suggests that there may be natural constraints on the ways in which sounds are mapped on to objects.”⁹ This experiment points toward a more general question of how we relate between different senses. We use metaphor to relate between our sense of sound and other sense dimensions. Sounds can be described as: shallow, deep, or hollow; bright or dark; hard, rough, or smooth. The reverse relationship is also possible: we can use sounds to describe visual or tactile phenomena exhibiting these characteristics.

Direct linkages between sound and meaning can exist at several levels of vocal or verbal communication: at a corporeal, an imitative, or a synesthetic level, or as conventional sound symbolism.¹⁰ At the most basic level, pre-verbal sounds of the body can be used for communicative functions. Depending on the context, a shout, a groan, a laugh, or a clearing of the throat can express one’s desires or needs.¹¹ Imitative sound symbolism occurs at one level above the corporeal, with onomatopoeic words and phrases (e.g. *knock, swish, snap, ding-dong*) representing environmental sounds.

Synesthetic sound symbolism is the third level, defined as the acoustic symbolization of non-acoustic phenomena. In this type of sound symbolism, certain vowels, consonants, or intonations are chosen to represent visual or tactile properties of objects. Synesthetic sound symbolism is also invoked when a speaker prolongs certain sounds (*hu-u-uge*), alters intonation, or makes vowel sounds deeper or more shallow to convey added information. One example of synesthetic sound symbolism can be seen in evidence that across all languages, words denoting or connoting smallness tend to contain high, front vowels, while words of largeness exhibit low, back vowels.¹² In English, the sound symbolic colloquial words *teeny, wee,* and *itsy-bitsy,* versus words such as *humongous, large,* and *grand,* exemplify this phenomenon, as do *skinny* and *fat.* (Notable exceptions to this pattern in English are

the common words *small* and *big*.) Where a word does not fit the expected vowel pattern, however, we find we have a tendency in our speech to deepen and prolong sounds to make the word sound larger: as in, “He caught a bi-i-ig fish.” The French philosopher Gaston Bachelard alludes to synesthetic sound symbolism in *The Poetics of Space*. In his phenomenological ruminations on Baudelaire’s use of *vast* (or, “*vaste*” in the original French), a word that “brings calm and unity; it opens up unlimited space,” Bachelard writes:

In the word *vast*, the vowel *a* retains all the virtues of an enlarging vocal agent. Considered vocally, therefore, this word is no longer merely dimensional. Like some soft substance, it receives the balsamic powers of infinite calm. With it, we take infinity into our lungs, and through it, we breathe cosmically, far from human anguish.¹³

Bachelard credits the component sounds of words with great power: “At times the sound of a vocable, or the force of a letter, reveals and defines the real thought attached to a word.”¹⁴

Conventional sound symbolism, or clustering, represents the least direct but most complex level of connection between sound and meaning. In conventional sound symbolism, we see clusters of semantically related words containing the same phonemes, generally consonant sounds. Unlike the previous categories which may work cross-linguistically and cross-culturally, this type of sound symbolism is generally language-specific. For instance, a cluster of words beginning with *gl* in English deals with qualities of reflected light: *glisten*, *glitter*, *glimmer*, *glass*, *glow*, *gleam*. While semantically related words may cluster around certain sounds, however, the meanings of those sounds are not singular or pre-defined. A second, smaller cluster of words beginning with the same phoneme sequence *gl* has another connotation relating to the quality of being stuck: *glom*, *glut*, *glue*. The semantic and emotional connotations of different sounds plays a large role in marketing, especially in the creation of names for commercial products and services. Lexicon Branding, a company in Sausalito, California responsible for developing names such as *Dasani*, *Swiffer*, and *BlackBerry*, uses this knowledge when researching and inventing names for new products and services. By presenting volunteers with pairs of nonsense words that differ in only a single phoneme, then asking which sounds more speedy, daring, or comfortable, the company is able to create a ranking of phoneme sounds according to the qualities

they represent.¹⁵ Their findings show that explosive consonant sounds such as *p*, *b*, *t*, or *d* connote slowness, while fricative sounds *f*, *v*, *s* and *z* are fast. The high-frequency *z* sound, exhibited in words such as *fizz*, *pizazz*, *zip*, *zest*, and *zany*, communicates the greatest speed; this quality in brand names such as *Zoloft* and *Prozac* connotes speed of recovery or in *Amazon* suggests quickness of delivery. While linguistic studies have found that these types of phoneme-to-meaning connections tend to be language specific, product names such as these, developed for an American audience, thrive because English is the global language of branding.

In this chapter, I have explored ways in which the sounds of the signifier may have some relationship and linkage to the signified, in essence, challenging one of Saussure's primary assumptions. In Saussure's linguistic theory, the relationship between signified and signifier is arbitrary, and meaning is constructed by differences among a complex network of signifieds. If we are considering ways in which signifier and signified may have some material connection, then we may need to rethink also how it is that we construct meaning in language. If speech sounds themselves can carry meaning, these sounds may in fact have a visceral, bodily impact on our selves; perhaps we perceive meaning phenomenologically, through synesthetic, kinesthetic pathways. Language may be considered a series or accumulation of bodily states. This is one goal of the marketeers described above: short-circuiting the intellect and aiming for the gut, attacking the primal urges of desire and brand loyalty that drive us to consume.

Combining phonemes in new ways to elicit a visceral response is one strategy also explored in early sound poetry, beginning with the Italian Futurists and continuing with the Dadaists. Sound poetry represents an artistic approach to exploring the connection between sound and meaning. Traditional poets work with words expressively and are keenly aware of the sounds and images they are creating. Sound poets use speech sounds as the basic building block. The sound poem is "a concerted attempt to dissolve the linguistic sign and fix absolute attention on its ancillary rhythmic-acoustic properties, isolating its phonetic, subphonemic, and predenotative aspects and deploying them at the expense of any referential profit."¹⁶ Both the Futurists and Dadaists developed sound poetry works that could be seen as

attempting to overcome the “problem” of language. The Italian Futurists, and Filippo Tommaso Marinetti in particular, were interested in destroying existing cultural forms such as language, which they believed were tools of the bourgeois society. In his manifestos, Marinetti wrote in favor of the destruction of traditional syntax, specifically the abolition of adjectives and adverbs. He advocated a continuation of the trajectory from metered to free verse towards what he calls *parole in libertà*, or words-in-freedom:

This instinctive deformation of words corresponds to our natural tendency towards onomatopoeia. It matters little if the deformed word becomes ambiguous. It will marry itself to the onomatopoetic harmonies, or the noise-summaries, and will permit us soon to reach the *onomatopoetic psychic* harmony, the sonorous but abstract expression of an emotion or a pure thought.¹⁷

The Futurists' play with language was also an admiration of the machine age, as they often using onomatopoeics to represent mechanized sounds. Indeed, Marinetti wrote about the ZANG-TUMB-TUUUMB of the cannons to report on the sounds of military combat at Adrianople.¹⁸ The Dadaists, on the other hand, were interested in challenging the false rationality of language. Works such as Hugo Ball's “Karawane” and Kurt Schwitters' “Ursonate” defy comprehension on a semantic level. Ball writes, “In these phonetic poems we totally renounce the language that journalism has abused and corrupted. We must return to the innermost alchemy of the word, we must even give up the word too, to keep poetry for its last and holiest refuge.”¹⁹

While this discussion may present a convincing case for sound symbolism, the question remains whether the phenomenon is based entirely on instinct, physiology, and synesthetic response or if it might be culturally derived and influenced. Since many of the relationships between sound and meaning are language-specific, it seems reasonable to suggest that these values are culturally coded. Sound symbolism may result from the phonetic similarities and differences among the network of signifiers in a given language. While the culture- and language-specific influences must be taken into consideration, the connection between phoneme sounds and meaning may derive at least in part from innate, physiological, kinesthetic, and synesthetic human qualities that play a role in how we receive, produce, and process language.

3. Ideal Alphabets

There is a whole volume of human history in back of every one of the twenty-six alphabetic characters with which we write our thoughts.

—Otto Ege, 1923

Think slowly, speak slowly, write slowly; but think the words, speak the sounds and write something which reasonably presents those sounds.

—Eric Gill, *An Essay on Typography*, 1931

In an alphabet, each letter roughly represents a phoneme of a spoken language, either as it exists now or as it may have been in the past. Of the different types of writing systems in existence—ideographic, in which each written sign represents a word; logographic, where a glyph or character directly represents a concept; syllabic, in which each written sign represents a combination of consonants and a vowel; and phonetic—the last of these, of which the alphabet is an example, is the most economic, efficient, and wide-spread. The Roman alphabet is used today to write, record, and transmit a large variety of historically unrelated languages, from Fenno-Hungarian and Indo-European language groups to native languages of Africa and Southeast Asia. The alphabet is a technology of great influence and power. The development of the alphabet, and alphabetization, was a major factor leading to the categorization of knowledge, the creation of libraries, and scholarship as we know it today. Phonetic writing systems allow for greater literacy and access to knowledge in a culture. Beyond the practical functionalities of the alphabet, written forms have also held performative roles in the mythical and magical practices of many cultures throughout history.

As such a broadly employed system, the alphabet's phonetic regularity and integration with the phonemes of spoken sounds varies greatly depending on the language. Ancient Greek, for example, has a nearly exact one-to-one relation between phonemes of the spoken language and letters of the alphabet. As the alphabet has been adopted and adapted by different cultures who speak other languages, however, this relationship becomes less direct. The English we read and write today is a minefield of spelling irregularities and complexities: the same phoneme can

be represented by two different letters or combinations of letters, or words with unpronounced letters may exist for historical or other reasons. In this chapter, I am interested in examining some of the processes of alphabetic creation and reformation.

The Korean people take great pride in their alphabet, Hangul, regarded as the most scientific and only deliberately created alphabet in modern usage today and described by British linguist Geoffrey Sampson as “one of the great intellectual achievements of humankind.”²⁰ In the mid-1400s, King Sejong directed a team of scholars to create a phonetic writing system for Korean. Until that point, only highly educated scholars had been literate, since at that time Korean, a language linguistically unrelated to Chinese, was written using a complex system of Chinese characters employed either for their meaning or for their phonetic resemblance to Korean syllables. When Hangul was introduced in 1443, the alphabet met resistance among the literate elite, who called it “females’ script” or “children’s script.” Indeed, the alphabet did not come into wide usage until the mid-20th century, after the Japanese occupation of Korea from 1910 to 1945, when Hangul and King Sejong himself became symbols of Korean nationalism. After Korea’s post-war division, Hangul was adopted widely first in North Korea, then in the South.²¹

The letters of the Korean alphabet are constructed using different schema based on the graphic interplay between the complementary opposites of yin and yang. Consonants are based on a profile view of the position of the tongue when a sound is pronounced, while vowels are composed of Confucian symbols representing man, heaven, and earth. Consonants are either “hard” or “soft,” with further symbolic connections indicating whether they are consonants of the back teeth, front teeth, tongue, lips, or throat. Vowels are characterized as either “bright” or “dark” depending on the left-to-right or top-to-bottom orientations of the letter shapes.²²

As a rational, scientific, alphabetic system, Hangul serves as a model for what many Western orthographic and typographic reformers have attempted to achieve since the time of the Renaissance. Trends to rationalize the Latin alphabet generally involve two types of reform: either phonetic, seen in efforts to correct the mismatches between spoken and written forms; or formal, exhibited in attempts to analyze and streamline the graphic forms of the alphabet. Phonetic reformers generally take

one of three approaches: augmentive alphabets, reductive alphabets, and diacritical additions to existing ones.²³ In his 1668 “An Essay towards a Real Character and a Philosophical Language,” Bishop John Wilkins introduced a new orthography for the English language to be used for philosophical texts. Wilkins' interests went beyond merely improving existing writing systems; he introduced a conceptual writing system that was pictorial and iconographic in nature, based on his belief in the ontology of concepts. Wilkins' proposal combined the idea of a universal writing system with that of a universal language, a topic that will remain outside of the scope of this discussion. Benjamin Franklin's alphabet of 1768 adds some letters and drops others. Another alphabetic innovator was Isaac Pitman. After the phonetic shorthand system he developed in the 1830s became a commercial success, Pitman became interested in pedagogy and spelling reform in English. He created a phonetic alphabet based on existing typography in the 1840s, though the system never reached the popularity of his shorthand. Pitman's system was a major influence on the development of the International Phonetic Alphabet, beginning in the 1870s. Alexander Melville Bell's Visible Speech (1867), used diagrams of the speech organs to illustrate the sounds of letters. Famed type designer Eric Gill, in his 1931 *An Essay on Typography*, advocated the adoption of a phonetic writing system, whether it be Pitman's shorthand or otherwise, for the sake of beauty and efficiency.²⁴ Perhaps the most radical reformer of all, George Bernard Shaw provided for a contest in his will to develop a new phonetic alphabet for English. Now called the Shavian alphabet, the winning design, developed by Kingsley Read in the late 1950s, is a highly systematic writing system. The Shavian alphabet has reached only a limited audience since its inception, through a bi-alphabetic edition of Shaw's play “Androcles and the Lion” published in 1962. None of these alphabet reformers achieved much success, and the enthusiasm for alphabet reform has waned in the past few generations. One useful counter argument to the adoption of a uniform phonetic alphabet is that our current writing system allows us to make clear distinctions between homophones and similar-sounding phrases; furthermore, irregular spellings can add richness to the act of reading by carrying with them the origins and histories of how different words entered the language.

Another trend related to alphabetic reform deals with creating idealized visual forms rather than ideal character sets.²⁵ Early Renaissance times saw mathematicians and printers debating the correct proportion in letters, chief among these Albrecht Dürer and Geoffrey Tory. The twentieth century and the vision of modernism saw the rise of the idea of a universal alphabet and a universal typeface. Capital letters were abolished within the Bauhaus in 1925, and Joost Schmidt and Herbert Bayer's typefaces, based on pure geometric elements, date from the same time period. Kurt Schwitters's "Systemschrift," first published in 1927, was a single alphabet that modified letter shapes to relate to their sounds. In the 1950s, American graphic designer Bradbury Thompson created "Alphabet 26" a monoalphabet of twenty-six characters combining the upper and lower case letters of Baroque typeforms from the 17th century. Wim Crouwel's 1967 alphabet inspired by the cathode-ray tube anticipates the bitmapped computer typefaces of the 1980s and 90s.

Another kind of technological rationalization of the alphabet can be seen in Donald Knuth's project Metafont, an ambitious attempt to encapsulate all possible typefaces within a single set of computer algorithms. We could view this project as the late-20th century digital analog to the earlier historical efforts to universalize writing from the Age of Enlightenment onward. Knuth, a computer scientist who developed TeX, a popular system used for mathematics and science publishing, spent most of the 1970s creating a system that could generate a large variety of typefaces through the manipulation of a few dozen parameters. The system relies on the belief in a Platonic letter, that "underneath all 'A's there is just one grand, ultimate abstraction that can be captured in a finitely parametrizable computational structure—a 'software machine' with a finite number of 'tunable knobs.'"²⁶ Metafont finds similarities with other challenging technologically-motivated projects—including the creation of a Unicode character set standard or the Microsoft typeface Sylfaen, a font that tries to encapsulate all present-day written scripts into a single typeface—projects that suggest a modern Tower of Babel. Trying to order, classify, and define the means by which we write shows us just how complex and multi-layered our writing systems truly are.

Letters have long captured the imagination as a source of myth and sacred

power, and a tool for divination and numerology. Alphabets also play an important role in visual arts, particularly in the works of artist and poet Henri Michaux. In his paintings and drawings, abstract markings become encrypted writings, imaginary alphabets, pictograms and ideograms. The works are suggestive of cryptography or automatic writing, a handwritten glossolalia. About his 1950-51 series "Mouvements," Michaux writes:

The drawings, quite new in me, especially these, in the very process of being born, in the state of innocence, of surprise; but the words, the words came afterwards, afterwards, always afterwards... and after so many others. How could they set me free? On the contrary, it is through having freed me from words, those tenacious partners, that the drawings are frisky and almost joyous, that their movements came buoyantly to me even in exasperation. And so I see in them a new language, spurning the verbal, and so I see them as liberators.²⁷

Michaux's hand produces invented signs that imply the act of writing but create a language that is entirely the artist's own.

4. Sound, Machine, Line, Body

In this new enterprise, our senses, with perceptions that are too slow and confused, can no longer guide us, but the graphical method substitutes for their insufficiency; in this chaos, it reveals an unknown world.

—Étienne-Jules Marey, 1878

In the preceding chapters, I explore the relationship between sound and meaning in language and the interplay between speech and written forms. In this chapter, I begin by examining some of the ways vocal sounds have been transcribed, reproduced, and synthesized by way of mechanical devices and artistic explorations dating from the industrial revolution to the present. From the early 19th century onward, machines have become increasingly intertwined in the processes of inscription and transcription, altering how we write and record speech. Mechanical recording devices have also changed our relationship with the graphic line, no longer solely within the domain of the hand-drawn and handmade. When the machine assumes the role of inscription, it alters our bodily interaction with writing. In this chapter, I explore some of the ways that these issues of sound, machine, line, and body can relate to each other through examples of combining sound, mechanization, embodiment, writing, and the graphic line.

The study of the relationships between sound and visual or symbolic representation dates back at least to the time of Pythagoras, who is often credited with discovering the numerical relationships that determine tones of the musical scale. In scientific research into acoustics and physiology beginning in the late 1700s, however, the emphasis became “the intrinsic value attached to the shapes that inscriptional apparatus could produce.”²⁸ Ernst Chladni found that distinct two-dimensional patterns were created when he ran a violin bow against the edges of various glass or metal plates, setting the sand-coated plates into vibration. Chladni’s figures, dating from 1785, represent one of the first physical means for capturing a visual output created by acoustic phenomena. Important within the context of nineteenth-century acoustics research (and of special importance to my personal project) is Edouard-Leon Scott de Martinville’s invention the phonautograph, a

device that could automatically transcribe vocal sounds as graphic contours. A typographer by training, Scott became interested in preserving the natural language of speech rather than assigning a symbolic written representation: “to construct an apparatus that reproduces by a graphic trace the most delicate details of the movement of sonorous waves. . . . [and] with the help of mathematics, to decipher this natural stenography.”²⁹ His 1857 photautograph consisted of a funnel-shaped collecting chamber and hand-cranked wheel. As a subject spoke into the open end of the chamber, an elastic membrane and stylus at the smaller end left a trace on a steadily moving strip of paper, wood, or glass surface coated with lampblack. When the phonograph was later introduced in 1877, Scott criticized Edison’s work, since the device could play back recorded sounds on a cylindrical drum but could not be “read.”³⁰ Scott believed that his phonautograph, allowing for the mechanized transcription of speech, and ultimately its decoding, would be of greater benefit to civilization.³¹

The French physiologist, Etienne-Jules Marey, believed instrumentation and the graphical method could surpass the human senses, allowing us to diagnose and follow the minute changes in the organs of living things. His stated goals echoed the sentiments of some of the writing reformers discussed in the previous chapter: “This graphic representation, if it were applied to the representation of ideas as to the figuration of objects, would constitute the true universal language.”³² Marey’s inventions include an early polygraph device, an artificial heart prototype, and the sphygmograph, which could record the pulse. Most interesting to this discussion, however, was Marey’s collaboration with the linguist Michel Bréal into rendering vocalization as a graphic mark. Marey’s work with Bréal led to a “vocal polygraph,” an invention that translated vocal sounds into graphic signals on a spinning drum, much like Edison’s phonograph. One of Bréal’s students was in fact Ferdinand de Saussure, who was influenced by the treatment of the acoustic image as a graphical representation. According to Saussure, the linguistic signal, “being auditory, is unfolded solely in time from which it gets the following characteristics: (a) it represents a span, and (b) the span is measurable in a single dimension; it is a line.”³³ Marey’s work with Bréal led Saussure to recognize the *image acoustique*, as he

called it, or “phoneme, a key notion for the constitution of the modern science of linguistics.”³⁴

Another historical trend that deserves a brief mention, a history parallel to these accounts of mechanized sound inscription and recording, is the development of machines that could produce vocal sounds. Speaking machines and related automata enjoyed a flurry of activity in the late 1700s. Many of the inventors and researchers who pursued speaking machines were practitioners of phonetics and stenography, interested in analyzing speech sounds and creating a precisely phonetic system for shorthand. Some of the alphabetic and writing reformers discussed in the previous chapter, such as John Wilkins in the mid 17th and Erasmus Darwin in the late 18th century, conducted research into phonetics and phonology that fueled their interest in how speech sounds could be reproduced through mechanical means. Wilkins, for example, noted the resemblance of phonemes to different natural sounds: the *L* sound he described as “the trembling of water,” the *Ng*, “the sound of strings,” and so forth.³⁵ Familiar with and inspired by Wilkins’ research and writings, Erasmus Darwin (grandfather of Charles) built a simple machine which could pronounce the consonant sounds *p*, *b*, *m*, and the vowel *a*.³⁶

These pre-electronic researchers were interested in speaking machines to get a better understanding of speech and phonetics, to entertain audiences, or more practically, to amplify speech so that a machine could address a large crowd.³⁷ A more recent example of using these techniques for an artistic purpose can be seen in the work of Martin Riches. In artworks such as *Talking Machine* (1989-1991) and *MotorMouth* (1996-1999), Riches creates elegant, sculptural, speaking machines that continue where his predecessors, derailed by the invention of Edison’s phonograph, left off. Synthesized speech production and recognition has become an integral part of computer technologies in the digital age, finding use in automated telephone customer support conversations, for instance. These technologies play an integral part in some artworks as well. Media artists sometimes use speech recognition and computerized voices to create a more physically or personally engaging interaction with the work, such as in David Rokeby’s media artworks *nChant* and *The Giver of Names*.

The relationships among sound, line, and the body grow more complex when considered in light of the machine: through mechanized sound inscription, production, and reproduction, the machine becomes an intermediary in the writing or reading process. One starting point for connecting the three entities of sound, line, and body is handwriting—it is through the physical action of making a mark that language can pass through sound and mind to hand, to paper, and continue on to another reader. The pen or pencil would generally not be classified as a machine in this case, but more likely, a tool, an extension of one's writing hand. The choice of tool, however, does have an impact on the writer. As Vivian Sobchack remarks, the “particular writing technology” may affect “so personal and nontechnological a matter as one's own handwriting.”³⁸ The sketch-like quality of the pencil or the permanence of the pen, the physical labor involved in operating the mechanical typewriter, or the continuous scrolling of the computer word processing program can all make an impact on the process of writing, and may also affect the content which flows most easily in the chosen technological context. Furthermore, as Carrie Noland points out, writing itself represents “the body's submission to regimes of gestural training that are neither natural nor easily acquired.”³⁹ One could argue that the structures dictated by writing require the writer to exhibit mechanical precision and control, that writing itself conditions the writer to perform like a machine.

For a visual artist, the graphic quality of the line, of course, changes remarkably whether the medium is graphite, charcoal, oil paints, or pixels on the computer display, and whether the motor action creating the line takes place in the fingers, the wrist, the elbow, shoulder, or entire body. The graphic scribbles in Cy Twombly's paintings or the ink strokes in works by Henri Michaux, for example, suggest the physical actions of writing and draw attention to, in Noland's words, the “most simple and repeatable motor movements undergirding tracing systems in order to bring to mind the kinetic energy central to but tamed by all acts of inscription.”⁴⁰ In these artworks, the line derives from embodied gestures that echo acts of writing but break free from a direct connection to language.

An alternative relationship between intentionality and the act of inscription can be seen in “automatic writing,” the purposeful disengagement of the mind from

the physical act of writing. The technique has been used over the past century for a number of different purposes: spiritualists used automatic writing as a means for channeling the dead; psychologists encouraged the technique to gain access to the subconscious; and the Surrealists employed automatic writing and drawing to stimulate creativity without self-censorship. While these phenomena attempt to disconnect the conscious mind from the physical act of writing, an example of entirely replacing the intentional act of writing with a mechanical one can be seen in artist Tim Hawkinson's work *Signature* (1993), in which a machine signs the artist's name onto a roll of paper, chops it off, and drops it into a pile. In this case, the inscriptive gesture is cut off at the pen, disconnected from the body and mind of the author, and replaced with a machine.

An author with a pen in hand can fill many pages, putting his or her thoughts down in patterns of lines. The graphic line in this instance is a means for self-expression. In the case of Scott's phonautograph, a machine intercedes in the expression of the self, taking on the performative act of writing. The contours traced by the phonautograph precede and predict the visualization of sound waveforms now familiar in digital audio editing tools of the past few decades. Edison's phonograph also allows for sounds to be written in lines—narrow grooves filled with tiny hills and valleys. In our present day culture, the “automatic writing machine” often plays a clinical and diagnostic role, as the modern polygraph machine or heart monitor. These machines could also be seen as aiding in acts of “self-expression,” creating a real-time trace of the minute changes in the body's sounds and vibrations.

A final, whimsical example of how sound, machine, line, and body can interact in a creative way can be seen in the Japanese videogame *Vib Ribbon*. In this game, you control an animated cartoon rabbit who strolls along a horizontal line, in time with a musical soundtrack. Rhythmic, melodic, or percussive events in the audio, which can be either a pre-programmed musical selection or a CD of your own choosing, are visualized on the horizon line as peaks, valleys, and other obstacles your character must avoid. In *Vib Ribbon*, every physical action you make with the handheld controller, whether in or out of sync with the audio, has ramifications for the character; you embody an avatar who lives on a line generated by sound.

5. Takeluma: Project Description

Takeluma is a project that interrogates and explores the many complex relationships described in the previous few chapters: relationships among sound and speech, meaning, writing, the machine, the line, and the body. I began the project by developing a new writing system for representing the sounds of spoken American English, then developed a series of examples to explore the system in print, physical space, animation, and reactive installation.

Within this system, time is represented by a flowing horizontal line. When phoneme sounds are produced, they make specific shapes that deform the shape of the line. I designed the symbol for each consonant deliberately, taking into account its acoustic and physiological properties, as well as the possible meanings that might be ascribed to the phoneme sound. I found the book *Gods of the Word: Archetypes in the Consonants* by Margaret Magnus especially useful during this process. In this collection of observations about the consonant sounds, Magnus gives examples of meaning “clusters” she has found correspond to different consonants. The /p/, for instance is “a precise ‘special’ place or point or pea or pinprick, which spreads into a ‘plane’ when followed by /l/ or /æ/ (‘pan’).”⁴¹ She describes each of the 24 consonant sounds as having mystical characteristics and indicates whether the sound is moving

P as in PIN		T as in TIP		CH as in CHIN		A as in FATHER		I as in FILL	
B as in BULGE		D as in DOOR		J as in JAZZ		U as in CUT		EE as in FEEL	
C as in COVER		G as in GUT		H as in HOLD		A as in Ago		A as in ATE	
TH as in THIN		TH as in THEN		L as in LIGHT		A as in cAT		I as in BITE	
M as in MAKE		N as in NUB		Y as in YEARN		E as in PET		OU as in FOUL	
S as in SIP		Z as in ZAP		R as in RUN		OO as in BOOK		OY as in TOY	
SH as in SHELL		S as in PLEASURE		W as in WILL		OO as in TOO		O as in CO	
F as in FUZZ		V as in VENT		NG as in SING					

or static, balanced or biased. I used some of her observations liberally but also applied my own intuitive and subjective sense in creating shapes from these consonant sounds. Similar types of sounds (for instance, *p* and *t*, or *b* and *d*) have similar shapes. In some cases, I obeyed the rules of phonetics: the shape for the *j* sound (as in judge) is a ligature of the *d* (of door) plus the *zh* sound (as in pleasure). Likewise, the character for *ch* is a combination of *t* and *sh*.

The 14 vowel sounds, however, were developed systematically. While the consonant sounds deform the line, the vowels in the Takeluma writing system are formed by a split in the line. Each of the nine pure vowels were given a height below or above the middle point based on whether the sound is produced towards the back of the throat or the front of the mouth. The height of the space between the two lines indicates how wide the mouth is open when producing the vowel sound. The 'a' sound in father is represented by a tall opening below the horizon line, while the 'ee' sound in feel is a narrow opening above the horizon.

My thesis installation consists of several pieces. First among these is a series of four pre-rendered animations, displayed on small LCD displays with headphones for

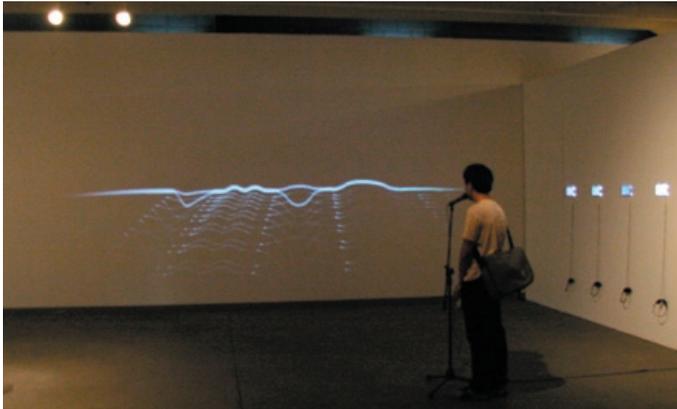


the audio. These animations illustrate the sound-symbol connections in Takeluma. In the first, a woman's voice reads three sets of words beginning with *g*, *b*, and *p*, while only the consonants in those words are drawn on the line with a small colored spark. In the second, Neil Armstrong's famous recording from the Apollo moon landing is illustrated

by a static-y line on a black background. The third features an excerpt from Martin Luther King, Jr.'s famous speech "Let Freedom Ring," where echoes of the main speech line fan out and disperse into the crowd. In the fourth and final animation of the set, an advertising jingle for Alka-Seltzer is displayed on a light-blue background.

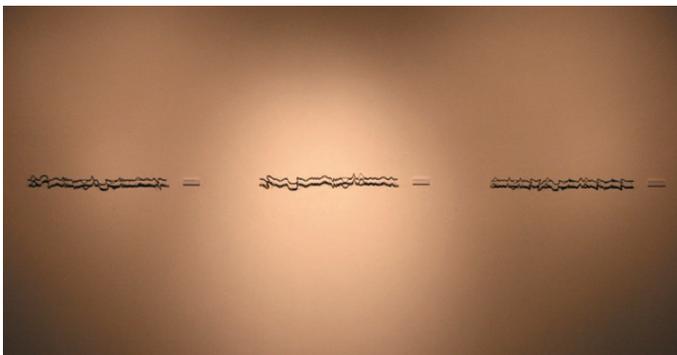
The second piece in the installation, Takeluma Phonautograph, is a live reactive installation, a transcription machine that converts the visitor's speech into the Takeluma writing system. The words and sounds appear on a central horizon line

which is echoed by several lighter dotted lines. I added these extra lines to create an implied surface from the Takeluma line and to give more depth to the display. My



desire is for the shapes to be experienced more fully.

The next component of the installation was also developed with an interest in making the shapes on the line more tangible and experiential. In three small sculptural pieces, I used a laser cutter to carve sentences out of black acrylic. The three sentences I chose, "I hear what you're saying", "Do you see what I mean?", "I'm touched by your kind words" each make use of the idea that we can experience and understand through all of our senses.



The final piece in the installation is a 100 foot long paper ribbon printed with six

paragraphs of text from Saussure's Principle I: The Arbitrary Nature of the Sign. The ribbon is displayed on the floor, beginning in a straight line but becoming tangled and



messy. It is a small commentary on the many ways that Saussure's assumption of the arbitrariness of the signifier-signified relation can be challenged and complicated.

6. Conclusion

In developing the Takeluma project, I have been interested in creating a new type of visible language representation that brings to question some of our assumptions about writing, speech, and meaning. One of the best compliments I received after the show opening was from Grace Fujishima, who works in the UCLA Design | Media Arts office. She told me that the project made her think about writing in a different way, and she hoped there would be some way to bring these ideas into public schools.

One important point to make is that my goal is not actually to replace how we write today with another system. There are many arguments against phonetic alphabets—written words contain a history and help distinguish homophones; spaces also assist us in seeing where words begin and end. Beyond these considerations, my system is quite impractical and very difficult to write by hand. I have not yet tried to write these symbols in my own handwriting and might never do so.

While my efforts do reference the systematic efforts of Scott de Martinville to create a true visual language, I also believe in the absurdity of my efforts. While a viewer might be able to learn to read the Takeluma system, at first glance, the shapes seem like hieroglyphics or scribbles. Vivian Sobchack asks the question, “Where does scribble end and writing as communication, or drawing as representation, begin?”⁴² I am interested in this boundary: between sense and nonsense, between pattern and noise.

Endnotes

¹ Ferdinand de Saussure, *Course in General Linguistics*. Edited by Charles Bally and Albert Sechehaye. Translated by Wade Baskin. New York: McGraw-Hill, 1959, 67.

² Saussure, 23-24.

³ Saussure, 24.

⁴ Walter Ong, *Orality and Literacy: The Technologizing of the Word*. London: Methuen, 1982, 11.

⁵ Johanna Drucker, *The Alphabetic Labyrinth: The Letters in History and Imagination*. London: Thames and Hudson, 1995, 65.

⁶ Ong, 12.

⁷ Otto Jespersen: *Language: Its Nature, Development and Origin*. London: Allen and Unwin, 1922, 410.

⁸ V.S. Ramachandran and E.M. Hubbard: "Synaesthesia – A Window into Perception, Thought and Language" in *Journal of Consciousness Studies*, Vol. 8 No. 12, 2001, 18-20.

⁹ Ramachandran, 19.

¹⁰ This typology of sound symbolism from Hinton, et al: "Introduction: Sound-Symbolic Processes" in *Sound Symbolism*, Cambridge University Press, 1994, 1-6.

¹¹ Even speech is not limited to vocal production: witness throat cancer survivors who learn to speak by replacing laryngeal phonation with burping, or "Le Pétomane," a French stage performer who entertained audiences with his large vocabulary of fart sounds.

¹² John J. Ohala: "The Frequency Code Underlies the Sound-Symbolic Use of Voice Pitch" in *Sound Symbolism*, Cambridge University Press, 1994, 335.

¹³ Gaston Bachelard, *The Poetics of Space*, Trans. Maria Jolas. Boston: Beacon Press, 1969, 197. The original French text begins: "Dans le mot vaste, la voyelle a conserve toutes ses vertus de vocalité agrandissante."

¹⁴ Bachelard, 198.

¹⁵ This experiment is described in Sharon Begley: "StrawBerry Is No BlackBerry: Building Brands Using Sound." *Wall Street Journal*, August 26, 2002, <http://online.wsj.com/article/0,,SB1030310730179474675.djm,00.html>

¹⁶ Jed Rasula and Steve McCaffery, "Sound Effects" in *Imagining Language: An Anthology*. Cambridge, Mass.: The MIT Press, 1998, 93.

¹⁷ F.T. Marinetti: *Destruction of Syntax—Imagination without Strings—Words-in-Freedom*, in *Lacerba*, Florence, 1913, <http://www.unknown.nu/futurism/>

destruction.html (last checked March 22, 2005).

¹⁸ Douglas Kahn: *Noise, Water, Meat: A History of Sound in the Arts*. Cambridge, Mass. The MIT Press, 1999, 58.

¹⁹ Hugo Ball: *Flight Out of Time: A Dada Diary*. Trans. Ann Raimés. New York: Viking, 1974 [1927], 71.

²⁰ John Man: *Alpha Beta: How 26 Letters Shaped the Western World*. New York: Barnes and Noble Books, 2000, 109.

²¹ The literacy rate today is 97.9% and 99% in South and North Korea, respectively. From the CIA World Fact Book: <http://www.cia.gov/cia/publications/factbook/>.

²² John Man, 115-116.

²³ Jed Rasula and Steve McCaffery, "Spelling, Saving, Spending" in *Imagining Language: An Anthology*. Cambridge, Mass.: The MIT Press, 1998, 439-445.

²⁴ Eric Gill: "But Why Lettering?" in *An Essay on Typography*. London: J.M. Dent & Sons, 1931, 115-127.

²⁵ Robin Kinross: "Universal Faces, Ideal Characters" in *Unjustified Texts: Perspectives on Typography*. London: Hyphen Press, 2002, 233-245.

²⁶ Douglas Hofstadter: "Metafont, Metamathematics, and Metaphysics: Comments on Donald Knuth's Article 'The Concept of a Meta-Font'" in *Metamagical Themas*. Basic Books, New York, 1985. 261.

²⁷ *Henri Michaux*. New York: Solomon R. Guggenheim Museum, 1978, 71.

²⁸ Thomas Hankins and Robert Silverman: *Instruments and the Imagination*. Princeton, New Jersey: Princeton University Press, 1995, 130.

²⁹ E.L. Scott de Martinville: "Principes de phonautographie," in *Le problème de la parole s'écrivant elle-même*. Paris: Scott, 1878, 31.

³⁰ This is not withstanding a man by the name of Dr. Arthur Lintgen, who according to articles in Time and the New York Times and an appearance on the television show *That's Incredible!* in the early 1980s, could read the grooves and recognize which pieces of classical music on a phonograph record. He could perform the feat by combining the technique of determining the structure and dynamics of a piece of music by examining the spacing and pattern of the grooves with his thorough knowledge of classical music. (<http://www.snopes.com/music/media/reader.htm>)

³¹ Hankins and Silverman, 137.

³² Etienne-Jules Marey: *La méthode graphique dans les sciences expérimentales et principalement en physiologie et en médecine*. Paris: G. Masson, 1878, 3-4.

³³ Saussure: *Course in General Linguistics*, 70.

³⁴ Brain, Robert: "Representation on the Line" in *From Energy to Information*. Edited by Bruce Clarke and Linda Dalrymple Henderson. Stanford, Ca.: Stanford University

Press, 2002, 168.

³⁵ Hankins and Silverman, 181.

³⁶ Rasula and McCaffery, 98.

³⁷ Hankins and Silverman, 178.

³⁸ Vivian Sobchack: "Susie Scribbles!": On Technology, *Techné*, and Writing Incarnate" in *Carnal Thoughts: Embodiment and Moving Image Culture*. University of California Press, 2004, 118.

³⁹ Carrie Noland: "Digital Gestures" [manuscript], 14.

⁴⁰ Noland, 22.

⁴¹ Margaret Magnus: *Gods of the Word*. Thomas Jefferson University Press, 1999, 53.

⁴² Sobchack, 172.

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