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Language Barriers: Early Jesuit Efforts at Creating Common and/or Universal Languages

Abstract: In sixteenth-century South America, Jesuit missionaries were faced with communication problems in the "reductions" where they resettled the Tupí tribes. They created a language that drew on Tupinambá dialects while adopting a framework from Portuguese. In 1595, José de Anchieta published the first handbook of what became known as the *Língua Geral Brasilica*. Sixty years later, another Jesuit, Pedro Bermudo, overcame a different linguistic barrier: a so-called deaf-mute educated with other such children, he published his *Arithmeticus Nomenclator* in Rome in 1654. He proposed a mathematical-combinatorial system expressing each word in its limited vocabulary through numerical combinations. Kaspar Schott, a Jesuit working in Rome, brought this material to the attention of his Jesuit mentor, Athanasius Kircher. Using Bermudo's and Schott's own materials, Kircher published a *Polygraphia* in 1663, a more elaborate attempt at creating a combinatorial universal language still based on Latin. Building on all these linguistic proposals, J. J. Becher, a Catholic convert, in 1661 put out a *Character* with a greatly expanded mathematical-combinatorial language. Yet Becher questioned the universality of this numerical system: he translated the numbers into a graphic system influenced by pseudo-hieroglyphs that had to be learned by everyone alike, thus creating the first truly worldwide universal-language scheme. Even so, it was criticized by contemporaries like Dalgarno, Wilkins, or Leibniz, who favoured a universal language based on a philosophical system that also proved too complicated to succeed.

Keywords: Brazil, Esperanto, Jesuits, Johann Christoph Sturm, Johann Joachim Becher, John Wilkins, José de Anchieta, Kaspar Schott, *Língua Geral Brasilica*, Matteo Ricci, Pablo Bonet, Pedro Bermudo, Portugal, Tupí Indians, universal language

1 Overview

An analysis of early Jesuit efforts at overcoming the linguistic problems encountered in the missionary activities of this young Catholic order leads to a wide array of related developments that encompass a surprising range of fields. From the outset, there is an attempt by missionaries to establish a lingua franca between the various peoples in Central and South America and their own Portu-

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guese priests and countrymen. These efforts, which were soon documented in print, became known in seventeenth-century Spain and led to the development of methods aimed at creating another form of common language, namely systems that were to enable deaf-mutes – as deaf people were called at the time – to communicate with persons around them from whom they had hitherto been shut off.[1]

While these new ways of communication developed by Jesuit fathers were aimed at establishing a common linguistic ground among clearly defined groups, information on the training of deaf-mutes reached Jesuits in Rome who reprocessed this material: they expanded the intended range of users, which had hitherto been limited to persons with a medical condition, and created a system of communication that professed to establish universal written exchanges regardless of the individual linguistic background of its users. A Catholic convert privy to the new invention refined this numerically based system in what he considered its ultimate, logical expansion: as a commercial promoter with an eye to the opening-up of trade with the Far East, he devised a graphic means of replacing the Arabic numbers with a system of dots and bars that would have to be assimilated by everyone alike, by Europeans as well as by people in China or Japan, thereby creating the first truly universal system of worldwide written communication. Thus, an effort to establish a common language within a limited area influenced the newly devised instruction of deaf-mutes, which in turn led to the creation of systems of universal written communication that ultimately were refined to encompass the entire known globe.

2 Jesuit efforts at creating a common language in the Americas

Five hundred years ago, when the first Portuguese arrived in Central and South America, they immediately encountered a linguistic problem: the indigenous peoples in the areas they conquered spoke some seven hundred different languages. Among them was Old Tupi or Classical Tupi, a language – now virtually extinct – belonging to the Tupi-Guarani linguistic family. It was spoken by the native Tupí people who settled mostly along the coast of Brazil and were among the first the Europeans encountered when they landed after 1500. The missionaries accompanying these early explorers resettled the native population in what became

1 The term “deaf-mute” is a historical designation for people who were deaf and, as a consequence, did not have the ability to speak either; it will be retained throughout this article.

known as "reductions." They soon realized that none of the European languages in which they themselves were competent – and certainly not Latin, the lingua franca in their homelands – could be adapted to communication with the local tribes.

Although only founded in 1540, the Jesuit order, in particular, responded to this linguistic challenge. Jesuit priests began to devise a mixture of the idiom most widely understood among the indigenous tribes, namely Old Tupi, along with some Portuguese and, later on, even African words, to create a universally adoptable language. They systematized common standards of what they called the *língua geral* or the "general language," which became the accepted means of communication in the ever-expanding Portuguese colonial realm. The priest who carried out this linguistic groundwork was José de Anchieta (1534–1597), himself part of the third group of Jesuits who were sent to the Portuguese colony of Brazil in the 1550s. In 1554, thirteen of them made the arduous journey inland and founded São Paulo on the Tietê river. Their mission settlement soon developed into a small population centre, and it was there that Anchieta and his Jesuit colleagues began their efforts to instruct the native people in the rudiments of Christianity. They initially taught Latin to the Indians, but came to realize that such efforts resulted in failure. Anchieta then began to learn their language, Old Tupi, and with the help of Manuel de Vega started compiling a dictionary and a grammar that drew on Tupinambá dialects.[2] Anchieta's seminal work, *Arte de grammática da língoa mais usada na costa do Brasil* [The Art of a Grammar of the Coastal Language of Brazil], was written down in 1555, only one year after his arrival in São Paulo. It was published in Coimbra in 1595; his grammar and dictionary "still rank among the best ever produced of a Brazilian language, nearly 500 years later" (Sakel and Everett 2012, 153; see also Rother 2005). (Fig. 1)

On fifty-nine pages, Anchieta analysed Old Tupi according to the standards of Latin and/or Portuguese grammar; it should not surprise us that Tupi verbs, for instance, could express present and past subjunctives and formed a gerund or even a supine, an extremely rare form even in Latin. This standardized Tupi language – the *Língua Geral Brasilica*, as it became known – for centuries remained the primary means of communication in vast areas of South America and was even used for literary purposes.

2 On the cooperation of de Vega and Anchieta, see Denisov (1973, 19–21) and "Anchieta, José de" (2001). Manuel de Vega seems to have authored a *Catecismo, Diccionario i Gramatica de la Lengua de los Maramomisios, Indios del Brasil*, but there is no record of such a publication. See Ludewig, Turner, and Trübner (1858, 228).

Fig. 1: Title page of José de Anchieta's 1595 *Arte de grammática da lingoa [...] do Brasil.*

Two distinct versions developed in different regions and were spoken by the Tupí Indians, Portuguese colonizers, and, later on, black slaves and European immigrants alike: the *língua geral paulista* was used in the region of São Paulo, while the *língua geral amazônica* was centred on the Amazon basin. They suffered different fates: due to the imposition of the Portuguese language in Brazil in 1758 by the Marquis de Pombal, the all-powerful prime minister, the expulsion of the Jesuits from the country in 1759, and increased immigration from Portugal, the *lín-*

gua geral paulista became extinct in the nineteenth century. Its northern counterpart, the *língua geral amazônica*, has survived in small pockets of the Amazon region – as the Nhe(e)ngatú language (the "good language"), it is the native tongue of the area's rural population along the Rio Negro of northern Brazil as well as in neighbouring Colombia and Venezuela. In the past decade there has been a revival of Nhengatú, which has even become an official language alongside Portuguese in the municipality where most speakers are concentrated.[3] Their number pales, however, in comparison with Paraguayan Guarani, with which it is closely related. Far from being extinct, Guarani is the most widely spoken idiom in Paraguay and one of the country's official languages.

3 From the *língua geral* via manuals for the instruction of the deaf to the first system of universal written communication

These pioneering efforts at creating a common means of communication among various linguistic groups such as Amerindians and Portuguese colonists by Jesuit missionaries were certainly known by the end of the sixteenth century, when Anchieta's treatise appeared in Coimbra. It is no surprise that another Jesuit, the Spaniard Pedro Bermudo (1610–1684), was well aware of it when he received instruction as a deaf-mute by one of the first teachers in this field. Such training was frequently based on manuals for the instruction of deaf-mutes. The earliest publication of this kind, which contained several pages of illustrations of sign language, was a 1593 religious handbook for the sick. (Fig. 2)

In 1630, one of the important teachers of the deaf, Pablo Bonet (1579–1633), published a manual titled *Reducción de las letras […]* [Simplification of Letters, and the Art of Teaching Mute Persons How to Speak],[4] (Fig. 3) as there was an ever-increasing demand for such instruction among members of the Spanish nobility due to their problematic intermarriages: children from such close marriages were frequently born deaf. It is astounding that with the help of this kind of atten-

3 The municipality is São Gabriel da Cachoeira in the north-eastern corner of Brazil.

4 Bonet (1620, especially the *Abecedario demonstrativo*, 130–131). A similar illustration of hand and finger positions had appeared in an earlier book by Melchior de Yebra (1526–1586; publication posthumously in 1593). Although de Yebra had used these signs – which might well have been commonly known – primarily for liturgical purposes, as his description and illustration might suggest (174r [*recte* 147r]–179v), it was possible to adapt this sign alphabet for the teaching of the deaf. See Strasser (2018, 48–55).

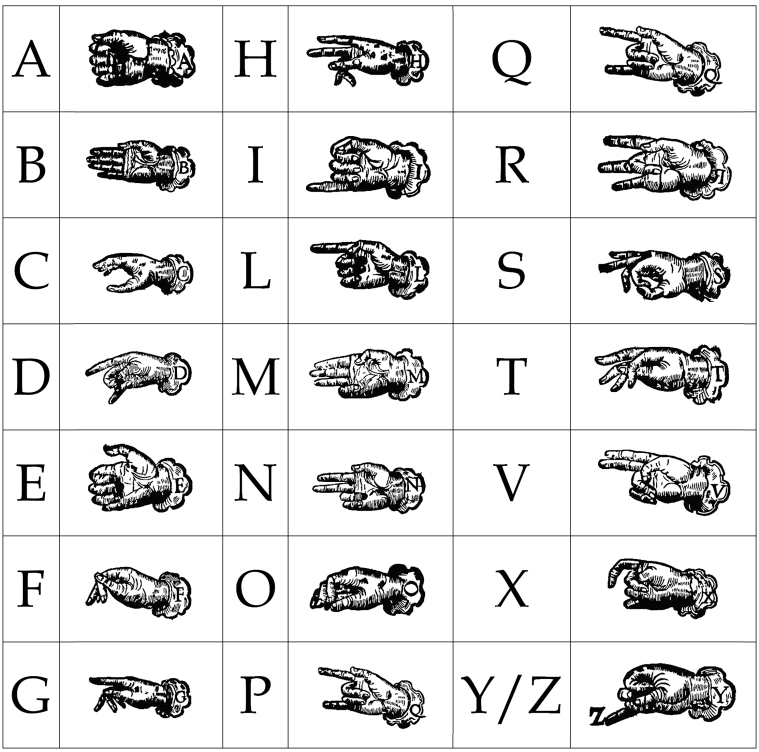


Fig. 2: First illustration of a finger alphabet in Melchior Sánchez de Yebra's posthumous 1593 *Libro llamado Refugium infirmorum.*

tion, deaf-mutes became so adept that they not only led productive lives but even entered the priesthood – where public speaking was of prime importance, after all. Pedro Bermudo was accepted into the Jesuit order and rose through the ranks to become the so-called General of the Spanish order in Rome – and that as a deaf-mute, as contemporaries documented.

There is no doubt that part of the instruction for the deaf, namely the rudimentary sign language already in use, along with knowledge of the *língua geral*, contributed to Bermudo's development of an early means of non-verbal communication (Strasser 2011, 556–561; Blanke 2006). Bermudo was certainly also aware of the first publications on the Chinese language and the intriguing writing system of this multi-ethnic empire. The best-informed source on the Chinese characters, or logograms – to use the modern linguistic term – was a report by the Jesuit Matteo Ricci (1552–1610), who during his two decades on Chinese soil mastered the language and rose to the rank of mandarin at the imperial court in Beijing. Before his death, he managed

Fig. 3: *Abecedario demonstrativo* from Juan Pablo Bonet's 1620 *Reducción de las letras [...].*

to send a manuscript to Rome – published in 1615 and translated into five languages in the next few years (Ricci 1615) – in which he chronicled the success of the Jesuit mission and analysed in detail a system that facilitated written communication amongst the speakers of numerous Chinese dialects, the Koreans, and the Japanese. All of this – along with the discussions of a philosophical universal language by scholars such as Francis Bacon, René Descartes, and others – was available to Pedro Bermudo when he devised his own system. Bermudo was aware of the limitations of Latin halfway into the seventeenth century when this long-established means of uni-

versal communication became increasingly suspect in Protestant countries as the "Popish tongue."[5]

Bermudo created his universal language based on a mathematical-combinatorial system. The title of the broadsheet that appeared in Rome in 1653 outlines his approach: *Arithmeticus Nomenclator […]*, or "Arithmetical Nomenclator Inviting all Nations of the World to a Unified Language and Speech, by a Spanish Author Who – Lo and Behold – Is Truly Said to Be Mute." The ephemeral broadsheet is lost; its title and Bermudo's material have only come down to us through the report of another Jesuit, Kaspar Schott (1608–1666), who submitted it to his mentor, the influential Jesuit polyhistor Athanasius Kircher (1602–1680). Schott ultimately described Bermudo's material along with a later universal-language proposal by Kircher and a much more extensive and truly "universal" one by another mid-seventeenth century scholar, Johann Joachim Becher (1635–1682), a Catholic convert and the only non-Jesuit in this group; all three systems, Schott writes, deserve to be analysed (Schott 1664, 478–505).

Bermudo's single-sheet publication, whose title already highlights two of the areas the author drew on, namely mathematics and cryptography (the "nomenclator"), and alludes to instruction of the deaf, divides the conceptual world into forty-four classes that he felt would encompass the phenomena essential for universal communication (see Strasser 1988c, 135–139, 144–165). These classes range from *I. Elementa*, *II. Coelum & Coelestia*, and *III. Intellectualia* all the way to *XXXVIII. Verba contrahendi*, *XLI. Adverbia*, *XLII. Praepositiones*, *XLIII. Personae*, and *XLIV. Viatoria*. The relative importance of each class is indicated by the number of items (ranging from fourteen to fifty-seven) within each class, which are indicated by Arabic numerals and listed in the manner of *I.1. Ignis*, *I.2. Flamma*, or *XLIV.1. Via*. Contrary to vertically arranged alphabetical nomenclators, Bermudo's items are listed consecutively in each class, which makes working with them more difficult. Since the Spaniard is not interested in secret communication, he proposes a system of dots and accents to indicate tense, case, and number (a method that would never be used in cryptography as it would facilitate deciphering). There is precedent for such a system in an Italian publication that Bermudo might have seen.[6] Schott dem-

5 This increased reluctance to use "Roman Latin" in Protestant areas, which in countries such as England or the Low Countries may well have led to early linguistic and philosophical deliberations about means of communication to replace Latin, should at least be mentioned here. See Strasser (1988c, 133–134).

6 Silvestri, *Opvs novvm […]* (1526). Silvestri's long title suggests that his invention could also be used by the military, researchers, and merchants – a group that later Lodwick and after him Becher would clearly have in mind, see p. 414 and n. 9 in this article, also Strasser (1988c, 64–68) and Strasser (1988b, 84–89).

onstrates Bermudo's grammatical and morphological system with the beginning of the Apostolic creed; his vocabulary – limited to 1,200 words – forced him to adjust the standard wording, *Credo in unum Deum, Patrem omnipotentem, factorem coeli et terrae […]*, to read: "XXXIX.$_4$ *(Credo)* XLII.$_8$ *(in)* III.$_1$ … *(Deum Patrem)* XXXIII.$_{47}$ *(omni-)* XL.$_{23}$ … *(potentem)*, XXXVI.$_{17}$ … *(creatorem)* II.$_{10}$ … *(coeli)* XLI.$_{15}$ *(et)* I.$_{21}$ … *(telluris)* […]." To be used in written communication across various languages, Bermudo's mathematical-combinatorial numbers can be transferred from a given reference language (Latin) to any other, provided that parallel dictionaries have been prepared. This, of course, is the principle of Bermudo's and all the subsequent combinatorial systems of this kind.

Schott's analysis of Bermudo's system profits from knowledge of two later universal-language proposals with which Schott compares Bermudo's. In particular, Schott disputes the potential worldwide use of the system as he questions the universality of Roman and Arabic numbers, which – he alleges – would not be understood everywhere on this planet. Since they can actually just be considered "universal characters" to be used in the transmission of a written message from one language to another and do not have to be analysed or understood, Schott's objection does not really stand up. He suggests an alternative, a "neutral" graphic method of expressing such numerical relations, and was influenced by Becher's *Character, pro Notitia Linguarum Universali* of 1661, which suggested for such neutral communication a graphic system influenced by pseudo-hieroglyphs that everyone would have to learn.

4 Johann Joachim Becher's pseudo-hieroglyphic system of universal communication

Becher's system, published in late 1661, possibly profited from Bermudo's proposal and certainly was influenced by an earlier, manuscript version of Kircher's 1663 *Polygraphia nova et vniversalis* that he had seen at the court of his employer, the Archbishop of Mainz.[7] In the introduction to his *Character*, Becher stresses

7 The full title of Kircher's work (1663) stresses the combinatorial aspect of the system: *Polygraphia nova et vniversalis ex combinatoria arte detecta*. The earlier manuscript that Becher had seen at the Archbishop's referred in its title to the reduction of all languages to a single one, namely to Latin as reference language: *Nouum Inuentum Linguarum omnium ad vnam reductarum*. It anticipated the somewhat similar system proposed in the 1663 *Polygraphia* and used symbols instead of Roman and Arabic numbers for the universal characters. See Strasser (1988c, 144–154, 182–191) and Strasser (1988a, 70–73).

the importance of written communication (he does not doubt that Adam knew how to write), is awed by the Chinese writing system, and draws parallels with cryptography – "when one considers different languages and ways of writing, then graphic communication is a form of secret written intercourse," he states, alluding to the potential of his open system to support secret exchanges (Becher 1663, A6v–A7v).[8] In the body of his work, Becher followed Kircher's bipartite arrangement: he prepared a Latin word list or *Lexicon* of more than 12,000 entries (including first names and geographical locations); he was aware of the different alphabetical arrangement in the dictionaries that were to be drawn up for the remaining six languages ("or even more, and – if you so desire – for all of them," he added). None of these parallel dictionaries were ever prepared, however;[9] as so often, Becher rushed his book into print since he wanted to claim the priority of his invention over Kircher's 1663 *Polygraphia*.

Much of Becher's material, therefore, is not fundamentally new; but his insistence on eliminating Roman numerals from his system and working exclusively with Arabic numbers facilitated its use. His *Character* deserves to be seriously investigated for one innovative reason alone: as Schott's comparative evaluation had already shown, Becher was the first scholar who considered the numbering system used in the previous combinatorial proposals – including Kircher's *Polygraphia nova* of 1663 that Schott also incorporated into his comparison – overtly "Eurocentric," to use this contemporary term. In this respect, Becher's system did not fare any better. Since his earlier publications had covered the field of economics, in particular seventeenth-century cameralistics, though, and as a commercial advisor to several German courts and the Hapsburg Emperor, Becher felt that the emerging international trade with Japan and China would be hampered if the Western system were forced upon these nations. It is ironic that Kircher's various publications in the field of hieroglyphics would suggest to his rival the translation of his numerical combinations into a pseudo-hieroglyphic system that is heralded in the engraving of an obelisk on the title page of the *Character*. (Fig. 4)

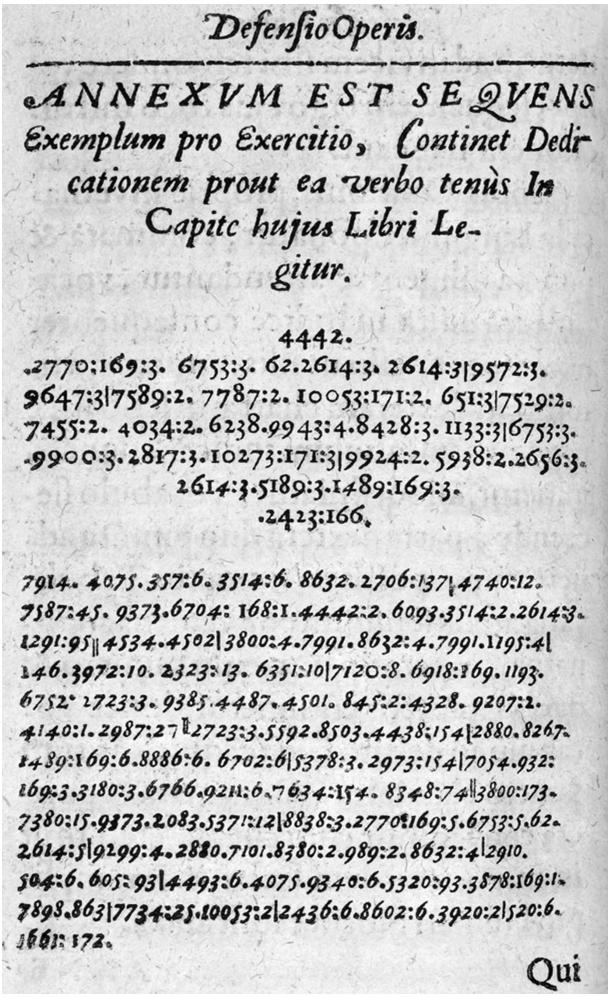
A look at the dedication to the Archbishop shows that the author had to resort to subgroupings in order to express grammatical and morphological content beyond the place-number of each word (Strasser 1993, 218–231). (Fig. 5)

8 Translations in this article are my own.

9 In a 1678 catalogue of his publications, Becher lists a *Character Idiomate Germanico* (allegedly Frankfurt 1660) that cannot be found now, even though Schott quotes from it in his comparison of the three systems (Schott 1664, 504, 508–510).

Fig. 4: Title page of Johann Joachim Becher's 1661 *Character, pro Notitia Linguarum Universali*. Courtesy of Herzog August Bibliothek, Wolfenbüttel, 371.4 (Quod.) 3.

"2770:169:3 / 6753:3 / 62 / 2614:30" is the numerical sequence for *Eminentissimo Principi Electori ac Domino* [Most Eminent Prince Elector and Master], whereby 2770 is the sequential number or "root" for *eminens* in the *Lexicon*, 169 indicates the superlative, and the additional qualifier 3 denotes the dative case – in other words, *eminentissimo*. These combinations as expressed in Arabic numbers are then transposed into what Becher considered hieroglyphic-like symbols surrounded by an Egyptian-looking cartouche. (Fig. 6)



Defensio Operis.

ANNEXVM EST SEQVENS Exemplum pro Exercitio, Continet Dedicationem prout ea verbo tenùs In Capite hujus Libri Legitur.

4442.
.2770:169:3. 6753:3. 62.2614:3. 2614:3|9572:3.
9647:3|7589:2. 7787:2. 10053:171:2. 651:3|7529:2.
7455:2. 4034:2. 6238.9943:4.8428:3. 1133:3|6753:3.
.9900:3.2817:3.10273:171:3|9924:2. 5938:2.2656:3.
2614:3.5189:3.1489:169:3.
.2423:166.

7914. 4075. 357:6. 3514:6. 8632. 2706:137|4740:12.
7587:45. 9373.6704: 168:1.4442:2. 6093.3514:2.2614:3.
1291:95‖4534.4502|3800:4.7991.8632:4.7991.1195:4|
146.3972:10. 2323:13. 6351:10|7120:8. 6918:169. 1193.
6752. 2723:3. 9385.4487.4501. 845:2:4328. 9207:2.
4140:1. 2987:27‖2723:3.5592.8503.4438:154|2880.8267.
1489:169:6.8886:6. 6702:6|5378:3. 2973:154|7054.932:
169:3.3180:3.6766.9211:6.7634:154. 8348:74‖3800:173.
7380:15.9373.2083.5371:12|8838:3.2770:169:5.6753:5.62.
2614:5|9299:4.2880.7101.8380:2.989:2.8632:4|2910.
504:6. 605: 93|4493:6.4075.9340:6.5320:93.3878:169:1.
7898.863|7734:25.10053:2|2436:6.8602:6.3920:2|520:6.
1661: 172.

Qui

Fig. 5: J. J. Becher, *Character [...]*: "Dedication" (= dictionary #4442) to the Archbishop in Becher's mathematical-combinatorial numbers. Courtesy of Herzog August Bibliothek, Wolfenbüttel, 371.4 (Quod.) 3, N5v°.

The horizontal and vertical bars and the dots allow Becher to transfer his mathematical-combinatorial universal characters into a value-neutral system[10] that –

10 Once more there may have been a precedent: the English merchant Francis Lodwick (1619–1694) may have been the first to propose such an opening of the combinatorial character to full universal validity. See Salmon (1972, 1–156).

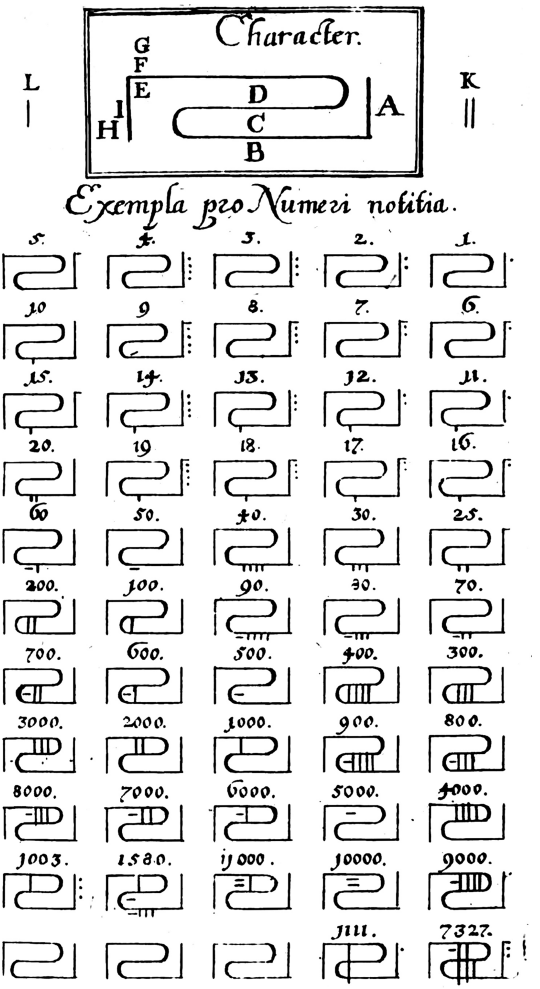


Fig. 6: J. J. Becher, *Character [...]*: sample page with transformation of Arabic numerals into hieroglyphic-like graphics. Courtesy of Herzog August Bibliothek, Wolfenbüttel, 371.4 (Quod.) 3, B7r°.

seen from today's vantage point – is actually binomial. His pseudo-hieroglyphic representation is one of the oldest attempts at a pasigraphic system, in other words, an attempt at creating a purely graphic (written) universal language. None of Becher's contemporaries had taken this extra step, although Bermudo and certainly Kircher had detailed knowledge of the worldwide Jesuit missions and their linguistic problems at a time when Latin could no longer be used as a

true universal means of communication[11] – but their efforts were directed toward proselytizing and not primarily enhancing world trade. For this reason, they assumed that conventional Roman and Arabic numerals could be introduced worldwide, if necessary, thus obviating any need for a graphic system like Becher's. It should come as no surprise, therefore, that Becher's system was discussed in England, where efforts to create a universal language were under way. And, when, in 1676, Johann Christoph Sturm produced the hitherto missing parallel word lists in Greek, German, French, and Italian, and the necessary indexes, his publication[12] was immediately heralded in the *Philosophical Transactions of the Royal Society*. Yet, despite this ultimate enhancement, Becher's graphic system of worldwide communication did not transcend its mathematical-combinatorial underpinning, which put it – and all similar endeavours – in direct contrast with the competing universal-language systems that were based on philosophical notions.

5 Athanasius Kircher's "polygraphic" system of universal communication

To close, let us have a look at Athanasius Kircher's seminal "polygraphic" system as demonstrated in his 1663 *Polygraphia nova*. The book reused elements of the earlier manuscript that Kircher had sent to several German courts and was a belated response to Emperor Ferdinand III's (1608–1657) request to rework a system originally proposed in a 1518 *Polygraphia* by Abbot Johannes Trithemius (Strasser 2011, 565–569). This earlier method – and Kircher's as well – indeed implied "multiple writing," as the title could be translated: in simple terms, each word in any of the dictionaries of the various languages Kircher prepared stood for one single letter of a given message – hence multiple writing. As in the previous systems discussed, communication was reduced to the transformation of a word or text into a mathematical-combinatorial system of numbers, which in Kircher's case (contrary to Becher's) relied on a mix of Roman and Arabic numerals. This required two separate lists, which are basically encoding and decoding lists – and I use

11 It is ironic that Schott's comparative evaluation of Bermudo's, Becher's, and Kircher's systems results in his apodictic statement that it should be easy for anyone to learn the Arabic numbers. In his specific analysis of Becher's method, he then claims that he cannot reproduce the hieroglyphic figures, but in return decides to improve on the system by devising a much more ingenious dot-and-dash method that none other than Umberto Eco considered highly refined (1995, 210–211).

12 Sturm only identified Becher as the creator of this system in the second (h) part of the *Collegium*. See Strasser (1988c, 191–195).

these cryptographic terms here given that Kircher's book extended its original intent as a means of universal, open communication to include various cryptographic, closed applications in later sections.

Thus, Kircher's *Dictionarium I, Pentaglossum* provided lists for about 1,200 words in five languages. Using Latin as the reference language – just like all previous authors, Kircher retained the priority of this former lingua franca – meant that only the Latin list was alphabetized, while the corresponding words in the four other languages did not follow this sequential order:

Latina.	**Italica.**	**Gallica.**	**Hispanica.**	**Germanica.**
A A	A	A	A	A
Abalienare I.1	*astenere*. I.4	abstenir. I.4	*abstenir*. I.4	abhalten. I.3
abdere. I.2	*abbracciare*. II.10	abayer. XII.35	*abbracar*. II.10	abschneiden. I.5

Kircher's decoding list – needed to locate the numerical combinations of a message – had to be arranged according to the 1,200 numbers of his dictionary. Thus *Dictionarium II* (which "serves to read and interpret the letters," as the subtitle states) is arranged in thirty-two groups of thirty-three to forty words per group; once again only the left-hand, Latin, column is alphabetized:

Latina	**Italica**	**Gallica**	**Hispanica**	**Germanica**
II.	II.	II.	II.	II.
Aliquid noui. 1	*nuova*. 1	nouuelles. 1	*nueuas*. 1	vevve [*sic* (= neue)] zeitung

Beginning with the twenty-fourth group, this bipartite code lists names of cities, months, proper names, adverbs, prepositions, or pronouns. These double numbers are followed by additional graphic symbols that indicate tense, number, mode, and similar information that provides the grammatical frame of a message. The author encourages the use of synonyms in view of the limited vocabulary, and suggests a plain, non-elaborate style. As in the earlier manuscript, he then prints a sample sentence to illustrate the "reduction of eight languages to a single one": *Petrus noster amicus venit ad nos [...]* [Peter, our friend, came to (see) us (...)] appears in seven additional columns, in the very last of which we find the transformation of each word into Kircher's universal characters, replete with additional symbols when needed. (Fig. 7)

Kircher's preamble to this part of his *Polygraphia* fulfills exactly the request of the late Emperor: "The first application of this development will enable everyone – even if he only mastered his native tongue – to nonetheless engage in a mutual exchange of letters with the peoples of the entire world" (Kircher 1663, 16). Despite the wide distribution of the book – the Jesuit network made sure it

Specimen reductionis octo linguarum ad vnam.

Latina	*Græca*	*Hebraica*	*Arabica*	*Italica*	*Gallica*	*Hiſpanica*	*Germanica*	*Literæ omnibus linguis communes.*
Petrus	Πέτρος	בחרום	بطرس	Pietro	Pierre	Pedro	Peter	xxvii. 36.
noſter	ἡμῶν	אחו -	حمتيه	noſtro	noſtre	nueſtro	vnſer	xxx. 21.
amicus	φίλος	בנ ו	ـــنا	amico	amy	amigo	freundt	ii. 5.
venit	ἥξει	בא	جا	è venuto	eſt venù	à venido	iſt kommen	xxiii. 8.
ad	πρὸς	אלי -	الي	à	à	a	zu	xxviii. 10.
nos	ἡμᾶς	נו	ـــنا	noi	nous	noſotros	vns	xxx. 20.
qui	ὃς	אשר	الذي	il quale	le quel	que	vvelcher	xxx. 22.
portauit	ἤνεγκε	הביא	جعطي	hà portato	à portè	ha trahido	hat gebracht	xvii. 29.
tuas	σοῦ	אגרת-	رسالا-	la tua	ta	vueſtra	deinen	xxx. 28.
litteras	ἐπιστολήν	ד	تنكى	lettera	lettre	carta	brieff	xiii. 16.
ex	ἐξ	ממי -	مه	dalla	de	de	auſs	xxix. 12.
quibus	οἷς	נח	ها	quale	la quelle	la qual	vvelchen	xxx. 22.
intellexi	συνῆκα	חיבנתי	عقلت	ho inteſo	iay entendu	he entiẽdido	ich hab verſtanden	xii. 3.
tuum	σοῦ	נפש-	نفسه	la tua	ton	vueſtro	dein	xxx. 28.
animum	θυμὸν	ד	ـــك	intentione	intention	animo	gemüth	ii. 13.
&	Καὶ	ו	و	è	&	y	vnd	xxix. 5.
faciam	Ποιήσω	אעשח	اعمل	farò	ie feray	harè	vvill thun	viii. 25.
iuxta	κατὰ	כ	ـــك	conforme	ſelon	ſegun	nach	xxix. 20.
tuam	σὴν	רצונ-	ارا	alla tua	ta	vueſtra	deinem	xxx. 28.
voluntatem	θέλημα	ד	تك	volontà.	volonté.	volontad.	vvillen.	xxiii. 40.

Fig. 7: A. Kircher, *Polygraphia nova [...]*: sample sentence in eight languages, with the transformation of each word into Kircher's "universal characters" in the last column. Courtesy of Herzog August Bibliothek, Wolfenbüttel, Fb 4° 52, 12.

would reach the farthest corners of the earth, and Kircher himself sent it to the Emperor in Vienna and to Catholic and Protestant rulers alike – his suggestion that the nobility, in particular, engage in this kind of worldwide written communication fell on deaf ears.

6 Demise of seventeenth-century numerical systems, rise of philosophically based universal-language systems

As we have touched on, the time was not ripe for manageable though limited systems such as Kircher's or even Becher's. By mid-century, universal-language systems based on philosophical notions seemed to gain the upper hand. Contemporary schol-

ars such as George Dalgarno and John Wilkins in England, or Gottfried Wilhelm Leibniz in Germany, proposed the idea that the entirety of human knowledge could be classified along philosophical – and not mathematical-combinatorial – lines, which could serve as a basis for a conceptual universal character and a new language. In 1668, Wilkins published his seminal work, *An Essay Towards a Real Character, And a Philosphical Language*, which for a while was seriously discussed by the Royal Society, of which Wilkins was a member – but his death-wish, a revised edition, did not come about. His system – in many ways contrary to Kircher's – was far too complicated for scholars, merchants, and long-distance traders alike, for whom it was intended. And Leibniz's lifelong, sporadic efforts to devise such a philosophical language met with a similar fate.

Thus end the efforts by seventeenth-century Catholic and, in particular, Jesuit scholars to stem the tide against the increased disuse of Latin as a means of universal scholarly communication. It is ironic that modern linguists have come to the conclusion that Becher's or Kircher's systems – possibly reworked and refined – could indeed have met the needs for worldwide written interchange in the seventeenth century. Instead, both the combinatorial and philosophical systems fell into oblivion, and with the rise of national languages as a vehicle for diplomatic and scholarly communication we have to wait until the 1880s when Esperanto, the one modern universal language to have survived, was proposed by Dr Ludwig Zamenhof. Alas, Esperanto, too, cannot aspire to reach the worldwide success of English, the one and only modern universal means of communication, from China, Japan, and Russia to Europe and beyond.

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