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TRANSLATING ENGLISH MATHEMATICAL EPONYMS

Floriana POPESCU

Introduction

The current study pertains to a comprehensive project so designed as to follow two major directions. On the one hand, English eponyms are described both in general and in particular terms, starting from their evolving definitions and presenting possible classification criteria as well as in approaching details, focusing on structures and meanings. In addition they are compared with their Romanian meaningfully corresponding patterns and are analyzed in terms of the solutions advanced by reliable sources of documentation regarding the translation of personal-names derived lexemes or lexical formations which pertain to science terminologies. To the same extent, this current study is a sequel to a descriptive approach of the English mathematical eponyms (Popescu 2009a).

1. A rationale

To discuss the English eponyms literature of speciality means, in our opinion, to devise two approaching perspectives, a) their interpretation through lexicographic descriptions which are mainly monolingual dictionaries and b) their theoretical descriptions which should focus on the eponym structure classification criteria (dealing with lexemes as well as the whole range of 'ready made' patterns revealing an impressive number of purposefully created word associations). An inventory of the lexicographic products of the English medical eponyms is available in Popescu (2009b). In addition to McArthur's (1996: 350) and Manser's (2005) rather generic distinctions of the groups of eponyms, a detailed classification of specialist eponyms is provided in Popescu and Maftei (2003).

The translation of English eponyms into other languages has hardly been tackled from the perspective of translation, be it perceived either as a process or as a product. Just two impressive works are referred to where English specialist eponyms are paralleled to their counterexamples in French (van Hoof, Henri 1993) and Russian (Petrov and Perepelkin 2005), respectively.

Against the 21st century background, specialists need to exchange ideas, to communicate or disseminate and share their experience or experiments results. Non-scientifically trained academics teaching English to non-philological students certainly as well as to professional translators may equally need answers to their queries. Professional translators, in particular, need proper tools to work as professional intermediaries contributing to the conveying of the SL message correctly to TL beneficiaries and to produce high-quality translations.

2. Corpus description

The current research is based on two corpora, one extracted from English sources (specialist dictionaries and samples from the literature of speciality) and the other from Romanian sources (specialist dictionaries and a mathematics compendium as well as excerpts from the literature of speciality, textbooks included). Our corpora scanning shows that over 350 eponymists indirectly made their contributions to the evolution of the mathematical terminology derived from personal names.

3. Method

Basically, the English mathematical eponymous formations consist of two elements, the eponym (which may be one up to four personal names, in synthetic or analytic genitive forms) followed by (one up to three common) nouns with or without determination. Since the paper main aim is to detect, enlist, interpret, comment and illustrate ways of translating eponyms in Romanian, the presentation will mainly rely on Catford's theory of translation, although other translation strategies and methods have been described in the literature on translations. Our interpretation is based on this outlook for practical reasons exclusively.

4. Findings

The interpretation of the translation methods or strategies will consider the contribution of Catford's linguistic theory. Within Catford's theory framework, three methods of translation are demonstrated to be active in the translation of eponymous patterns from English into Romanian: equivalence, translation shifts and transference.

4.1. Equivalence

Catford (1980: 27) defined equivalence to be possibility of 'any target language form which is observed to be equivalent of a given source language form'. In terms of mathematical eponyms this translation method is applicable in very few instances. One of them would be the syntagm the *method of Darboux*, where the English genitive pattern [noun + of + eponym] is nearly similar to the Romanian genitival pattern [noun + lui + eponym], *metoda lui Darboux*. Equally, the *sieve of Eratosthenes*, which has almost the same structure as its Romanian version, where the common noun is followed by a morphological element (preposition in English and possessive article in Romanian) involving possession, is translated into Romanian with two syntagms, i.e., *ciurul lui Eratostene* and *sita lui Eratostene*. This latter formula consists of the eponym preceded by literary form of the term *sieve.* The former syntagm is the unanimously accepted syntagm. Actually the *sita* version was recorded only in a popularizing booklet (Flynn 2008) translated into Romanian, while specialist dictionaries give the version *ciurul lui Eratostene* which is recorded as such in the literature of speciality (D.M.G. 1974: 48), even if the word *ciurul* is a regionalism and consequently, it should not be part of the scientific terminology. This is an example of superficial translation performed by a non-scientifically trained translator who, being unfamiliar with the Romanian mathematical terminology could hardly recognize the well-established 'ready made' patterns and created a personal version in surprising contrast to the already existing pattern.

4.2. Translation shifts

The majority of the illustrations are circumscribed to the subdivision of translation shifts, that is class-shifts wherein more specifically, "the translation equivalent of a source language item is a member of a different class from the original item" (Catford 1980: 78), or where the grammar patterns of the TL, Romanian in our case, require specific structures. The cases of both grammatical and meaning equivalence are obvious in patterns including a wide variety of common nouns, which may be further separated into technical terms and highly technical terms (Mackay and Mountford 1978: 145).

The first set of translation shift examples focuses on the generically called common words accompanying personal names. Words as *bottle, cut*, *path*, *test, surface*, *domain*, *space*, *method*, *paradox, principle, symbol* and *distribution*, in examples as the *Klein bottle,* the *Dedekind cut (tăietura Dedekind)*, the *Hamiltonian path (drum hamiltonian)*, the *Kummer surface (suprafață Kummer),* the *Hausdorff space (spațiu Hausdorff),* the *WKB method (metoda WKB),* the *Grelling-Nelson paradox (paradox Grelling-Nelson*), the *Kolmogorov-Smirnov test* and the *Kronecker symbol* (*simbolul Kronecker*). The pattern including a common noun as *principle* in *Hamilton's principle* will illustrate that particular case of transposition where the SL genitive construction is translated into Romanian through the same genitive pattern but which observes the Romanian morphological patterns *(pricipiul lui Hamilton).*

The second set of translation shift examples includes "those words which are unique to particular subject specializations and which rarely occur outside it" (Mackay & Mountford 1978: 145) and which are shared by a multitude of branches pertaining either to mathematics or to physics. They are specific terms as: *inequality, series, axiom, triangle, function and multipliers*. These nouns may appear in association with different personal names as in: the *Schwarz inequality* (inegalitatea Schwarz), *Hermann Amandus inequality* (*inegalitatea Hermann Amandus*), *Cauchy's inequality* (*inegalitatea Cauchy*), *Neumann series* (*seria Neumann*), *Hilbert's axioms*, *Pascal's triangle*, *Lagrangian function*, *the Hankel function, Lagrange multipliers*, *triunghiul lui Pascal*.

Finally, the highly technical words, i.e., those terms which represent "an intrinsic part of the learning of the discipline itself" (Kennedy and Bolitho, 1984: 57-8), will include such terms as *theorem, differential, equation, matrix, lemma, polynomial, equivariant, integral, cohomology* and *inference*. Since all the compounds including one of the examples in the foregoing illustrate translation shifts arousing no difficulty in the process of turning from one language into another, only special cases of duality will be considered. If the first term is analyzed in terms of translation possibilities, two mentions are worth remembering: most of the English theorem-compounds consist of the structure eponym in the 's genitive and very few have the alternate form, i.e., eponym (as determiner) + common noun. In addition to *Fermat's theorem*, *Euler's theorem*, *Green's theorem*, *Lagrange's theorem*, the specialist vocabulary includes the *tauberian theorem* or the *lagrangian theorem*. The same lexical duality is observable in Romanian where *teorema lui Fermat*, *teorema lui Euler* or t*eorema lui Green* appear in the close vicinity of *teorema Moivre-Laplace* or *teorema Lasker-Noether*.

The relationship of determination may be replaced by a relationship of possession, which in the Romanian versions is transposed into a relationship of determination. Thus, *Euler's theorem* becomes *teorema lui Euler* or *the Galilean group* becomes *grupul lui Galilei*.

4.3. Transference

Transference, 'an implantation of source language meanings into the target language text' (Catford 1980: 48) is to be understood to have been active with the borrowing of the proper name with its associated eponymous value, illustrated in the preceding paragraph. Another example could be the case of the eponym *abelian* (<Abel, the Norwegian mathematician, introduced in both languages. The Romanian versions of this adjective, due to this language morphological system, will have gender- and number-depending forms; thus, for only one example, the English syntagm *nonabelian algebraic topology* will become in Romanian *topologie algebrică nonabeliană,* the adjective in question showing the feminine mark *–ă. Hamiltonian* (<*Hamilton* + *-ian*) which is familiar to mathematicians as part of the syntagm *Hamiltonian cycle* or *Hamiltonian path* (this being translated into Romanian as *drum hamiltonian*, D.E. 1999: 17). The term *Hamiltonian*, another case of transference into Romanian, is also used as a noun to refer to a special mathematical formula and it is a case of lexical ellipsis, where the whole syntagm, *Hamiltonian operator,* was reduced to the eponym only.

5. Remarks on the eponym entries in English and Romanian dictionaries

The analysis of the corpus dictionaries reveals solid inconsistency and scarce documentation to be almost permanent characteristics of mathematical lexicography. Thus, Daintith and Nelson (1989) ignore items which are quite familiar in the literature (for example, the *Matcuzinski function*, (*non*)*Wahlquistness*, *Kopfschmerzhaus-type problem* which had been the object of research in the early 1980s, that is almost a decade before their dictionary publication). It may be argued that the terms do not originate in the English language, which is obviously true, but the terms had been used in a written literature whose language was English.

As for the Romanian lexicography, in general and the mathematical lexicography in particular, things are a bit different from the English one. Internationally acknowledged non-Romanian mathematicians are accounted for in Romanian lexicographic works of great value and importance against our cultural background, but the terms derived from these celebrity names are dealt with insubstantially. For example, a dictionary (D.E., V, 2004: 330) designed and conceived of to be 'encyclopaedic', dedicates an entry to Johann Friedrich Pfaff, the German mathematician, but

it makes no reference whatsoever to *pfaffian*, used as a determiner for ready made patterns including *equation*, *function*, *structure*, *form.* On the other hand, the entry describing Riemann's personality (D.E., V, 2004: 330), in the very same dictionary is rich in details, with references to *geometria riemaniană*, or to his having introduced the notion of *suprafață riemaniană*, etc.

Even if very few Romanian mathematicians have acquired worldwide reputation before the compiling of the dictionary in focus (Dictionar enciclopedic, vol. I to VI), some of them are very sketchily presented in brief entries, when they are not completely ignored. While Dan Barbilian's contribution to mathematics not only was considered during his lifetime (see Kelly 1954), but it still represents a topic of debate nearly half a century after it was advanced to the scientific community (see, for an example, only the two titles, the former signed by Hansen and Maldeghem 1989, and the latter by Boskoff, Ciucă, Suceavă, 2007), the encyclopaedic dictionary praises his literary gift and makes no reference at all to the 'ready made' structures including his eponym, such as *barbilian domain, barbilian space, barbilian equation, barbilian's metrization procedure*. Even fewer details are provided to the entry dedicated to Vasile Mihai Popov (D.E., V, 2004: 443), whose role in the field of mathematics has exercised a certain impact on specialists still approaching his ideas (Arlinski 2008, Hagiwara, Kurada, Araki 1998). The same reluctance is noticeable in the case of mathematical dictionaries referring to Gheorghe Țițeica, whose eponyms were known by the international community as early as the 1940s (see Niculescu 1945) and are still in use (see Zykov and Pavlov 2002), but which were not even mentioned in *Dicționar de matematici generale.* We agree that such an observation does not apply in the case of the *Dan Popescu*-derived eponyms (Swan 1998), which are fairly recent, but the attitude towards the derivates in the foregoing is unpardonable, to say the least.

Conclusions

The research of the English and Romanian mathematical eponyms as they are described in dictionaries shows that both languages do benefit from a rich collection of eponyms, irrespective of their structure. The lexicographic approaches of both languages need entry updating and revising procedures, based on a thorough exploration of the mathematical literature, now that information has become so easily accessible via the electronic tools and devices as well as the networking links. The corpus examination leads to comparisons: the English set of mathematical eponyms consists of an impressive number of ready made patterns, while the Romanian one is richer in one-word examples. Nevertheless, as our lexicographic corpus shows it, the Romanian mathematical terminology lacks more complicate 'ready made patterns' such as *the Brauer group of Enriques surface,* the *non-trivial Galois action of Gal, Shioda's theory of Mordell-Weil lattices,* the *Weyl vector of a compact Lie group, the* Wiener's tauberian theorem.

Since much of the specialist literature is published in the English language, the process of creating new eponyms or eponymous patterns is continually growing, and as a consequence, it is rather difficult not only to estimate the sum total of English mathematical eponyms, but to keep track of each new term or combination connected to personal names and to have it accounted for in the latest versions of specialist dictionaries. Moreover, Romanian lexicographers face both a lot of backlog to deal with as well as a change in their attitude towards exploring the Romanian contributions to the world mathematics as they are accounted for not by Romanian but by foreign forces.

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