WHEN WORDS OF CULTURE AND ETHNICITY BECOME SCIENTIFIC AND TECHNICAL

Maxim Nikolayevich Latu

Assoc. Prof. Ph.D., Pyatigorsk State Linguistic University, Russia, Laatuu@yandex.ru

Abstract

In the article I discuss some issues and peculiarities of cultural phenomena and ethnicity markers representation in the underlying form of certain technical terms as they are being coined. A comparative analysis of contemporary developing terminologies of space research, IT, nanotechnology, military science, medicine and ecology that are among the most promising fields of modern science as well as the terminologies of national martial arts is carried out to demonstrate and characterize their distinctive features and the nature of the relationship reflected in the underlying form of such technical terms.

Keywords: technical term; culture; ethnic identity; semantics; underlying form; coining; terminology; terminological element

1. INTRODUCTION

Today it is hard to deny the interaction between language and culture. “Language, culture and mind are interrelated, but this relation is optional and not direct. It doesn’t always appear all around (in the language) and is not necessarily obvious” (Vorkachev, 2014). At the beginning of the second half of the XXth century some linguists actively suggested that technical terms representing notions from various fields of academic and professional knowledge should be stylistically neutral, lack connotations and expression. They claimed that for this reason scientific texts appeared as if they were composed by a machine (Savory, 1967). Later studies have proved that some terms indeed correspond to this idea, however, there is a great number of others with figurative and metaphorical underlying form. Today some scholars following the trend on studying the differences in linguistic world maps claim that technical terms also “cannot but represent the part of concept that is nationally specific”, consequently cultural aspect “may improve and specify the term’s definition” (Merzliakova, 2009). Does the researcher refer to very specific terminologies? This, with some reservations, is probably true for some terms of arts and crafts that are closely related to culture. However such knowledge is more suitable for an article in an encyclopedia rather than for a definition. Different combinatory, figurativeness, variations in term elements in different languages are stated among the other “cultural traces” in technical terms. Thus, J. Sobol considers the Ukrainian technical terms to be of more “academese” as compared to the English ones that are figurative (Stezhko, 2013). But such differences are also natural and common for synonymous terms in one language. No doubt that every notion expressed by a technical term has its own history to tell. New terms arise from general vocabulary and those expressing topical notions acquire general use with additional associations. In this respect, Y.G. Stezhko states that, while “birch tree” is just a botanic term in English, it also expresses a cultural national symbol in Russian (Stezhko, 2013). This approach seems to be a slippery slope, for such information is not sufficient for the conception of the notion within the field of science and may result into definitions similar to the famous one of “oats” in Samuel Johnson’s Dictionary. So, what nature and specificity does the relationship between some ethnic and cultural phenomena, on the one hand, and pieces of scientific knowledge, on the other, have when it is reflected in the language? This issue is not that unambiguous or simple.

2. METHODOLOGY

Within the scope of this study I focus on some peculiarities of words reflecting ethnicity and cultural phenomena representation in the underlying forms and structure of technical terms, i.e. *Hydra* (that appears in space research, biology, etc.), *Griselda complex*, etc. My approach is to carry out a comparative analysis to demonstrate and characterize the distinctive features and nature of such technical terms in contemporary developing terminologies of space research, medicine, IT, nanotechnology, military science, ecology and some national martial arts from which I draw most of the examples. The technical terms for the analysis were singled out from the terminological data bases of the mentioned fields of knowledge. However the elaboration of the approaches mentioned hereinafter and detection of the types of lexical strata that was one of the parameters for the technical terms analysis and classification had demanded to turn to a wider range of terminologies. Thus, the study sheds light on a number of issues related to the nature of such technical terms. Semantic interpretation (that demanded reference to encyclopedic knowledge) and definition analysis proved helpful in detecting the lexical strata and classify the technical terms. The semantic and structural peculiarities were studied to define the degree of significance of the relationship between the cultural image or ethnic marker and a notion. The frame analysis was applied to reveal the distribution of the technical terms within the terminology systems and the categories of the notions they express. The comparative and qualitative methods were used to define the differences and regularities in the discussed terminologies. Thus, the algorithm of the study consisted of several steps. At first the technical terms belonging to the discussed terminologies were collected and organized in data bases. In the second step the bodies of the technical terms were analyzed to elaborate the approaches for analysis and principles of distribution of technical terms that have cultural or ethnicity markers in the underlying form. Subsequently, data bases were systemized and such technical terms were singled out. As the semantic features of terminological elements were analyzed and definitions were studied, the technical terms singled out were classified according to the defined strata of vocabulary units that refer to cultural and ethnic phenomena. In the next step statistical calculation of the strata was carried out, the peculiarities of the relationship between cultural phenomena and scientific concepts were reviewed, structural characteristics (including the number of components) were analyzed as well as the categories of notions that these technical terms express.

3. DISCUSSION OF RESULTS

The analysis of various terminologies has helped to define some ground arguments regarding the technical terms the underlying form (derivative and semantic motivation of a technical term) of which involves words referring to ethnicity or cultural phenomena. The percentage of such terms within different terminologies varies. It is more common for such technical terms not to be distributed equally in the extent of a terminology but to appear within certain areas of it. The reflection of cultural phenomena in the underlying form may result from the coining patterns of technical terms that have been historically established within certain scientific communities.

The analysis has shown that there are at least two approaches according to which it is possible to consider and classify such technical terms:

- identification of the strata of words representing ethnic identity and cultural affiliation that are used to create technical terms;
- detection of the origins of the reflected phenomenon.

According to the first approach the relationship between the expressed notion and culture or ethnicity is reflected in the underlying form of technical terms with the help of specific vocabulary units that can be classified into different strata and, in compliance with the specificity of such interaction, be of different degree of significance. The degree of significance influences the principles of such technical terms distribution and their number within a terminology. Let us consider them in detail and see if they appear in the discussed terminologies.

The first stratum includes vocabulary units that express images, characters, items that belong to or are associated with a particular culture. According to the degree of significance of the represented phenomenon these may be classified into two categories. The first category involves technical terms where a notion in a particular field of knowledge is directly linked to a specific cultural or ethnic phenomenon which appears in the underlying form for better understanding and conception. The notion is not preconditioned by it, however is closely related to it, i.e. *Oedipus complex* represents a notion that expresses an emotional attitude of a 3-4 year-old child, that is characterized by envy and hatred towards the parent of the same sex and sexual attraction toward the parent of the opposite sex. This term is based on the analogy made by S. Freud with

the logic and events described in Greek mythology where Oedipus kills his father and marries his own mother. The notion does not explain the behavior algorithm in a myth but bears strong resemblance to it, due to which this information is reflected in encyclopedic articles and even definitions in some dictionaries. The same is true for technical terms that represent scripts, defined by E. Berne, i.e. after pattern or *Damocles script*. In this case a patient's torments (he cannot enjoy life for he thinks he is doomed to pay for it) are analogic to the sufferings of mythological character Damocles (Berne, 1973). Other examples of such terms include *adonis* (herb), *myrrh, Ahasuerus' syndrome, Hercules beetle*, etc.

As for the terminologies of ecology, military science, nanotechnology and IT such technical terms are not numerous and represent less than 1%. Examples include *Gaia principle* in ecology proposing that the Earth (associated with mythical Gaia personifying it) acts as a self-regulating complex system or organism to maintain and transform conditions for life; *support-launcher "dzigit"* in military science that derives from an ethnic word for a skillful horseman and warrior reflected in folklore; *Janus nanoparticles* were perceived to have two-faces like the Roman god Janus, as they possess two distinct types of properties; the unique structure of *matryoshka* (*Russian dolls*) represents the differentia for a nanostructure (where one nanotube is inserted in another) that is known under the same term in nanotechnology. One of the types of malware in IT known as *Trojan horse* inflicts damage to a system after getting there under false pretences by disguising itself as a desirable object. This principle wholly replays the events involving the famous Trojan Horse described in the Iliad.

As for the terminology of space research there are more technical terms that borrow their structural elements from this stratum, especially those that were coined in the ancient periods, i.e. contemporary terms for 48 constellations have mythological origins. Their position in the sky is predetermined by myth structure, i.e. *Cepheus, Cassiopeia, Andromeda* and *Perseus* are characters of the same myth and the constellations named after them are located next to one another. The same is true for many other celestial objects: planets and satellites, star clusters, etc., i.e. Jupiter's satellites (*Io, Europe*, etc.) are named after characters that interacted with this supreme god, the seven bright stars in *Pleiades* bear names of the seven sisters. *Eridanus* is a long straggling constellation that is thought to resemble and represents a river in a myth into which Phaethon fell. The relationship in these examples gets weaker is symbolic and that brings us to the next category of the same stratum where it is indirect and the word for a cultural phenomenon has little to do with the notion.

The line separating the two may sometimes be very indistinct. The reference to cultural phenomena in such technical terms is indirect, symbolic and does not provide necessary information to reveal the essence of the notion. Sometimes such terms result from a pre-established coining pattern in a terminology, i.e. *5335 asteroid Damocles* that unlike the *Damocles script* does not share any details with a mythological character it refers to. The same is true for such technical terms as *dwarf-planet Ceres* (named after the goddess of agriculture), *hobbit galaxy*, etc. This group also involves derivatives and multi-component terms based on the core vocabulary, i.e. *damocloids, cepheids, andromedids, plutoid, Andromeda nebula, trans-Neptunian object, alpha Centauri*, etc. Some objects may share common rules and principles of naming, i.e. classical objects in *Kuiper belt* are named after creator deity, i.e. *Makemake*. This stratum being productive for the terminology of space research is not well represented in the other discussed terminologies, i.e. *microflora* in ecology.

Another stratum consists of words that do not necessarily express cultural or ethnic phenomena but may act as indicators or markers referring to a certain nation, state, geopolitical status, etc. The relationship is indirect and symbolic, i.e. the use of the names of rivers in Russia to coin terms for national weapons such as *surface-to-air missile systems "Neva", "Dvina", "Tunguska"* as well as different toponyms. Similarly, *SSN-777 North Carolina, SSN-780 Missouri*, etc. reflect the names of states and express USA nuclear submarines, *CH-47 «Chinook», AH-64 «Apache»* express USA helicopters and it would be surprising if it was vice-versa. This stratum proves productive for the terminology of military science especially due to the formation of the technical terms coining patterns for certain weapons. Examples in other terminologies include Russian *space-launch vehicle Rus*, *Harvard system of spectral classification, Soyuz spacecraft* in space research, *Harvard architecture* in IT, *Los Angeles smog* in ecology etc. In ecology, nanotechnology and IT such terms constitute less than 1%.

The next stratum presumes the use of words for nationalities in the underlying form of technical terms, i.e. *French head screw, French nail* ("*pointe*" in French), *Russian flying squirrel* that in Russian, for instance, do not have these indications. Similarly, what the English know as *Dutch bond*, is, literally, called "*English bond*" in Russian terminology which makes one wonder what the Dutch technical term is then. Some of such terms along with subjective perceptions represent encyclopedic knowledge, i.e. *Mongolian spots* that were first

discovered in newborn Mongoloids. However this stratum is nor represented in the discussed terminologies except for medicine, i.e. such terms were not found in the body of IT and nanotechnology technical terms. The statistics proves that the percentage of such terms is very low.

Another stratum is the names of real people who were scholars making discoveries related to the named notions or developers (humans and organizations) as well as historical personalities that are associated with the field of knowledge and notions. National origins of these people are well-known to specialists, however the relationship here is even weaker. Such technical terms appear in larger numbers in all the discussed terminologies as compared to the other mentioned strata: ecology (4,8%), military science (7,1%), nanotechnology (5,4%), IT (3,2%), space research (6%). The examples include *main battle tank M1 Abrams*, named after General Abrams, *T-90 Vladimir* named after the chief designer, *Beretta 900S, AK-47, Heckler & Koch MP7, nuclear submarine Alexander Nevsky* named after a great Russian warlord in military science; *Von Neumann architecture* in IT; *Abrikosov vortex, Volmer-Weber growth mode, Pechini method, Van der Waals interation, Moessbauer effect, Fresnel lens* in nanotechnology; *Andrewartha and Birch's theory in ecology*; *Tolman-Oppenheimer-Volkoff limit, Hubble's law*, multiple terms for comets such as *comet Shoemaker-Levi 9* that has become a coining productive pattern for such objects in space research terminology.

The second approach presumes that the reflected phenomenon may belong to home or foreign cultures. This may be well illustrated by comparing the specificity of the technical terms of tai chi chuan (Chinese), gorits fighting (Russian) and capoeira (Brazil) martial arts where ethnic and cultural specificity influences the process of term coining and are reflected in their semantics and structure.

Martial arts are known to rely on philosophy which in many ways correlates with culture and traditions of the ethnic society, i.e. in Chinese martial arts it is crucial to understand the essence of the notions *yin, yang, trigrams, qi*, etc., applied to combat. The analysis proves that tai chi chuan technical terms expressing combat techniques, are characterized by a high degree of figurativeness (that is also true for other Chinese martial arts), i.e. *Lazily Tying Coat, Fair Maiden Works Shuttles, Parting the Wild Horse's Mane*, etc. that in many cases follows the tradition of the imitation of animals reflecting the views of Hua Tuo, i.e. *Hungry Tiger Pounces on Prey, Wild Horse Leaping Ravine, White Crane Spreads Wings*, etc. Each animal, both mythological and real, embodies special characteristics in a tradition, i.e. monkey symbolizes cunning and dexterity. It is also stated that the correct performance stems from the correct understanding of the details of the image and "getting the feel of the role" (Makashev, Edilyan, 1991), i.e. *White Crane Spreads Wings* presumes rotational protecting and attacking cycle of hand movements that resemble spreading and flapping of wings (Chen, 1993). The underlying form also includes notions of folklore and mythological characters, i.e. *Green Dragon Emerges from Water, Buddha's Warrior Attendant Pounds Mortar/ Diamond king pounds mortar, Nezha Searches the Sea, Luohan Subduing Dragon*. Other distinctive features include the presence of predication in some technical terms that rates them as a unique structural type that is equivalent to a sentence, i.e. *Golden Rooster Stands on One Leg, Black Bear Turns Backward*, etc.; multicomponent structure (there are no one-component terms to describe Lao Jia and Jian forms) with three- and four-component terms predominating. The latter sometimes include prepositions and conjunctions in their structure. More than 60% of technical terms correspond to these peculiarities.

Apart from different ethnic and cultural images recalled in the underlying form (i.e. the symbolism of *Sun* and its yearly rotation important for ancient Slavs, *radogora*, etc.) the relationship with culture in terminology of gorits fighting is represented by the use of obsolete words, wordforms and expressions rarely used today as well as their derivatives to express combat movements that illustrate deep-rooted tradition, such as *secha* (fierce bloody battle usually with cold arms), *koromyslo, zaruchnitsa, zdrava, svilya, nadezha-boets, prav'*, etc. For this reason definitions also reveal etymology. Other distinctive features include the presence of neologisms, i.e. *trigora*, etc., the use of informal and abridged forms, irony, i.e. *rubilnya, koviryalka, spokoinoy nochi* (literally, "good night" that presumes a body drop by throwing back the opponent's head), affectionate diminutive suffixes, i.e. *sokolik*, *stelushka,* etc. (Gorits fighting). All the mentioned peculiarities do not appear in the tai chi terminology. One- and two-component technical terms predominate while technical terms with three and more components are of very limited number. More than 50% of terms correspond to the peculiarities.

The terminology of capoeira in Russian as well as in English is a body of transliterated borrowings from Portuguese. According to specialists, "the translation is not necessary or helpful here for it does not reveal the specificity of combat techniques. The early practitioners were slaves and the poor who were not well-educated so they coined simple terms understandable for them" (Capoeira), i.e. *armada* (literally, "crowd") is a reverse roundhouse kick, *martelu* ("hammer") a strike in the temple with the instep, etc. Some terms reflect

associations that the movement resembles conjures up, i.e. *telephone* (“phone”), *tesoura* (“scissors”), *relógio* (“timepiece”), etc. One- and two-component structure predominates here, but technical terms with three and more components are also present. The number of terms that conform to the pattern comes close to 100%.

4. CONCLUSION

The representation of cultural phenomena and ethnic markers in the underlying form of technical terms is characterized by a number of peculiarities and is reflected in the defined lexical strata. The reconsidered semantics of the words refers to cultural phenomena and ethnic identity, but this relationship, as a rule, is not reflected in definitions and may become less evident. The analysis has revealed a regularity that the number of terms grow as the degree of significance of the relationship weakens in accordance with the defined strata. In quantity the relationship is indirect, symbolic especially when newly created technical terms follow preestablished coining patterns (i.e. in space research, military science, etc.) or are derived from such technical terms. It is important to note that on the whole such technical terms generally do not represent significant percentage within the discussed terminologies (except for the terminology of space research) and are dispersed unevenly sometimes in groups to signify the notions of one subsystem or class of objects. In many cases productive coining patterns are established that explains the adjacency of the notions they express and their groupings within certain areas in the extent of terminological systems. In the terminology of space research the pattern that first was used for constellations was later extended on celestial objects of various classes. Some words serve as productive term elements to coin new technical terms in different terminologies. The discussed relationship was found in both one-component and multi-component technical terms. The analysis proves it is more common for the technical terms that express the notions of nomenclature. Our research has also proved that such terms generally express the notions of certain categories, such as material natural and artificial objects (i.e. mechanisms in military science, space objects, etc.), as well as some nonmaterial entities (effects, theories, etc.), however such technical terms are not coined to express the following categories of notions: characteristics, processes and agents of action that also build up a significant body within a terminology. The discussed strata are not evenly represented within terminologies and peculiarities of semantics and structure of the technical terms reflect the specificity of a terminological system. In case of very specific terminologies, such as those of martial arts, the cultural identity is not only reflected in the underlying form but also defines semantic and structural preferences, the choice of terminological elements and the formation of productive coining patterns.

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