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The Search for Real Characters: Pasigraphies as Silent Languages in European Linguistic Thought, 1600-1800

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Abstract

The Search for Real Characters: Pasigraphies as Silent Languages in European Linguistic Thought, 1600-1800. As its scholars sought artificial languages suitable for international communication and capable of philosophical and scientific precision, seventeenth- and eighteenth-century Europe saw several waves of proposals for visual languages, or pasigraphies, entirely separate from spoken languages. From a semiotic perspective, pasigraphies constitute a radical departure from the conventional paradigm of linguistic writing, instead representing meaning directly by means of graphic signifiers, and dispensing with the representation of phonemes, syllables, and morphemes that characterizes conventional writing systems. Pasigraphies, if successfully designed and adopted, would constitute a new, silent modality – the graphic-visual modality – as distinct from the vocal-auditory modality of spoken languages and visual-gestural modality of signed languages. The present study outlines the varied approaches the creators of pasigraphies adopted over the period 1600 to 1800, while detailing their attempts to solve challenges they faced in their efforts to endow these visual languages with autonomy from spoken language and, crucially, with effability – the flexibility and expressiveness of natural languages. Typically examined in previous studies as an element of the search for post-Latin international auxiliary languages, pasigraphies are here presented as a linguistic and semiotic phenomenon that can shed light on the present use and future possibilities of visual communication

Keywords

Constructed languages, pasigraphy, semiotics, visual communication, writing systems

Parole chiave

Linguaggi costruiti, pasigrafia, semiotica, comunicazione visiva, sistemi di scrittura

A silent lingua franca as a seventeenth-century desideratum

A confluence of factors made a universal language a desirable prospect in seventeenth-century Europe. As European vernaculars emerged as mediums for commerce and trade increased between European nations, there was a growing feeling that Latin had limited

potential in the practical discourse of commercial transactions.[1] The Protestant Reformation of the previous century and the consequent proliferation of religious viewpoints, a proliferation that continued unabated in the 1600s, led to a desire for an unambiguous language for religious disputation or, perhaps, a language of peace capable of surmounting newly created sectarian boundaries.[2] A burgeoning interest in observational and experimental science, and an increasing feeling for Latin's obsolescence in its role of pan-European language of scholarship, served as catalyst for a search for new scientific languages capable of describing new discoveries with clarity and precision.[3] At the same time, the rise of empirical method in science also served – at least in the eyes of some – to shift the locus of academic effort away from language learning. Writing in 1641, John Wilkins – who two decades later would author the century's most important universal language project – expressed the hope that a symbolic visual language would free scholars from memorizing words of foreign tongues and instead allow them to focus upon what should be the true object of their study, things in themselves.[4] As a solution to these perceived problems, many sought to create an easily-learned, expressive, and practical lingua franca, engendering the first real European drive to create artificial languages. A fascinating aspect of this initial flowering of European interest in interlinguistics is that most language planners during this period did not seek to create primarily spoken languages secondarily represented by writing, but instead sought to create silent languages that existed only, or primarily, as writing. These partly or wholly silent written languages – called *pasigraphies* – pose numerous quandaries for linguistic, epigraphic, and semiotic analysis.

Writing, language, and pasigraphy

Pasigraphies are written artificial languages intended to fulfil the communicative and social functions of human language while achieving comparable expressive capacity. In terms of modality, pasigraphies are graphic-visual – they are produced by means of graphic marks and perceived visually. They stand in contrast to the two primary modalities of natural human languages – the vocal-aural modality of spoken languages, and the gestural-visual modality of signed languages.[5] Pasigraphies employ (semi-)permanent graphic marks as their physical signifiers, thus possessing a permanence in their primary form that is not present in the ephemeral speech of spoken language and

[1] Knowlson 1975, pp. 27-30; Salmon 1964, p. 13; Idem 1972, pp. 51-53, 55-57.

[2] DeMott 1955; Knowlson 1975, pp. 9-12; Lewis 2007, pp. 176-182; Salmon 1972, pp. 43-51.

[3] Knowlson 1975, pp. 36-43; Lewis 2007, pp. 105-107.

[4] Wilkins 1641, p. 56.

[5] This is not to say that the spoken-aural modality and the gestural-visual modality exhaust the possible modalities of human language. For example, a vocal-visual modality – vocal production, visual perception – is present for those who can lip-read.

signed language. A pasigraphy, then, is a truly written language, in a completely silent modality, in this regard fundamentally different from natural human languages, while at the same time differing from true writing in the primacy of the (semi)permanent graphic form over ephemeral speech.

Crucially, pasigraphies are distinct from conventional writing. This distinction is perhaps not immediately apparent, and warrants some discussion. In recent decades the field of writing systems studies has come to a consensus on two basic tenets. First, the term *writing* should be reserved for systems that represent elements of linguistic form.[6] Consequently, any system of visual communication that represents something other than linguistic form cannot properly be termed writing. Such systems of a linguistic visual communication are additionally said to lack the full expressive power of human language, either in its spoken modality or represented secondarily by writing.[7] Second, writing is separate from – and secondary to – language, and thus the phrase *written language* is a misnomer. Writing, on this view, constitutes a secondary semiotic system that serves only to represent elements of language, a primary semiotic system, nearly always doing so imperfectly and imprecisely.[8] Which linguistic units are represented in writing depends upon the nature of the writing system – the phoneme, the mora, the syllable, and the morpheme all serve as possible units of representation.[9] While this explicit recognition is a significant achievement among recent scholars of writing systems, scholars from previous periods have also come to the same conclusion. One seventeenth-century language creator, George Dalgarno, called alphabetic writing 'mediate Signs of sounds and so *signa signorum* ('signs of signs' – author's note) and not *signa rerum* 'signs of things').'[10] The present chapter, while sharing these two basic assumptions as to the nature of 'true' writing and verbal language's primacy, will discuss a series of attempts to create systems – exceptional systems – that function in ways that somewhat complicate this paradigm.

As an attempt to artificially create a functional and expressive human language, a true pasigraphy should strive for two properties – effability and autonomy. Effability is the comprehensive expressive capacity of human language, generally attributed to natural languages as a facet of their languagehood.[11] An important aspect of effability – and one that proved especially challenging – is a capacity for the creation of novel forms to express meanings not otherwise expressable using the language's existing store of

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[6] DeFrancis 1989; Gelbe 1963; Meletis 2020; Rogers 2005. While this is the consensus position, especially among writing systems scholars with an explicitly linguistic orientation, such a view of writing is sometimes challenged (cf. Boone 1994; see also discussion in Meletis 2020, pp. 65-77).

[7] DeFrancis 1989, pp. 3-64.

[8] DeFrancis 1989, *passim*; de Saussure 1916, pp. 44-54.

[9] DeFrancis 1989; Meletis 2020; Rogers 2005.

[10] Cram, Maat 2001, p. 381

[11] Cf. Katz 1972.

lexical and grammatical units. Autonomy is the independence of the language from other languages, its ability to express meaning using its own semiotic resources, without employing another language's. Pasigraphers – the creators of pasigraphies – employed various means in attempts to achieve these two frequently-intersecting properties, with varying levels of success and practicality, but always falling short of the autonomy and effability of natural languages. Nevertheless, their attempts are illustrative of the potentials and pitfalls of visual communication, as well as the complexities of its relation to human language.

Silent symbols: hieroglyphs and numerals as real characters *par excellence*: Egyptian and Chinese 'characters real'

Most scholars trace the origins of seventeenth-century universal language schemes in general, and the quest for real characters in particular, to Francis Bacon's *Advancement of Learning* (1605), which includes an oft-quoted passage on 'characters real':

> It is the use of China, and the kingdoms of the high Levant,[12] to write in characters real, which express neither letters nor words in gross, but things or notions; insomuch as countries and provinces, which understand not one another's languages, can nevertheless read one another's writings, because the characters are accepted more generally, than the languages do extend; and therefore they have a vast multitude of characters, as many, I suppose, as radical words.[13]

Many were captivated by Bacon's assertion that a form of writing could express 'things or notions' rather that language, leading to a decades-long preoccupation among European thinkers with the possibility that visual signifiers could signify directly, without the intermediary of a spoken language.[14] In addition to Bacon's famous if mistaken passage, Chinese characters fired the European imagination due to their mention in the Jesuit missionary Matteo Ricci's account of his travels in China, *De Christiana expeditione apud Sinas*, published posthumously in 1615.[15] Bacon's passage is typical of a sustained European tradition that has misinterpreted Chinese characters as a non-linguistic system of visual signs, a position that has been repeatedly debunked by linguists and writing systems scholars who assert the Chinese writing system's status as true writing, a means for encoding specific linguistic forms.[16] Many seventeenth-century scholars were

[12] I.e. East Asia, and not the eastern coast of the Mediterranean.
[13] Bacon 1605, pp. 59-60.
[14] Cf. Goodhart 1952, *passim*.
[15] For example, Cave Beck explicitly cited Ricci as an influence (Cohen 1977, p. 3).
[16] DeFrancis 1989; Unger 2003.

similarly mistaken about the nature of Egyptian hieroglyphics, continuing a European tradition dating back to late Antiquity in which they were believed to be a kind of a linguistic visual communication rather than true writing.[17] As with Chinese characters, comparisons with the assumed linguistic neutrality of Egyptian hieroglyphics were frequent among pasigraphers – among others, Jean Douet made the comparison in 1627 in his proposal to the French king, as did Wilkins in his *Mercury* (1641), while a young Isaac Newton set up hieroglyphics as a model for emulation in his 1661 manuscript 'Of an Universall Language.'[18]

Signs and numbers

Egyptian hieroglyphs and Chinese characters were not the only visual signs that appealed to pasigraphers. Several authors made reference to other quasi-pasigraphic signs which could be 'read off' in any language, including mathematical symbols, musical notation, the signs of the Zodiac, alchemical symbols, and signs for weights and measures.[19] However, by far the most consistent touchpoint for those who sought to create silent languages were Arabic numerals. Works on pasigraphy are replete with references to numeric signs as a kind of visual communication above and beyond language.[20] Taking their cue from their perceptions, accurate and misguided, about these visual sign systems, pasigraphers very often touted the freedom to 'read off' a pasigraphy's characters in any language, as well.[21] However, if we take the languagehood of pasigraphies seriously, then 'reading off' the characters of a pasigraphy is not akin to reading the written representation of a spoken language, but rather constitutes an act of translation from a silent language into a spoken one.

Arabic numerals as a domain-specific pasigraphy

Beyond their assumed linguistic neutrality and translingual nature, the ten Arabic numerals of 0 through 9 impressed projectors of universal languages for another reason: within their domain of reference they achieved total effability with a limited set of signs and, in the form of the place-value system, a truly minimal grammar. It is truly the case that Arabic numerals are, at least in some uses, 'translingual', representing a constant semantic value even if their correspondence to specific phonological and morphological sequences of a language is inconstant. With the addition of a few other visual signs

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[17] Eco 1995, pp. 144-158.

[18] Cf. Elliott 1957. I owe these three examples to Singer 1989, pp. 56.

[19] Cf. Salmon 1972, pp. 128-156; Wilkins 1641, pp. 56-58; Lodwick 1647, p. A2.

[20] E.g. Wilkins 1641, p. 56; Lodwick 1647, p. A2; Boyle 1647 [1744].

[21] Lodwick 1647, p. A2; Wilkins 1641, p. 56-58.

employed in mathematical notation, the set of Arabic numerals in fact constitutes the lexicon of a domain-specific pasigraphy. This can be demonstrated by examples in which the semantic value of an Arabic numeral remains constant, even if its English pronunciation, or 'translation', varies. For example, in the following terms, the character <2> is used but is not read as *two* in English: 12, 21, 1/2, 2^{nd}, x^2.[22] In all of these cases, the semantic import of the character <2> never ceases be 'twoness', but its precise value depends on its syntagmatic relation to other characters and symbols. Further examples can be given that rely solely upon place-value. In <12> and <20>, < 2 > does not represent a phonological sequence entirely homophonous with the English morpheme *two*. The string <100> may be pronounced either *a hundred* or *one hundred*, just as <1,500> may be read either *fifteen hundred* or *one thousand five hundred*. In at least a few cases, the base employed in the Arabic numeral system and in a spoken-modality language may differ. In most varieties of French, the word for 'eighty', *quatre-vingts*, has a vigesimal base, but it is visually represented by a speaker of French with the string < 80 >, which is base-ten. In possessing this ability to modulate the meaning of paradigmatically contrastive numeral characters, either through place-value or co-occurrence with other signs, mathematical notation with Arabic numerals can be said to possess syntax – and thus grammar – as well as a lexicon. Taken together, these aspects of Arabic numerals suggest that they fulfil the pasigraphic ideal, in terms of both expressiveness and autonomy from spoken language, within their admittedly limited semantic domain.

Numerical pasigraphies as one of two strands of pasigraphic design

The pasigraphies invented during the 1600s and 1700s divide into two primary design strands. Pasigraphies of the first sort, numerical pasigraphies, consist of a glossary in which words of a pre-existing natural language, such as English or Latin, are assigned a uniquely identifying numerical sequence. A straightforward example of a numerical pasigraphy is Cave Beck's *Universal Character* (1657). A frequent variation on the numerical pasigraphy added a series of translation equivalents to each natural language headword, making the numerical pasigraphy in effect a multilingual translation dictionary as well as a neutral numerical code. Numerical pasigraphies of this type came to be known as polygraphies, in large part after Athanasius Kircher's *Polygraphia Nova* (1663). Pasigraphies within the second strand, which one might call real character systems, relied upon invented characters, with each character expressing either a lexical root or a grammatical category. Examples of this second type include the Real Character of John Wilkins's *Essay towards a real character, and a philosophical language* (1668) and Joseph de Maimieux's *Pasigraphie* (1797). In some cases an element of a real

[22] Rogers 2005, p. 60, citing a personal communication from J.J. Chew.

character system was incorporated into a numerical pasigraphy in the form of invented symbols representing grammatical derivations and inflections, as distinct from the lexical roots expressed by numerical identifiers. An example of such a split numerical/real character system is Solbrig's *Allgemeine Schrift* (1726).

Numerical pasigraphies, although they may seem simple, are semiotically quite sophisticated. The basic unit in such a system is a 'word', consisting of a string of numerals, e.g., in Cave Beck's Universal Character, < 2477 > signifies 'parent'. The use of a sequence of numerals (even if that sequence may consist of only one such numeral) entails that each digit within the string functions as a meaningless primitive – the Arabic numerals 0-9 are the equivalents of phonemes in a silent language. In this regard, numerical pasigraphies resemble later uses of numerals in unique numerical identifiers, such as tracking numbers, credit card numbers, or personal ID numbers. Although the immediately aforementioned terms contain the word 'number', in fact the individual numerals within unique numerical identifiers do not represent numbers in any real way – instead, it is the *sequence* of numerals as a unit, and that sequence of numerals' difference from any other sequence of numerals, that assigns reference to an individual entity and thus has meaning. This use of numerals in which each individual digit in isolation is 'meaningless' stands in stark contrast to the original use of Arabic numerals solely to represent numbers – in which case, even if the precise magnitude of their signification varies in accordance with their placement, each individual Arabic numeral never ceases to represent a numerical value. In divorcing Arabic numerals from their original, inherently semantic use and repurposing them as a semantic primitives to make up semantic radicals (i.e. numerical identifiers), the creators of numerical pasigraphies, quaint as they might seem at first, were in fact radically innovative. In doing so, pasigraphers artificially created duality of patterning – the ability to combine contrastive units with no semantic value of their own into larger, meaningful units.[23] Another advantage of using numerical strings is that such systems are open-ended: since a string of numerals can be of any length – much like a word in a spoken language can consist of any number of phonemes – there is no theoretical upper limit to the distinct 'words' that may be formed in a numerical pasigraphy.

Cave Beck's *Universal Character*

The earliest serious attempt to create a numerical pasigraphy is *The Universal Character* (1657), authored by the Ipswich schoolmaster Cave Beck (1623-1706). A large portion of

[23] Hockett 1960; Martinet 1949. The canonical illustration of duality of patterning is the combination of phonemes, themselves meaningless (in the conventional semantic sense), into morphemes, which do have meanings. While there are perhaps some marginal exceptions to duality of patterning (Blevins 2012, Ladd 2012), it is difficult to refute the position that duality of patterning is extremely common in human languages and a major source of their productivity and expressiveness.

The Universal Character consists of a glossary of 3,996 English words, each of which is assigned – or translated by – an Arabic numeral consisting of one or more digits. An additional derivational and inflectional component, partially modelled upon Latin, was indicated by letters of the Roman alphabet.[24] Thus, the meaning expressed by English *Honour thy father and mother* would be translated into Beck's Universal Character as < leb 2314 p2477 and pf 2477 >, with < leb > signifying the imperative plural, < p > a personal noun, and < pf > a female personal noun.[25] An intriguing element of Beck's proposal is that lexical roots are represented by one character set (numerals) while inflectional and derivational morphs are represented by another (letters of the Roman alphabet); in this regard it somewhat resembles the split between representation of lexical roots by kanji, as opposed to representation of inflections and functional items by kana scripts, in the Japanese writing system.[26] Beck includes a chapter entitled 'prosody' that provides a system whereby the digits 0-9 could be pronounced as syllables, turning the silent pasigraphy back into speech. According to these rules of encoding, the aforementioned string < leb 2314 p2477 and pf 2477 > would be pronounced as *leb toréonfo pee tofosensen & (sic) pif tofosensen*.[27]

Two semiotic analyses of *The Universal Character* suggest themselves. The simplest is to agree with fellow language planner George Dalgarno, who upon reading the work judged that the Universal Character was 'nothing else, but an enigmaticall way of writing the English language.'[28] Instead of employing phonographic letters that represent the phonemes of English, like the common English alphabet, each string of digits represents a single English lexeme in its entirety. On this view, the *Universal Character* is not so much a visual language as a simple numerical code. Another, more subtle perspective holds that Beck's system calques its lexicon from English, much like an *a posteriori* constructed language such as Esperanto calques its lexicon from the major languages of Europe. After calquing those elements of the verbal language, those elements are 'deverbalized', the reference language's phonological form swapped out for the Universal Character's written form of numerals and letters. On this view, Beck's system is a true pasigraphy.

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[24] Salmon 1976.

[25] Beck 1657, cited in Salmon 1976, pp. 189. The *and* (sic) is, apparently, left untranslated. In the line of Beck (1657) providing the pronunciation, *and* in the pasigraphy is represented with an ampersand < & >.

[26] Cf. Smith 1996.

[27] Beck 1657, cited in Salmon 1976, pp. 189.

[28] Cram, Maat 2001, pp. 418.

Arithmeticus Nomenclator

A slightly different numeral-based system was proposed by an unidentified Spanish priest in Rome in 1653.[29] Titled *Arithmeticus Nomenclator*, the proposal only survives in the account of the Jesuit scholar Gaspar Schottus (1608-1666).[30] The *Nomenclator* consisted of 45 categories containing a total of more than 1,200 Latin words. Each word formed according to the rules adhered to the simple template of a Roman numeral indicating category, followed by an Arabic numeral indicating the item number within that category, with inflectional and derivational information indicated by diacritics at various positions around the Arabic numeral.[31] Thus, 'crocodile' was XVI2. – < XVI > for the category '*Reptilia*, *Pisces*' ('Reptiles, Fish'), < 2 > for the second item within the subcategory, *crocodili* ('crocodiles'), and a final dot indicating that the preceding item is a singular noun in the nominative case.[32] Unfamiliar as they might be to speakers of European languages, prefixes assigning semantic classifications are not unknown in natural human languages – they can be found, for example, in the noun class system of the Bantu languages.[33] For all the potential of semantic classification as an organizing principle, there were glaring flaws in *Arithmeticus Nomenclator*'s execution of it – categories were of a varied character, ranging from word classes (e.g. adjectives) to looser thematic groupings such as items related to travel.[34]

Athanasius Kircher's *Polygraphia Nova* and Zalkind Hourwitz's *Polygraphie*

The plan for a third numerical pasigraphy, *Polygraphia Nova*, was published in 1661 by the Jesuit priest and polymath Athanasius Kircher (1601-1680). The title of Kircher's book is a direct reference to the *Polygraphia* (1518) of Johannes Trithemius, a work on secret writing, a topic also covered in several sections of Kircher's work.[35] Despite some similarities to the work of Beck in structure and to the work of several Oxford-based scholars in its intent, Kircher seems to have hit upon his system independently of any British influences;[36] we cannot be entirely sure if Kircher knew of the *Arithmeticus Nomenclator*, although given the close association of Kircher and Gaspar Schottus, to

[29] Strasser 1988, pp. 134-135 identifies this unnamed priest as Fr Pedro Bermudo.
[30] Schottus 1664, pp. 482-505; Maat, Cram 2008, pp. 1032-1033.
[31] Goodhart 1952, p. 77.
[32] Schottus 1664, p. 501, cited in Goodhart 1952, p. 77.
[33] Creider 1975.
[34] Maat, Cram 2008, p. 1033.
[35] McCracken 1948, pp. 216-218.
[36] McCracken 1948, p. 218.

whom we owe our only account of the *Nomenclator*, it is likely.[37] Kircher's 'new polygraphy' consisted primarily of a five-language vocabulary of 1,048 numbered Latin headwords, each with translations into Italian, French, Spanish, and German. Two appendices included, respectively, words belonging to functional classes (adverbs, conjunctions, prepositions, and pronouns) and the inflections of the Latin verbs *sum* and *habeo*. Intriguingly, and in a provision that other such systems nearly all lacked, the appendix of functional-class items also included a few personal names and place names, thus providing, in a limited manner, for the expression of proper nouns.[38] Kircher tacitly recognizes the 1,048-item vocabulary's expressive limitations when he suggests the user employ a bare-bones style of composition.[39]

Polygraphies broadly like Kircher's would be proposed not for decades, but for centuries afterwards. Many polygraphers appear to have struck upon the idea independently of Kircher. One reinvention of the polygraphy was the Polish-born Parisian Zalkind Hourwitz's *Polygraphie* (1801), which, like Kircher's, assigned numbers to Latin headwords, but differed in featuring no fewer than ten other languages in its multilingual lexicon.[40] In addition to newly-invented symbols for tense inflections, Hourwitz employed letters of the Roman alphabet for conjunctions, interjections, prepositions, and pronouns.[41] An additional feature, not found in Kircher's polygraphy, was the imposition of a regularized syntax on the polygraphy's alphanumeric words – a possible influence from de Mamieux's *Pasigraphie* (1797).

Real character systems: Lodwick's Common Writing

The second strand of pasigraphic design, real character systems, relied upon the creation of new symbols for its character set. The first full-scale work outlining such a pasigraphy is Francis Lodwick's *A Common Writing* (1647), which also appears to be the

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[37] It is also possible that Kircher was familiar with another numerical pasigraphy written only two years earlier – *Character pro Notitia Linguarum Universali* by Joachim Becher (1661). In its general outline, Becher's language resembles that of Cave Beck, save that Becher replaces Arabic numerals with an entirely new system of numerical notation of his own invention. *Character pro Notitia Linguarum Universali* is notable for its prodigious lexicon of no fewer than 10,283 words with Latin translations (Goodhart 1952, pp. 89-91).

[38] McCracken 1948. McCracken 1948, p. 220, rightly notes that there is no means to spell out additional proper names. One assumes that a user would simply use the alphabet of an existing language's orthography.

[39] McCracken 1948, p. 220.

[40] Malino 1996, pp. 161-166. It appears that Hourwitz coined *polygraphie* without knowledge of Kircher's 1663 book, of which he learned only after publishing his own study of the same name (Malino 1996, 164). He likely (re)coined *polygraphie* by analogy with *pasigraphie*, a word that had recently gained currency due to the work of de Maimieux, and which figures in the title of a 1799 essay by Hourwitz submitted to the Institut National (Malino 1996, p. 161).

[41] Malino 1996, pp. 162-163.

first work outlining an artificial language to be published.[42] A London merchant of Flemish and French descent, Lodwick – despite his primary vocation and lack of an academic degree – was an associate of the learned Oxford circles that included such mainstays of language planning as Samuel Hartlib, George Dalgarno, and John Wilkins.[43] In place of the sweeping taxonomic analysis that would underly the later work of Wilkins, Lodwick's Common Writing rested upon a detailed, subtle morphosyntactic scheme. The primary unit in this scheme is the radical, an invented character that represented an underived lexical root. Radicals were reserved for five word classes – one of words relating to 'action' (in effect, verbs), and the four otherwise underived functor classes referring to what Lodwick considered 'non-action': conjunctions, interjections, prepositions, and (underived) adverbs. Derivation and inflection were marked on radicals by diacritics taking the form of dots, strokes, and geometrical shapes. Not only four verbal tenses, but also related nouns, adjectives, and participles were derived from verb radicals by means of these diacritics, such that Lodwick's word for 'drinker', 'a drink', 'the (act of) drinking', and 'drunkard' consisted of a single radical 'to drink' modified by various diacritics.[44] This system extended to personal pronouns and possessives, which were also marked as diacritics on a verbal root, thus becoming the pasigraphic equivalent of bound pronominals.[45] A flexible and powerful derivational system not only drove down the number of characters required for communication, but also provided for greater expressive power and (should anyone have made the attempt) would likely have eased the burden of learning the system. Among its other notable features, Lodwick's pasigraphy is almost unique among those from this period for devoting some attention to the precise graphic structure of its characters, by presenting a means in which radicals and diacritics were, for greater legibility, composed using the five-staves of conventional musical notation. Despite its originality and thoroughgoing commitment to using visual signs as real characters, *A Common Writing* received a rather mixed reception among Lodwick's circle of correspondents, having at best a limited influence on subsequent pasigraphies.[46]

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[42] As noted by Lewis 2007, p. 49.

[43] Salmon 1976, *passim*.

[44] Lodwick 1647, p. 20. While 'drink' and its derivations are a case in which the morphology of Lodwick's Common Writing and that of English line up rather closely, it is clear that Lodwick intended that such derivational productivity and consistency be maintained in his pasigraphy even in cases where many natural languages used various distinct lexical roots to express such constellations of concepts.

[45] Lodwick 1647, p. 23.

[46] Lewis 2007, pp. 49-62; Knowlson 1975, pp. 59-61.

John Wilkins

Whereas previous pasigraphers either made no real attempt at semantic categorization (Cave Beck's *Universal Character*, Lodwick's *A Common Writing*) or did so only haphazardly (the anonymous *Arithmeticus Nomenclator*, Kircher's *Polygraphia Nova*), classification of one sort or another formed the organizational basis of another set of constructed universal languages. These languages, known as philosophical or analytical languages, sought effability through creating a regimented taxonomy embracing the totality of effable concepts. The formal elements of these languages then express particular concepts by indexing elements of linguistic form to particular clades or nodes within the taxonomy.

The most substantial, celebrated, and maligned philosophical language project of the seventeenth century is John Wilkins's *An Essay towards a Real Character, and a Philosophical Language* (1668). The *Essay* in fact proposes not one but two languages, both a pasigraphy (the 'real character' of its title) and a spoken language (the 'philosophical language'), with the latter to be represented by two phonetic alphabets.[47] In Wilkins's system neither the spoken language nor the written language is primary: both are isomorphic representations of elements within a classificatory taxonomy. The real character and the philosophical language in Wilkins's *Essay* have been aptly called 'autonomous codes'.[48] Thanks to this parallel architecture, the pasigraphy and the spoken language are fully commensurate and inter-translatable.

In keeping with its ambition to faithfully represent the true essences of things, Wilkins's *Essay* outlines an elaborate theory uniting semantics and ontology, built around an Aristotelian framework of genus, species, and difference that aspires to encompass every possible concept. The highest level of organization consists of forty genera, pertaining to categories in the natural world (stones, trees, beasts), metaphysical concepts (God, world), or notions of abstract characterization (quantity, quality, action, relation). Each is represented in the Real Character by a single invented character, while in the spoken 'Philosophical Language' it is represented by a particular consonant plus vowel sequence. Each genus then divides into up to nine differences, indicated by a diacritic stroke placed to the left of the Real Character's genus character and by a consonant suffixed to the Philosophical Language's initial CV sequence. The third and lowest level of the taxonomic hierarchy, species, likewise took the form of a right-hand diacritic to the genus character and an additional suffixed diphthong. Thus, each concept defined through the genus, difference, and species levels was represented in the Real Character by a compound sign of three parts – the primary genus character, functioning as a kind of root, flanked by diacritic strokes for the difference (on the left) and the species (on the right). Its translation equivalent in the spoken-modality Philosophical Language consisted of the sequence CV-C-V, for genus-difference-species. In either language, to

[47] Wilkins 1668, pp. 378-380, 395-413, 421-434.
[48] Nöth 1990, p. 269.

this base could be added an entire array of derivational and inflectional material taking the form of further diacritics or further suffixes. The derivational categories in themselves are quite ingenious, including not only the expected category-changing operations (e.g. adjectivisation of a root), but also derivations for opposites and coordinate terms. As can be gleaned from even this brief and necessarily incomplete overview of their design, the Real Character and the Philosophical Language of the *Essay* represent a monumental effort in language construction, constituting the most elaborate and detailed system of its sort from the seventeenth century.

Wilkins's project sought effability by classifying the totality of existence within this rigidly Aristotelian system. If, as he intended, the taxonomy captured all of existence, any referent could be signified by merely indicating its position within this taxonomy. However, since such a taxonomy will always be incomplete or partial – a fact that Wilkins himself realized[49] – any language built upon it will likewise suffer from its imperfections. The potential for linguistic innovation, a prerequisite for effability, is prevented by the rigidity of the taxonomy – it is not entirely clear how the 'Universal Philosophy', the classificatory scheme underlying the system of genera, differences, and species, could be updated and revised without disrupting the entire isomorphic structure of either the Philosophical Language or the Real Character. This lack is particularly acute in fields dealing with the natural sciences, an obvious preoccupation of both Wilkins and the Royal Society more generally, since – as James Knowlson has pointed out – the continual expansion of knowledge requires that a taxonomy of this sort be constantly updated.[50] The aspiration to comprehensiveness and detail of Wilkins's taxonomy is, ironically, precisely what limits the effability of the languages built upon it.

Despite its pretensions to completeness, Wilkins's taxonomy made no provision for proper names, which were to be represented by one of the two phonetic scripts intended for the Philosophical Language.[51] Since they fell outside the taxonomy's sweep, proper names could not be expressed in either of the *Essay*'s invented languages – a clear gap in their effability. Likewise, proper names written in the phonetic script cannot be said to belong to the philosophical language *stricto sensu*, since their structure does not reflect their placement in the taxonomy; therefore, proper names in phonetic script in either of Wilkins's languages, the verbal or the pasigraphic, amount to unassimilated borrowings. From a practical standpoint, the need to employ an alternative system to signify proper

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[49] Cf. Knowlson 1975, p. 102, and Lewis 2007, pp. 159-160. Wilkins himself thought the task of perfecting the *Essay*'s taxonomy, or 'Universal Philosophy' as it is called in the book's longest section, was the task of 'a college or an age' rather than that of a single person (Wilkins 1668, p. b2). For all the frankness of this admission, in his ardent faith that taxonomic language can iconically represent the true nature of things, Wilkins does not seem to have ever learned the lesson presented in Borges's famous essay on his work – namely, that his taxonomy, like that of the invented *Celestial Emporium of Benevolent Knowledge* and indeed of any other, will always be undermined by its arbitrariness (Borges 1952).

[50] Knowlson 1975, p. 101.

[51] Poole 2018, p. 11.

names is perhaps not much of a shortcoming; the other practical shortcomings of the system were likely to prove far more damning. From a theoretical standpoint, the lack of a means by which to express proper names within Wilkins's Real Character meant that it lacked an element of expressivity all natural human languages, and indeed spoken-modality constructed languages as well, invariably possess.

Despite these and other issues with its design, it is possible to use Wilkins's Real Character as a means of communication. In 1675, Robert Hooke, a friend and colleague of the recently deceased Wilkins, included an untranslated passage in the Real Character in his treatise *Helioscopes*.[52] It is some testament to the character's design, as well as Hooke's fluency in it, that more than 250 years later the British physicist Edward Andrade was able to provide a translation of the passage with a high degree of certainty.[53]

Pasigraphies in the Eighteenth Century

Many scholars have noted a dearth of universal language projects in the early and mid-eighteenth century, especially when compared to the broad-ranging and prominent work of the previous century.[54] Two factors likely contributed to the general waning of enthusiasm for universal language schemes. The most salient was the rise of French as a de facto pan-European language of commerce, diplomacy, scholarship, and the nobility, with its spread reaching as far east as Bucharest and St. Petersburg.[55] The second was a general realization that the various schemes proposed in the previous century, and further efforts along the same lines, were impractical.[56] This affected the spoken language and the pasigraphy proposed in Wilkins's *Essay*, interest in which declined with the death of Wilkins in 1672 and a gradual abandonment of the project by the scheme's continuators in Oxford in the 1670s.[57] A low point in the pasigraphic project's public reputation is reflected in Swift's satire on the Grand Academy of Laputa, whose 'most learned and wise' scholars have done real characters one better by eschewing speech altogether and instead conversing by silently pointing at objects which they carry around with them.[58] The few pasigraphies proposed during this period did not break any new ground: Solbrig's *Allgemeine Schrift* (1726) and the proposal published anonymously in the *Journal littéraire de l'année 1720* were both numerical pasigraphies; they differed substantively

[52] Andrade 1936; Poole 2018. *Helioscopes* was published in 1675 but postdated to 1676 (Andrade 1936).

[53] Andrade 1936.

[54] Wilkins, Asbach-Schnitker 1984, pp. xxix-xxxiii, xxxvii; Cohen 1977, p. 155, n.1; Knowlson 1975, pp. 139-140.

[55] Knowlson 1975, pp. 140-142.

[56] Knowlson 1975, pp. 139-140.

[57] Lewis 2001; Salmon 1974.

[58] Swift 1726; cf. discussion in Goodhart 1952.

from one another only in that the former used invented symbols for inflections, while the later suggested the use of letters for the same purpose.[59]

Interest in universal language projects only returned in the 1760s and 1770s, perhaps in part due to belated publication of various essays by Leibniz that attempted to employ a universal notation as a method of logical analysis.[60] However, it would only be in the century's last decade that a major new pasigraphy would appear. The *Pasigraphie* (1797) of Joseph de Maimieux (1753-1820) is, in many ways, the culmination of European pasigraphic thinking over the past two centuries. De Maimieux appears to have coined *pasigraphie* (from Greek πᾶσι *pasi* 'all' and -γραφία *graphia* 'writing') in 1795, the word first appearing in print in several early announcements of the project.[61] The word's first use in English, its spelling slightly anglicized as *pasigraphy*, occurred in that same year.[62] Reception of de Maimieux's work was enthusiastic – in addition to several public demonstrations of the system, the author presented the system to Napoleon in 1798, and for a time the Pasigraphie was taught at several places in France and Germany, de Maimieux's Parisian Bureau de la Pasigraphie functioning as a headquarters of sorts.[63] After the initial 1797 monograph, there followed three further works – a pamphlet and two books – expanding and refining the pasigraphy.[64] These did relatively little to change the language's general contours, although his *Pasilalie* (1799) introduced a method by which the pasigraphy's twelve characters could be (optionally) pronounced aloud, in a manner reminiscent of Beck's 'prosody' for the Universal Character and the dual-language system of Wilkins's *Essay*.

In its structure and usage, the Pasigraphie was an amalgam of features from previous visual constructed languages. The primitives of the system were 12 basic characters, all newly invented, with additional diacritics indicating – in a manner similar to many earlier proposals – a variety of grammatical categories such as tense and number. The smallness of the character set, however, was offset by the complexity of the rules for their combination and interpretation. Words in Maimieux's Pasigraphie were of only three lengths, following a Zipfian progression – three characters, for frequent closed-class items such as conjunctions and prepositions; four characters, for everyday words belonging to open lexical classes; and five characters, for specialist terms relating to the arts and sciences. Each length category had its own glossary – in ascending order, the *Indicule*, the *Petit Nomenclateur*, and the *Grand Nomenclateur*. In a manner reminiscent of

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[59] Cf. Wilkins, Asbach-Schnitker 1984, pp. l-li; Goodhart 1952, pp. 176-178.

[60] Knowlson 1975, pp. 142-149. The intersection of Leibniz's body of work with pasigraphy falls outside the scope of this chapter, since his work in this area is rather closely aligned with logical notation. On this topic, see Couturat 1901 and Maat, Cram 2008, pp. 1040-1042.

[61] Knowlson 1975, pp. 259, n. 15-16.

[62] Anonymous 1795.

[63] Knowlson 1975, p. 155.

[64] de Maimieux 1799, 1805, 1808.

Wilkins's Real Character, each subsequent character in a pasigraphic word further specified the word's location within its particular index – and, once again, as with Wilkins's system, the Pasigraphie's effability is limited by the comprehensiveness and arbitrariness of its taxonomies. Altogether, de Maimieux's pasigraphy is almost a distillation of Europe's pasigraphic theory and design, thus serving as a fitting bookend to a two-hundred year search for a silent language.

The continuing relevance of pasigraphies

It need hardly be said that neither the project of de Maimieux nor those of his predecessors enjoyed any lasting use. This is not to say that their efforts were trivial or even misguided – in many ways they were prescient, touching upon a perennial human search for new methods of communication. Indeed, silent visual languages have continued to hold a place in the linguistic imagination, with pasigraphy proposals continuing far past 1800 and on into the present day, many of them consciously or unconsciously emulating the general patterns established in the 1600s and 1700s.[65] Visual communication – and particularly the relation between language, writing, and alinguistic visual signs – has received renewed popular and academic interest with the advent and rapid spread of emoji.[66] Both the excitement and furor over emoji, and perhaps computer-mediated communication more generally, are symptoms of anticipation (or anxiety) that language and speech can be separated. Europe's first artificial language movement, the pasigraphers of the 1600s and 1700s, constitute a surprisingly early stage in this quest for silent language.

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[65] Cf. Harrison 1992; Nöth 1990, pp. 277-278.

[66] Evans 2017; McCulloch 2019.

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