The Semantics of Letter forms: Linguistic Variation and its Operative Artifacts
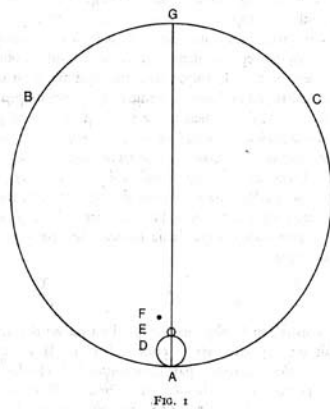
Gregory Bringman

FIG. 11.—CONSONANT SYMBOLS OF SOME CONTEMPORARY ALPHABETS

While archeologists and historians and all those who study material traces have known about the properties of operative images, from which principles of historical reconstruction follow, Norbert Wiener's formalization of this category in *God and Golem Inc.* shows that machines can automatically reconstruct themselves by putting their part for -- if not their whole -- then for their informational "élan", their spring without a "vital". The operative image then, is an encoding of -- or reference to -- a "mechanical" procedure, but it is also an artifact of larger wholes, social practices and agents in cultural fields that it can "reproduce". Given that written natural, spoken and automated languages leave many artifacts and also operatively allude to the "machine" of intersecting grammar, usage, and visual, aural, and verbal transformation, languages can be seen to propagate through operative images. The operative image then, can be used to formulate a semantics of "writing" in a generalized sense. To evaluate, analyze and synthesize a semantics of both linguistic change and the material forms of written characters over time, it is only necessary to trace how "parts" have been put for "wholes": creating them or being created by them in a variety of recording, coding, and writing domains.

The Transducer as Interface and the Social Contract as Interface

In *Le Systeme de Leibniz et ses modeles mathematiques*, Michel Serres characterizes the methodological pluralism of his subject by suggesting that Leibniz's "system of models is the model of the system" (Le system de Leibniz, 351). In fact, Wiener's notion of the operative image has the power that it does, because it analogously explains the operation of images as the image of operation. And in many ways, Wiener's work is directly related to Leibniz's : his specification for reproducing machines is a specification for the automation of Leibniz's theoretical physics, a physics based upon theories of cellular or monadic emboîtment, leading back to the microscopical, empirical work of Antony von Leeuwenhoek (356). For Serres, Leeuwenhoek's "error" (though empirically valid) in mathematizing his observations on the density of animalcule embeddedness, appears to suggest to Leibniz a theoretical improvement on the mathematics of the monadology. While not necessarily an improvement on Leibniz's physics, Wiener's specification for a kind of copying, a repeating of information systematically and monadically, in a sense improves upon this physics because it suggests how to reincorporate its mathematics into the mechanical fabric of industrial and informational society. Serres indicates, that, "The circle of departure (Leibniz's theoretical image of emboît-ment based on Leeuwenhoek's empirical one) is not a metrical standard or reference: it is a cell of any kind, repeatable everywhere, regardless of the nature of the portion of the world envisioned." (373) Thus, inaugural cybernetics, which describes a reproduction of a system from a mathematical sum/image similar to Leibniz's of the physics of enclosures, is a softening of the roles of machines leading to the mechanical distribution of mathematics into everyday functions according to models of biological organization. With the transformation by biology of machines-- and previously, with Leibniz, of mathematics -- we have one invention of the notion of "software", a new instance of the interface or contract of humans with technology.

Leeuwenhoek's model of animalcules
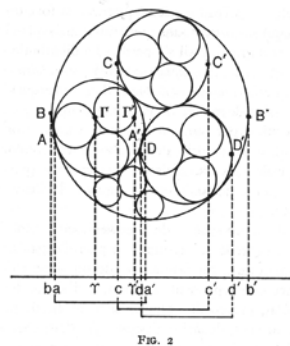
Leibniz's model of emboîtment

Following on the heels of Leibniz's proto-software, or specification of an emboîtement transposed onto mathematics from Leibnizian metaphysics, Wiener's description of reproduction as the image of operation (the

operative image in *God and Golem*) fundamentally defines the contemporary software interface in which properties and functionality emerge from mere references to larger bodies of information. With the ability to recreate its progenitors, the operative image is like the image of a circuit board which functions as the "original" plan of the circuit (Wiener, 31). It can be abstracted further in experimental domains to a system of non-linear inputs and outputs, as a message in certain non-trigonometric configurations arising from an "ensemble" of statistical inputs that can reproduce the technological component or "box" which has created it (33-34). Wiener uses the example of shot-effect generators that can be input into a black box, in this case an electric transducer, and simultaneously input into a polynomial-like array of white boxes. To correlate the two sets of boxes, their outputs are multiplied by electrical potentiometers. The white boxes functioning within the development of the black box produce a sum of their applicable coefficients as the operative image of the black box (42-44).

  This description of a lower-level component or white box with a known function conforming to the interface of an unknown component or black box in the operation of the latter, is now common in the construction of software. In fact, the strength of a computational system in terms of its reusability follows from not having to use the white box in the way in which it visibly shows its inner function, but simply being able to convert its functionality as exemplified by "what" it does to the contract of the black box with its own "what". Herein lies the concept of encapsulation: a paradoxically "open" property by which two similar but seemingly incompatible "whats" might be "wrapped", one on to the other. The black box as a "wrapper" component, ensures that despite the details of the particular technologist's implementation of functionality, the white component retains the same calling signature. The white boxes' procedures share a contract, which renders the details of accomplishing a task unnecessary to know. Ensuring compatibility, the contract is an interface that, on the one hand, only ultimately cares about the nominative category it needs in order to fit technological components into the network of calling or referring components, while at the same time, it determines the details of its technological implementation, that is, its particular semantic or logical implementation.

  Thus, reproductive software interfaces, in the fact that they obligate their users to follow a contract, can usefully be compared to the contracts of natural language, to the extent that they are material constraints from which a poetics, semantics, or logic arise. In *Les mots et les choses*, Foucault shows how language contracts shifted in the 19th century from a general grammar as an organizing principle to a philology of individual languages and their grammars, prototypically locating growing language formalization as a constraint of the modern Western episteme. Software developers and users contribute to contemporary versions of this episteme, agreeing on terminology and also authoring specifications to formalize this software on top of the technological, societal framework in which they find themselves. By contrast, a poetics emphasizing semantic worth is possible coming from, not a pure grammar following the specialization of language internally, but from code tied into things within a cultural, Micheletian soup of numerous contracts corresponding to technological implementations and even implementation errors. Formal writing prior to the invention of computer software is almost like a proto-software in the same way that, alphabetic writing, in its movement away from pictographic systems, became a proto-algebra, as Serres remarks in *Les Origins de la geometrie* (173). Conversely, in a generalized writing, it becomes increasingly obvious that semantic expressivity, or new languages multiply with newly created contracts, yet descend from this generalized writing, like a common linguistic ancestor of Foucault's classical age, since words are tied up with code and both are irrevocably tied to things.

Semitic languages and their semantic properties

  This sense of a link between sign and thing through an interface or contract can be shown in ancient Semitic languages, namely Hebrew, in which the alphabet is thought to be based upon concrete objects, many of them having an everyday, Braudelian character. Various scholarship attests to the fact Hebrew is a direct successor of picture writing, and that the names of Hebrew letters refer to objects resembling their graphic letter. For instance, the "y" sound or "yod" is the word for hand, written in Hebrew as 'י', no doubt possibly a cupped palm from a side view. The Hebrew "mem" or "water" (מ) is spelled out with consonant sounds, m-y-m (מים) with a vowel placed on the y with the short "i" sound. As the letter refers to an object, but also as the letter may be spelled out or expanded based upon which sign it is, the Hebrew alphabet links the development of language from pictogram to that picture-writing's contracted state. At the same time, its contraction may be coded not only as the concrete object to which it refers, but also may be coded in terms of the alphabet broken away from a theory of linguistic resemblance or similitude. The operative image could be seen in relation to a linguistic drift from resemblance, as Wiener defines the operative image as not necessarily having a pictorial relation to the whole that it brings forth (Wiener, 31). New language contracts necessitate a brushing aside of the objects of Braudelian analysis, reaching for the abstract from
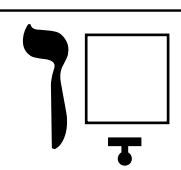
the concrete.

The "yod" character, hand-shaped

י

Inscription is right-to-left. Mem takes
a different form as a closing consonant
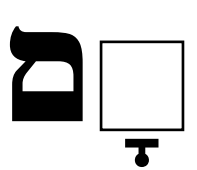than at the start of a word.

מים

    While the characters of the Hebrew alphabet have concrete roots, their abstraction as an alphabet replicates the psychology of birth and gender in the linguistic sign as a graphic unconscious in a curious echo of Freudian and Structuralist hermeneutics. In *Discourse Networks*, Friedrich Kittler traces the cultural history of the rebus, an image category that shares qualities of the operative image. He shows how through case studies, Freud located a nascent human unconscious in letter forms: a 24 year-old patient in *The Psychopathology of Everyday Life* evokes a childhood memory of his aunt's linguistic performance of a binary opposition between male and female, according to the Latin alphabet. The Latin "m" has "one whole piece more" in comparison to the Latin "n", representing the difference between boys and girls newly occupying the young child; the "n", a lack inscribed onto both the child's aunt as a mother figure who mentions the extra piece on the letter form, and young girls the age of the child. Through the process of transference, the "n", or the "m" can reproduce the sexual habitii of girl and boy, a process that is initiated through the possessors of this unconscious presence/lack cognitively completing meanings of these operative letter forms. Whereas Freud went from language to the unconscious, it is also possible to return from the unconscious to language. Since visual symbols become readable as code and form categories of text in opposition to images, text and the alphabet can subsequently be made simultaneously unfamiliar by the unconscious, so that their gestures and visual trajectories evoke, in the opposite direction, word origins.

    In an interesting cross-cultural, linguistic comparison of Latin characters to Hebrew script, the aforementioned sound for "m" or "mem" (מ) is used as a pronominal suffix in the third person masculine plural of the Qal stem, while the "n" sound or "nun" (נ) is used in the pronominal suffix in the third person feminine plural in Qal. The inscription of lack onto woman, the Freudian transfers largely through a comparative look at Hebrew through Latin characters. But there is another sense in which ancient Hebrew as an operative graphic form inscribes a proto-Freudian lack through nearly its entire alphabet as part/whole -- up until the 7th century AD, the time at which the Masoretes, a group of Jewish scholars froze the writing of Hebraic sounds.

3FP (Third person feminine plural using Nun).

3MP (Third person masculine plural using Mem).

    Before the Masoretes, the inscription of Hebrew almost completely lacked vowel signs. A theory of readership unfolds, perhaps connected to the beginnings of the Western written tradition, as readers completed sounds based on knowing the spoken stories then being placed into writing. Like a Sarrasine sculptor, Moshe, the prophet of the Old Testament exodus, inscribed the Hebraic law into stone, castrating its tablets to leave an imprint of vowel-less symbols. Semantically, this gesture mimes the Freudian tradition in its inaugural gendering designation. Almost all alphabetic characters at this point in the history of the language have a consonantal ontogeny, and readers, probably all male, bring a vocalic phallus to pronounce the sounds of the Jewish canon, adding gendered pronunciation and associating this phallus with an otherwise undifferentiated presence of vowels. Yet, as artifact, Hebrew inscription is -- at least through its recorded form and in Freudian terms -- originally "feminine".

    Although, if the act of carving stone and removing its pieces is the creation of the feminine in language,

as scribes reproduced feminine gender in abstract words which were aligned with Judaic custom, prohibition, and tradition, then writing in ancient Judaism is the masculine méconnaissance of the feminine through castration of language. Not only in the view of the ancient scribe is language made feminine, but the carving of Hebraic law with a consonantal alphabet also reproduces creation theology, that woman was created from man. But the carving of Hebraic law also suggests an operative, imagistic twist, on the production of woman by man, which calls into question the evolutionary precedence of either gender with ramifications for the encoding of human unconscious in alphabets. "Adam" in Hebrew can be translated as "mankind", while the Genesis text reads, "And God created man in His image, in the image of God He created him; male and female he created *them*" (Gen 1: 27, JPS, my emphasis). Could the stone carving implement of the prophet Moshe double as the scalpel of the Creator who, according to Rabbinic tradition, merely split the original hermaphrodite that was not only golem but also "mankind" into two sexes? In this view, Moshe introduces a phallus to pronounce the word of God, to remind himself in his inscription and his castration of the tablets, that he was also phylogenetically without phallus as an "Adam". The text which provides the phallus is only encoded through its lack, and the ontological statue that is Hebraic language operates as a slippery rebus echoing neither precedence nor succession of male or female. Moreover, the phallus of language is not "whole for part" but one division or part put for "mankind", an "absence as logos" and an operative image of the reproductive union of the sexes.

The reproduction of the human species and Judaic theology are mapped onto the material Hebrew language, with a large amount of inter-morphological transformation, that while seemingly the reverse of later Western grammatical structure, seems to stuff its texts with meaning "off the page". While there are no substantial, literal abbreviations in ancient Hebrew, the language abbreviates in a sense, using a pared down set of symbols to suggest many states of being. One notes that Hebraic roots primarily consist of only three consonantal characters, i.e. are triliteral, sometimes with changing stems. With fewer characters it seems there would be less linguistic variation, conversely and especially with the Masoretic introduction of symbols for vowels. While frozen by these scholars, Hebrew language metamorphosizes greatly depending upon context, conjugation, and construct, however. Not only are nouns and adjectives based on verbs, but the perfect tense has six variations on the Qal stem, to indicate activity, passivity, reflexivity, and intensification, not to mention that the imperfect has nearly as many. The vav consecutive can also virtually transform an imperfect conjugation into a perfect conjugation and vice versa through using only a conjunctive prefix. Moreover, from the conjugation of weak stems, the deciphering of the "mise en forme" of a word, is a complicated process. Thus Wiener was correct to not only connect the notion of machine reproduction to human origins, but by association, to connect the emboîtment of reproductive functionality to this same sense in Hebrew language, enclosed within its letter forms.

Thus, consonantal languages such as ancient Hebrew, in their development from pictographic systems and in their tendency toward abstraction while concretely, graphically, or operatively manifesting multiple human consciousnesses, vividly define the production of a semantic élan from drastically reduced parts. Could "mankind" create an artificial language through winnowing communication down to bare symbols, purged of the redundancies of natural languages acquired through its hundreds of years of evolution, yet have the primacy of "original language." The curious relation of such artificial, so-called universal languages to the sounds of spoken Hebrew or the Latin manifestation of its sounds phonetically-transcribed, necessitates a jump over the "whole" of modern language development to the apogee of its artificial development, the Western proto-Enlightenment. Here at the crux of the universal language movement, artificial languages offer a bridge between the formal specification of Wiener, and the organic development of natural language.

Artificial Languages and their semantic properties

In combining a formalism of letter forms and a technological or mathematical formalism, philosophers of language since the 1600s have attempted to construct apriori, aposteriori, and mixed philosophical or artificial languages. With Latin beginning to lapse as a European lingua franca in the mid-seventeenth century, an artificially created universal language could allow greater and easier communication among different disciplinary fields and natural language communities. Like natural languages and computer programming languages with their emboîtements and operative images, artificial languages have a contract, an interface, and a part/whole relationship-- especially to the reproduction of their systems through language communities.

Artificial, philosophical languages have a more arbitrary contract and interface than natural languages, although they are not necessarily separate from natural language, and are important to understanding "natural" language contracts. Foucault has shown the movement away from similitude in language corresponds to 19th century positive science, while in the same gesture shows that the new human subject of these sciences is not in fact

disconnected from the artificial world and that the artificial world is not disconnected from the so-called natural world. Artificial languages give birth to communication via rapid prototype, or rather they are synthesized without years of agents building language in a bottoms-up fashion. Artificial and natural languages are differentiated by use, the former being applied to the pursuit of international dialogue for world peace, and later, global diplomacy/democracy. Yet there are many practical and conceptual differences: artificial languages paradoxically reach to the original sounds of ancient language in attempting to make audible, taxonomic objects, while they similarly succeed in doing away with the very particularity that is characteristic of "natural" language: successful functioning in language communities.

Having overcome arbitrariness with difficulty and not limited to single sub-domains as effective computer programming languages, artificial languages animated classificatory systems in grafting sounds onto, essentially, numbering systems mapped to global categories, what are called predicamental constructions or series (Seriei Praedicamentalis [Dalgarno, 192]). Couturat fascinatingly opens his *Histoire de la langue universelle* with "passing" reference to "les pasigraphies", numbering systems based on taxonomic hierarchies keyed to words of multiple languages (1-2). Almost a 19th century network DNS or domain name service with its dot syntax, "les pasigraphies" can be made into "les pasiphrasies", or the keying of sounds to these pasigraphically-keyed numbers, thereby fulfilling the predicamental contract. Couturat goes on to remark that pasigraphies and pasiphrasies are most similar to apriori languages which he repeatedly shows in the first section of his history. Moreover, who else could inaugurate the proto-Enlightenment of artificial language but Descartes, who dreamed of an apriori, philosophical language with the same ease of use as Arabic numerals, although simultaneously cautionary and skeptical, also attempted to assert the necessity of only five to six days for its mastery by all men (12). As languages move on from numbering systems to apriori constructions, they can even employ, to use a term after Serres, a "bariolage" (Origins, 95-97), an ornate encrustation, in this case, of the arbitrary. Or they follow the pure transposition of one system of signs onto another, as in Jean-Francois Sudre's apriori language, "Solrésol" using spoken sounds for musical notes to encode the order of things. With letters coded to a given taxonomy, philosophers can then freely vocally pronounce them. The arrangement of vowels and consonants corresponding to taxonomic categories, Cram and Maat remark, is one of the major inventions of the artificial language movement, its realization that a totally new notation or set of characters, independent from all existing natural languages could be used as a operative image-like bridge for all language (Dalgarno, 2-3). While the resulting arbitrariness of the language makes it extremely difficult to learn, it is this very arbitrariness which ontogenetically transforms classification into the "things" beyond its systemic "order". The particularities of natural language dispensed with, the social actor then proceeds to refer to "pure things," skipping the connotative sense of language and going right to its indexical function.

As indexical bodies, the rebus-like, hybrid numerical and linguistic signs of artificial language attempted to purge the excesses of language while staying within the boundaries of science, the science of things, rather than that of speech or the senses (Dalgarno, 121). In George Dalgarno's *Ars Signorum* the author devises a philosophical language by creating words through juxtaposing categories, spun together like columnar digits in a Babbage calculating machine or universal table enclosing the filiations of all linguistic roots. For instance, A is mapped to Beings and things; H: substances; E: accidents: I: concrete beings of substance and accident; O: body; Y: Mind; U: Man; M: concrete mathematics; S: common accidents (150-51). Division two has its own list of subcategories as well as does division three. Couturat gives the example of "S" of the top level classification representing "common accidents", that when combined with "ka", it forms "Ska", or "religion", and when further combined with "m" we have a subdivision of religion, that of "grace". While Dalgarno performs his invention of language with a nearly mathematical substitution of characters into Latin signs in a quite sophisticated manner, another aspect of his motivation for building the language system is that it bypasses the messiness of flexions and difficult to pronounce sounds of natural languages. As a result, Dalgarno's attempt to "clean up" natural language initially has exclusion as its operative semantic image.

But Dalgarno's *Ars Signorum* and his linguistic work leading up to it, coming down to modernity as an artifact from the 17 Century, is amazingly literary in part of its sense. It attempts to "clean" language, and does so in ironing out syllabic variation into monosyllabic uniformity. Yet in the early broadsheets explaining a shorthand for translation or composition, Dalgarno also provides an elaborate system for users to learn the schema of his philosophical language, through an acrostic-like mnemonic poetry. So that, while the sounds of the words to be spoken in the fulfillment of the contract are cleansed of any direct situation within historical language, the interpretative frameworks packaged with the language do not so readily do away with a semantic richness and polyvalence of meaning. Therefore while artificial language largely fails to clean natural language of its seeming arbitrariness, inventing an arbitrariness of its own and a difficulty of language communities learning its system, at the same time, it is rich semantically and imaginatively.

PRACTICE

The First Chapter of Genesis

1. In the beginning God created the heaven and the earth.

2. And the earth was without form, and void; and darkness was upon the face of the deep. And the Spirit of God moved upon the face of the waters.

3. And God said, Let there be light: and there was light.

4. And God saw the light, that it was good: and God divided the light from the darkness.

5. And God called the light Day, and the darkness he called Night. And the evening and the morning were the first day.

6. And God said, Let there be a firmament in the midst of the waters, and let it divide the waters from the waters.

7. And God made the firmament, and divided the waters which were under the firmament from the waters which were above the firmament: and it was so.

8. And God called the firmament Heaven. And the evening and the morning were the second day.

9. And God said, Let the waters under the heaven be gathered together unto one place, and let the dry land appear: and it was so.

10. And God called the dry land Earth; and the gathering together of the waters <p. 119> called he Seas: and God saw that it was good.

11. And God said, Let the earth bring forth grass, the herb yielding seed, and the fruit tree yielding fruit after his kind, whose seed is in itself, upon the earth: and it was so.

12. And the earth brought forth grass, and herb yielding seed after his kind, and the tree yielding fruit, whose seed was in itself, after his kind: and God saw that it was good.

13. And the evening and the morning were the third day.

14. And God said, Let there be lights in the firmament of the heaven to divide the day from the night; and let them be for signs, and for seasons, and for days, and years.

15. And let them be for lights in the firmament of the heaven to give light upon the earth: and it was so.

16. And God made two great lights; the greater light to rule the day, and the

PRAXIS

Primum Caput Genesios

...an semu, Sava samesa Nam tηn Nom.

tηn nom avesa sof-shana tηn draga, tηn gromu avesa ben mem sηf bafu: tη υυ sηf Sava damesa ben mem sηf nimmi.

tηn Sava tinesa, gomu aveso: tηn gomu avesa.

tηn Sava mηsefa gomu sima: tηn Sava dosesa gomu dos gromu.

tηn Sava tonesa gomu Dan-gomu, tηn tonesa gromu Dan-gromu: tηn sem-gomu tηn sem-gomu avesa dan-ve vasa.

tηn Sava tinesa, dad-dreku aveso bred brepu suf nimmi: tηn doseso nimmi dos nimmi.

tηn Sava samesa dad-dreku, tηn dosesa nimmi bren dad-dreku dos nimmi ben dad-dreku: tηn lel-sηs avesa.

tηn Sava tonesa dad-dreku, Nam: tηn shemgomu tηn sem-gomu avesa dan-ve vηsa.

tηn Sava tinesa, nimmi bren nam dekoso bred dadu suma, tηn granar tηsoso: tηn lel-sηs avesa.

tηn Sava tonesa granar Nom, tηn tonesa <p. 119> deku sηf nimmi, Issi; tηn Sava mηsesa lolar suna.

tηn Sava tinesa, nom gυpeso nab, neibeid gune rug, tηn rag-sneig gune rag sos sugu lυla, rug sηf lul tim bred lυl ben nom: tηn lel-sηs avesa.

tηn nom gunesa nab, neibeid gune rug sos sugu lυla: tηn sneig gune rag, g sηf lul tim bred lυl, sos sugu lυla: tηn Sava mηsese lolar sima.

tηn shem-gomu tηn sem-gomu avesa danve vesa.

tηn Sava tinesa, gommu aveso bred daddreku sηf Nam sham dosesυ an-gomu dos dangromu: tηn lelli aveso sas dannu, tηn dan-vessi, tηn an-vussi.

tηn lelli aveso sas gommu bred dad-dreku sηf nam, sham gomesυ ben om: tηn lel-sηs avesa.

tηn Sava semesa vη gommu suma, goma suna sham sudesυ dan-gomu, n gomu shuna sham sudesυ dan-gromu: tηn samesa assi.

The Poetics of Dalgarno…

Conclusion: Poetic Languages as Science

So what, as in Dalgarno, is the artificial language contract, and can the lessons of the operative image as part/whole treat both natural and artificial language uniformly? Artificial languages, as extensions of natural language, are natural too. They demonstrate how semantic content follows an agreement between social agents to produce visual, spoken or material signs in a certain way, although this is usually an implicit agreement. Similarly, in numerous historical, literary contracts, modernist poetry later turns a practical expression in the universal language projects of its time into a science of poetics, an aposteriori poetics demonstrating the dual natural and artificial basis of its linguistic intervention. In Joyce for instance, writing is both poetry and science because it is a precise statement of the condition of le corps mêlé, of those in a cultural field implicated in numerous contracts of signification. Semantic richness is a product of a heterogeneity of the information signal along with a recognition of implicit heterogeneity in the noise of information, as writing fills in or "completes" the signature of the contract, a contract which its authors or sources may also have invented. The position taken by a language semantics in filtering natural/artificial language signs stems from the fact that languages difficult to learn, whether natural like Semitic languages, or "artificial" like Esperanto could invert the negative valence on their practicality for non-native speakers by instead prioritizing their complexity, their metaphor and the enhanced expressivity of heterogeneous signs.

As linguistic wholes, in every case, remain only other "parts" of "transducers" of language, the value placed on a scientificity of written or coded expression shifts directly in relation to the metaphorical power of writing. The operative image of linguistic change is the social contract for artificial/natural language, an interface that reestablishes an entire community of language users and its history -- in each participant's deployment or utterance, speech or transcription. Methodological pluralisms coming from the metaphysics of Leibniz up to the operative image as the image of operations, in interdisciplinary fashion, chart the interactions of seemingly incongruous systems of writing. The language contract remains despite the philosophical or natural status of language and its syntactical construction. Increasingly, new contracts proliferate along with systems of recording and writing, which are rich in semantic content.

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