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The central premise of this paper is that the practice of officially and unofficially translating the contents of French textbooks into Portuguese resulted in inconsistencies in the spelling of many scientific and technological terns. In the early and mid nineteenth century a plethora of scientific terms derived from the Latin and Greek and written in the French language were introduced into Brazil through oral or written translations of French textbooks. A great number of scientific vocabulary items had no counterpart in the Portuguese language. There were few consistent and uniformly enforced rules of orthography and prosody in the Portuguese language, particularly as they applied to highly specific scientific terminology. Portuguese translators throughout the Luzo-Brazilian world were free to decide upon the appropriate spelling and pronunciation of French scientific terms in the Portuguese language.

As expected, spelling conventions varied from author to author and inconsistencies in writing and pronouncing Portuguese scientific terms abounded and began to appear with increasing frequency in the dictionaries of the period. Portuguese language dictionaries, while following a few basic rules on orthography and prosody, tended to uncritically reproduce the spelling of scientific terms as encountered in popular usage, even when the usage varied from region to region in Brazil and Portugal. The result was that many words violated the principles of etymological orthography, thus disfiguring the words in the most "barbarous manner" (Galvão, 1909, p. 73). Specifically, the dictionaries as a group provided an incomplete collection of scientific terms and a bewildering array of inconsistencies in their translations.

These irregularities were convincingly pointed out by the Brazilian philologist, Benjamin Ramiz Galvão, who observed that several popular dictionaries circulating in Brazil and Portugal prior to 1880 were rife with errors and contradictions in their spelling of commonly used Portuguese words. The dictionaries of Rafael Bluteau

(1638-1734), Franciscso Constâncio (1777-1846), Alexandre José Mello Morães (1816-1882), Araujo Corrêa de Lacerda (1802-1877) and José Ignacio Roquette (1801-1870) often lacked agreement in the number, type and spelling of common words and, most importantly in this study, of scientific terminology (Freire, 1922, p. 72).

The next generation of dictionaries, appearing in the 1880s and 1890s, demonstrated marked improvement over their predecessors. The dictionaries were more systematic and precise in their definitions, and more copious and inclusive of scientific vocabulary that had emerged during the previous fifty years. They adhered to pre-established principles and gave greater attention to the etymology of many of the words they defined. The most prominent of these publications included the *Diccionario* of Friar Domingos Vieira; the *Diccionario contempororaneo da lingua portuguesa* (1881) of Friar J. Caldas Aulete; the *Diccionario manual etymologico da lingua portuguesa contendo a significação e prosodia* of Friar Adolfo Coelho; the *Diccionario prosodico de portugal e brasil* (1895) of Antonio José de Carvalho and João de Deus; and the *Novo diccionario da lingua portuguesa* (1899) of Candido de Figueiredo.

Yet, while these dictionaries more adequately served the interests of translators concerned with transmitting science content in the schools, they, like their predecessors, failed to keep abreast of the advances of science and the emergence of new scientific terminology.[1] As Galvão points out, the dictionaries of the 1880s and 1890s failed to present Portuguese equivalents for many technical-scientific terms presented in the specialized French medical and natural science dictionaries authored by the likes of Charles Orbigny, Pierre Drapiez, Émile Littré, Charles Robin, and others (Galvão, 1909, p. 73). [2]

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[1] A notable effort to redress this situation was the *Grande diccionario contemporaneo francez-portuguez* of Domingos Azevedo and Luiz Felippe Leite (Lisboa, A.M. Pereira, 1887-1889). The work was based on Portuguese dictionaries, both ancient and modern, and developed under the auspices of Victor Hugo. It was written in accordance with the dictionary of the French Academy.

[2] The *Dictionnaire classique des sciences* de Pierre Auguste Drapiez was published between 1837 and 1845, and again in 1853; the *Dictionnaire de médecine, de chirurgie, de pharmacie, de l'art vétérinaire et des sciences qui s'y rapportent*, was published by Littré, Émile (1801-1881) in Paris : Baillière, 1878, 1898; the *Dictionnaire universel d'histoire naturelle, résumant et complétant tous les faits présentés par les encyclopédies* by Orbigny, Charles (1806-1876) ed. Paris, L. Houssiaux et cie,, 1861, 13 v.; and the *Nouveau dictionnaire abrégé de médecine, de chirurgie, de pharmacie et des sciences physiques, chimiques et naturelles* by Robin, Charles Philippe. Paris, Doin, 1886

The dictionaries were replete with examples of variations in spelling and pronunciation that plagued efforts related to science research and instruction. The dictionary of Adolfo Coelho, for example, offers numerous examples of such irregularities. A case in point is the spelling of the chemical elements of hydrogen and halogen, which appeared with two different endings as "hydrogeno" and "halogenio." Also, the words identifying flowering and non-flowering plants, i.e. gymnosperms and angiosperms, were spelled as "gymnosperma" and "angiospermia," again contradicting the argument that analogous terms require the same endings. Similarly, there was no logic is spelling microcosm as "microcosmo" while at the same time translating macrocosm as "macrocosmos"; the first term presented in singular form and the second in plural form (Currently, both are singular). An illuminating example from Coelho's dictionary is the translation of the terms referring to the three great divisions of plants -- acotyledons, dicotyledons and monocotyledons – as "acotyledones," "dicoteyledoneos" and "monocotyledonios." Lest it be thought that these inconsistencies were restricted to scientific terminology, confusion in common word usage also permeated the Note the case of the word "diagram," which was represented as the masculine noun, "diagramma," and the word "anagram" which was denoted as the feminine noun "anagramma," even though both appeared with the traditional feminine word-ending letter of "a" (Galvão, 1909, p. 80). Currently, both nouns are masculine.

In the *Diccionarios* of Carvalho and João de Deus the endings of zoological families were spelled in different ways, without clear evidence of underlying guiding principles in the translations. Note, for example, the following five endings: "idas" (ex: escómbridas), or scombroids, a breed of fish like the tuna; "ides" (ex: "proboscides and 'probóscides), or proboscides, mammals with large nasal protuberances, such as elephants; "ídeos" (ex: arachnídeos), or arachnids, such as spiders; "idios" (ex: aphidios), or aphids, an insect grouping which includes aphids and flees; and "idos" (ex: anélidos), or annelids, which refers to segmented worms. Endings such as "iano" and "ino" were also used to refer to some taxonomic families (Galvão, 1909, p. 80). This variability

related to the translation of the taxonomic categories of flora and fauna clearly demonstrates a lack of consistency and method.

One of the dictionaries that most exemplified the confusion in representing scientific terminology in the Portuguese language was the *Novo diccionario da lingua portuguesa* of Candido de Figuereido, a renowned Brazilian authority on questions of orthography and prosody. The dictionary was criticized By Galvão for indiscriminately presenting all the graphic variations in use in different parts of the Luzo-Brazilian world (Galvão, 1909, p. 80). It was argued that instead of being a repository of the language spoken by 18 million inhabitants, one that presented exact and uniform representations of the different variations of terminology, the dictionary often reproduced terms as they were spoken at the time, with little consideration being given to systematic exactitude in spelling and pronunciation (Galváo, 1909, p. 81). Egregious examples of the indiscriminate presentation of terminology were exemplified in the translation of "orphan," which appeared in different forms of the text as "orphão," "orfão," "orpham" and "orfam"; or the translation of "Creole", as "criolo," "crioilo" and "crioulo." As for scientific terminology, an example of this tendency towards misdirected spelling and pronunciation can be seen in the word " monotremes," i.e. the order of egg-laying mammals, which was variously translated as "monotrémo," "monotréme" and "monótremo" (Currently, "monotremo").

The variations in spelling largely occurred due to the dictionaries' practice of presenting the current usage of the terms. Spelling and prosodic conventions then appeared to be dictated by the educated populace that dealt with science. While this may have been the case, it was also clear at that time that there was inconsistency in how terms were presented throughout the regions of the realm, and throughout institutions. Many of the terms were harvested from popular language in the provinces and the Azorean archipelago and ultramarine possessions, thus contributing to errors and incongruities in translations. Dictionaries often relied on highly specific interpretations of terminology by professors who taught the sciences or who translated foreign texts in the sciences. These translators, who were unguided by standardized rules of orthography, attempted to interpret in their own language a bewildering number of scientific terms, mostly presented in French texts. Absent rules of standardization, the terminology

appeared differently among various regions, with the dictionary representing that which it felt was most prominent, or that which was the most ubiquitous form of the term.

SOME INCONSISTENCIES

SPELLING

1800s	Modern
microphyllo -- rhizophylo	microfilo -- rizofilo plant with small leaves -- living on roots
hemorrhagia – phleborragia	hemorragia –fleborragia uncontained blood flow -- rupture of a vein
opthalmia – exophtalmia	oftalmia -- exoftalmia inflammation of eye -- protrusion of the eyeball
peristylo – epistyllo	peristilo – epistilio circular arranged columns - architectural term
perichondro – hypocondrio	pericondrIo -- hipocôndrio cartilage membrane – upper part of abdomen
oxygêneo -- hydrogêneo	oxygênio -- hydrogênio oxygen – hydrogen
tetrápodo – cephalópodo	tetrápode – cefalópode four feet – mollusk (mussels)

PROSODY

rheóstato – aerostáto	reóstato -- aeróstato resister for currents -- airship
methýlo – éthylo	metilo – etilo methyl – ethyl
cephalópode – gasteropódo	cefalópode – gastrópode mollusk (squid) – mollusk (snail)
myopía – dysópia	miopia -- disopia neersightedness – enfeebled vision
heteromórpho – homómorpho	heteromórfo – homomórfo many-shaped – one- shaped

Ramiz Galvão

In response to the confusion surrounding the spelling of scientific terminology, Benjamin Franklin Ramiz Galvão, a respected professor of Greek, Latin and the sciences, was one of the first Brazilians to attempt to standardize the usage and spelling of scientific terminology in the natural sciences in the nineteenth century. Galvão, a doctor of medicine from the Faculty of Rio de Janeiro, had a long and distinguished career as Director of the National Library and as professor of Latin and Greek. Between 1869 and 1870, he taught Greek and Rhetoric at the College Pedro II, and again in 1897 to 1900 he taught Greek on an interim basis at the college. From 1870 to 1882 he was Director of the National Library, where he was widely acclaimed for his efforts at systematizing the holdings of the library. In 1881 he was named to the chair of zoology and botany of that institution (Blake, 1970, v. I, p. 395-396). In June 1890 Galvão was appointed Inspector General of primary and secondary education in the Municipality of Rio de Janeiro. He also taught Greek in a private college from 1902 to 1911 (Mauricéa Filho, 1972, p. 58).

Throughout his career Galvão's principal interest was philology. His interest first surfaced during his studies in medicine, at which time he began to reflect upon the inconsistencies of the scientific language employed in his courses. Galvão soon committed himself to putting in order what he saw as the arbitrary rules of prosody and orthography of the Portuguese language, and to definitively establishing an appropriate manner for representing the "objects, apparatuses and new ideas – the fruit of recent discoveries and investigations " in the sciences. Galvão understood the complexity of the scientific terminology of his day, much of which, although translated from the French, was founded on the Greek and Latin languages. This fact led him to attempt to simplify the Portuguese spelling of many scientific terms by referring to their roots in the Greek language. He worked unrelentingly to develop rules of orthography and prosody that were based on the etymological roots of the words, and that were applicable to common, but more specifically, to scientific terms.

By 1872 Galvão had re-written some 2000 vocabulary terms with his new rules, and during the next two decades he substantially increased the number of items. From 1898 to 1901 he employed his system of orthography and prosody to translate French textbooks on mineralogy by Auguste Lapparent, and on chemistry by Louis Troost. By

1909 Galvão had completed his work and presented over 10,000 words in his signature work, the *Vocabulario etymologico, orthographico e prosodico das palavras portuguêsas derivadas da lingua grega.* [3] Unique to this great publication was its inclusion of thousands of new technical-scientific terms that had evolved from the progress in the sciences, and that to that date had not been addressed systematically or comprehensively in other reference publications (Galvão, 1909, p.84).

Final Comments

Galvão's decision to advance his system defied the practice of the day and addressed the major problem in writing of scientific terminology. Dictionaries followed the usual convention that the "general use" of the terms dictated the manner that they would be written. Galvão attempted to standardize scientific language by providing a uniform system of translation that, until the Academy, did not exist. He repudiated, therefore, the implicit acceptance of "popular usage" as the ultimate standard by which words would be presented (Galvão, 1909, p. 87). Galvão allowed for some variation in popular and current words, but he was intransigent when it came to translating scientific terminology. For Galvão, popular usage was not a credible authority in this process.

In August of 1907 the Brazilian Academy of Letters established new rules of orthography, many of which eliminated the then current complexities of spelling. The Academy adopted certain conventions that changed the redaction of the many words. The letters *k, h, y* were eliminated, as well as all consonants that were not vocalized in pronunciation, and the letter *g* when it produced the sound *j* in the middle of a word. Also eliminated were all paired consonants, with the exception of double *r, s*, and *l* as found only in specific cases. The letter *z* was substituted by *s*, as were the letter combinations of *ch*, *ph* and *th* by the letters *c* or *q, f* and *t*, respectively (Galvão, 1909, p. 89).

In 1919 Galvão published his grand work in defiance of the conventions established by the Academy. The effect was to make his work eventually obsolete as the

[3] For additional information about the publications and translations of Ramiz Galvão consult Freire, L. *Estante clássica da revista de lingua portuguesa. Volume X. Ramiz Galvão*. RJ: Typografia Flumenense, 1922.

definitive dictionary. However, his systematization of spelling and pronunciation lent itself readily to the new rules of orthography and prosody adopted by the Academy of Letters. Much of the groundwork for identifying consistent usage was introduced by Galvão thereby serving as a reference for the eventual transformation of his system of spelling and pronunciation to the new system advocated by the Academy of Letters.

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