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PHONETIC TYPOLOGY

Tetiana M. Korolova

Doctor of philology, Professor of Philology Department of Odesa National Maritime University, Odesa, Ukraine e-mail: kortami863@gmail.com ORCID ID https://orcid.org/0000-3441-196X

Svetlana Yu. Yukhimets

Candidate of Pedagogical Sciences, Associate Professor of Philology Department,
Odessa National Maritime University, Odessa, Ukraine
e-mail: yukhymets.svetlana@gmail.com
ORCID ID https://orcid.org/0000-0003-3350-7310

SUMMARY

In spite of many works in the field of phonetics some problems of typology still want systematisation both on segmental and suprasegmental levels. Experimental research is one of them. The research is aimed at determining phonetic typological characteristics in English and Ukrainian on segmental and suprasegmental levels. The results of the research demonstrate the significant amount of typologically similar characteristics in English and Ukrainian. The presence of fore lingual and back lingual vowels, plosives, fricatives, voiced and voiceless consonants, such phenomena as reduction and assimilation in both languages under investigation testify to it. Similar mechanisms of word stress production that is the total energy data (dynamic characteristics and duration time) is another mark of typological similarity of English and Ukrainian.

The intonation models, the degree of stability of intonation models, sentence stress variability, the same functions of intonation in the process of speech production show similar mechanisms of prosody elements' interaction. The most stable in both languages are the prosodic models of attitudinal and emotional functions of intonation. The status of different functions (the attitudinal function, sense-group delimitation, sense-groups relation, communicative type of utterances, sentence stress) of intonation changes from the subordinate one (as in the function of division into sense groups) up to the dominating one (as in the function reflecting the speaker's emotional state). In correspondence with this status and the poly-functional character of intonation the resulting intonation contour mainly

preserves the relevant prosodic features of the dominating intonation function in English and Ukrainian.

The qualitative and quantitative differences of segmental (phonematic length of vowels in English, phonemic length of consonants in Ukrainian, some difference in articulation) and suprasegmental units (variety of melody contour structure, prevalence of dynamic characteristics in English and temporal in Ukrainian) in the languages under investigation are explained by linguacultural peculiarities of the communities, their historical development.

Key words: typology, phonetics and phonology, similar characteristics, segmental and suprasegmental levels.

Introduction. A few words should be said about the fundamental works of A. A. Potebnya, A. V. Popov and other linguists, which formed the basis of the Ukrainian phonetic school. The existence of many phonetic schools in Ukraine: Kharkiv school (L. A. Bulakhovsky, M. F. Nakonechny, Yu. V. Shevelyov), Kyiv school (I. P. Suntsova, V. S. Perebiynis, N. I. Totska, L. G. Skalozub, A. Y. Bagmut), Odessa (T. O. Brovchenko, Yu. O. Karpenko, T. M. Koroleva, etc.) testify to the active development of phonology, phonetics in the 20-th century. Phonetics in the 21st century is in an active state, which is reflected in the appearance of numerous textbooks, monographic works in the field of phonetics and phonology, expansion of research issues (Багмут, 1991; Корольова, 2006; Тоцька, 1973; Шевельов, 2002; Gussenhoven, 2004; Kreidler, 2003).

This period is characterized by intensive development of all sciences and linguistics as well. The achievements of the scientists in the sphere of the theory of linguistics, the new approaches to different problems, the development of new methods and apparatus in the branch of experimental phonetics made it necessary to carry out additional theoretic and experimental investigations (Багмут, Борисюк, Покидько, 2000; Brovchenko, 1974; Бровченко, 1978; Карпенко, 1996). One of them concerns the problem of phonetic typology of the languages (Корольова, 2006; Корунець, 2004).

In this respect the method of contrastive phonetics is of great importance. This method was spread in Ukraine in 1950s-60s to meet the needs of the teachers of foreign languages i. e. the most successful way to teach foreign languages (Бакум, 2012). It was stated that the adults who want to acquire correct pronunciation of a foreign language are to learn the phonetic structure of the given language in comparison with the mother tongue. It caused the necessity of systematic comparative scientific investigations of phonetic structure of the foreign and native language of the learner.

In the contrastive investigation of the speech sounds and prosody in English and Ukrainian the experimental methods were applied; as a result, some specific peculiarities in either of the languages and typical features for the two languages with the dynamic type of stress were registered (Бровченко, 1971; Корольова, 2006; Багмут, Борисюк, Покидько, 2000).

The subject of phonetic typology is the system of speech sounds, their quantitative and qualitative characteristics in speech of the contrasted languages. Interchange and combinability of speech sounds in words and syllables as well as suprasegmental phenomena (melody, tempo, voice timbre and sentence stress) are examined.

In spite of many works in the field of phonetics some problems of typology still want systematisation both on segmental and suprasegmental levels.

The research is aimed at determining and describing phonetic typological characteristics in English and Ukrainian at segmental and suprasegmental levels.

The task of the contrastive analysis of the two languages is as follows:

- 1. Research of vowels and consonants, their combination characteristics in the languages under investigation. The function of segmental units.
 - 2. Comparison of functional characteristics of syllables, word-stress.
 - 3. Investigation of suprasegments' peculiarities.
 - 4. Defining typologically common and differential phonetic features.

As to the system of segmental units it should be stated that the existence of vowels and consonants in both languages testifies to the fact of their *similarity*, the same mechanisms of sounds functioning in speech: assimilation, dissimilation and reduction is another evidence that demonstrates the languages' common features. At the same time one should note that there are many points of qualitative and quantitative variety between English and Ukrainian. In this investigation special attention is payed to vowel and consonant phonemes in the compared languages.

Discussion. Common characteristics of vowel systems are the following. The existence of monophthongs in English and Ukrainian testify to similarity of the language systems. At the same time distributive characteristics of the systems of English and Ukrainian vowel phonemes differ: there are 20 vowel phonemes in the English language, 12 of them are monophthongs, 8 diphthongs. There are only 6 vowel phonemes in the Ukrainian language. All the Ukrainian vowel phonemes are monophthongs, there are no diphthongs in Ukrainian.

Existence of front and back vowel phonemes contributes to typologically common facts of the languages under analysis. At the same time in the English language exist mixed vowel phonemes that are absent in Ukrainian. The *quantitative* characteristic of front and back vowels differs too: the English front and back vowel groups include a considerably greater number of phonemes than those of the Ukrainian language.

The difference in the *qualitative* features of the vowel length is substantial. In the English language there are long and short vowel phonemes while in Ukrainian long vowel phonemes do not exist.

From the point of view of *production* peculiarities the division of vowel phonemes into different groups according to the position of the tongue is not the same in the English and Ukrainian languages. Thus, the English front vowel phonemes [*i*:], [*i*], [*e*] are closer and more front than the corresponding Ukrainian [I], [M], [E]. The English back vowel phonemes [o], [u:], [a:] are more retracted than the Ukrainian back vowel phonemes [O], [Y].

The position of the lips is not the same in forming English and Ukrainian labialized vowel phonemes. While producing English labialized sounds the lips are rounded but not protruded. In Ukrainian the rounding of the lips is accompanied by considerable protrusion. The position of the lips is not the same in pronouncing English and Ukrainian non-labialized vowels either. In pronouncing English non-labialized vowels the lips are flat and not protruded. In making Ukrainian non-labialized vowels the lips move noticeably forward from the teeth.

As to the consonant phonemes *common* for both languages is the mechanism of sound production. Both Ukrainian and English consonant phonemes are classified according to the manner of noise production, according to the active organ, forming an obstruction and according to the work of the vocal chords. According to the active organ causing the obstruction, there are the following groups of consonants in the Ukrainian and English languages: labial (bilabial and labiodental) and lingual (forelingual, mediolingual, backlingual). The only difference of English is that besides the above mentioned groups, there exists a group of pharyngeal consonant [h].

The phenomenon of consonant phonemes palatalization characterises both languages. In Ukrainian practically all consonants undergo palatalization, though in English there are considerably less consonant phonemes that depending upon the position of the sound in the word can be palatalized and are reduced to [L], [S], [Z].

Some peculiarities of English and Ukrainian consonants are explained by historical and cultural variety of the two lingual communities.

From the point of view of distribution, the number of consonant phonemes is not the same in the two languages. There are 24 consonant phonemes in the English language and 47 in the Ukrainian language (16 of them are long). Therefore, it can be stated that the length of consonants is phonematically an independent feature of articulation in Ukrainian. There are no long consonant phonemes in the English language. Thus, the difference in the distribution of English and Ukrainian consonant phonemes is due to existence of a large number of palatalized and long phonemes in Ukrainian and the fact the phonetic system of either language includes some phonemes which exist in one of the languages: [Π], [Π 3], [Π 1], [Π 1] in Ukrainian and two variants of pronouncing "th" in English; there are two additional Ukrainian backlingual constrictive consonants [X], [Γ 1].

From the point of view of similar consonants (consonants united by some common feature of articulation) *production* the following should be noted. When pronouncing Ukrainian forelingual consonants the place of obstruction is generally nearer to the front upper teeth than in the corresponding English consonants. The Ukrainian [T], [A], [H], [C], [3], for example, are dental according to the passive organ of speech, while the English [f], [d], [n], [s], [z] are alveolar; the Ukrainian [P] is alveolar, the English [r] is post-alveolar, etc.

The shape of the tongue in pronouncing English and Ukrainian forelingual consonants is different, English forelingual consonants are usually apical, while the Ukrainian ones are as a rule cacuminal.

English voiceless plosive consonants [p], [t], [k] are aspirated, while there are no aspirated consonants in the Ukrainian language.

The *interchange of sounds* is a term denoting change in the phonematic structure of the morpheme in the process of word-building. The phenomena observed in both languages demonstrates the similar tools in the process of vowel and consonant sounds interchange.

Nevertheless, the interchange of sounds takes place according to definite strict standards for each phoneme in a definite language. Thus, for example, the English phoneme [d] may alternate with the phoneme [t] (send - sent, build - built, etc.). In Ukrainian the phoneme [K] may alternate only with the phonemes [Y] and [Y] (nekna - neuew; pyka - pyui).

Interchange of sounds may be historical or living.

By the *historical* interchange of sounds we mean a case when the change is not determined by the position of the sound in the word, but appeared as a result of the laws which acted in the language at some definite periods of its development. It is closely connected with historical assimilation. Historical interchange of sounds is also explained by the phonetical structure of the language but has grammatical significance.

Cases of historical interchange of sounds in English can be found among the three forms of irregular verbs, the degrees of comparison of adjectives, different parts of speech originated from one root, the archaic forms of the plural of nouns (man-men), degrees of comparison of adjectives (good-better-best), three forms of irregular verbs (do-did-done).

By the *living* interchange of sounds we mean a case when the change is determined by the position of the sound in the word. The living interchange of sounds is mainly explained by the phonetical structure of the given language. It is closely connected with assimilation. Consequently, the forelingual alveolar final sound [s] in the words *six* [siks] — sixth [sikso] turns into the dental one under the influence of the following sound [0]. In the Ukrainian language grammatical interchange of sounds takes place within different cases of nouns (padicmb-padocmi), different parts of speech originated from a common root (женити — жонатий), different forms of the verbs (летіти — літати).

The interchange of sounds may be complete and zero. The interchange of sounds is called *complete* when different phonemes are interchanged, e.g., [grinich] where the sound [w] has disappeared as a result of two neighbouring sounds [i] interaction.

Sounds combine in *syllables* i. e. a primary minor basic unit of speech. Being joined with each other, speech sounds serve as structural material, as «bricks» for syllables. A syllable is a sequence of speech sounds joined together to form a solid undividable stable primary speech unit of segmental level.

In any language a person can divide speech into syllables and perceive them easily. The central part of the syllable is a pitch or syllabic sound. Pitch sounds are syllable-forming (syllabic) sounds, all other sounds are non-syllabic. The capacity of a sound to form a syllable depends mainly upon the degree of its sonority. Thus, a primary condition, obligatory to form a syllable, is the presence of a tonic element, i.e. a vowel or a stable sonant

Common for both languages is the mechanism of the syllable-forming capacity of the tonic element that depends upon the joint action of three

heterogeneous, but mutually connected factors. They are: width of the air-passage, the intensity of the vibration of the vocal cords and the duration of the optimal phase.

The tonic element of the syllable, its nucleus is usually a vowel in most languages. But in sometimes under specific conditions the nucleus may be presented by a sonant too. A syllable may consist of a single vowel or of a vowel and some consonants. The number of marginal consonants may be different, but in most languages it is from one to seven. The vowel is the main syllable-forming element of the syllable. The presence of consonants is not essential, a syllable may exist without consonants, and the presence of syllabic vowel or another vocalic element is the only condition necessary for the existence of a syllable.

A syllable alone has no meaning of its own, but when syllables combine into words, which have elementary meaning, denoting things, actions, qualities, etc., syllables become potentially meaningful. A syllable perception is an active process of decoding a speech wave. In the process of perception the syllable can be described as sounds segments treated independently of their semantic significance. Speech perception is based on articulatory elements and linguistic experience of the listener.

The syllable is a complex psycholinguistic, psychophisiological and acoustic process. The results of investigations made it possible to differentiate the two types of syllables — open and closed. These types of syllables are characteristic of both in English and Ukrainian. Open syllables are those, which end in a vowel; close syllables are those, which end in a consonant. From the phonological point of view, the open syllable may fall under the category of the main type of syllables.

Acoustically a syllable is regarded as an impulse of energy caused by strengthening of speech muscle tension in speech organs and the tension of the muscles between the ribs as a result of psycholinguistic and neurolinguistic processes. The main acoustic parameter of the syllable is the so-called total energy (W_{tot}) — a joint action of two components — intensity and duration. The share of each component of total energy depends upon the phonetic structure of the language and may differ in different languages, though the main acoustic parameter — the total energy remains unchanged in all the syllabic languages (T. A. Brovchenko).

In English not only vowels but some sonants may become syllabic under certain conditions. The English sonants [n], [I] become syllabic when they

are at the end of word and are not preceded by a vowel, e.g. *madam*, *garden*, *arrival*, *bacon* (final neutral sound disappears in quick speech).

Syllable is a minimal integrated (composed of speech sounds) and integrating unit of speech (where sounds form and organize a syllable as a linguistic and speech unit). Speech sounds are the base of the syllable. On the other hand, the syllable itself is the base for one segmental unit (phonetic word) and all suprasegmental units, sense-groups, phrases, supraphrasal unities and suprasegmental unity of the highest level — speech.

Being composed of speech sounds, syllables preserve articulatory characteristics of speech sounds and their inherent acoustic characteristics — the inherent intensity, fundamental frequency of informant structure of the vowels, the phonological length of vowels in English and Ukrainian.

But it should be taken into consideration that a syllable retains the characteristics of a lower speech unit to some extent when entering the speech unit of a higher level, thus, a syllable may undergo some changes under different linguistic and extralinguistic factors. Being integrated into a phrase the syllable exercises the suprasegmental features of a higher level, the one of a sense-group (syntagm), which is the first semantically and prosodically organized unit of speech.

The syllable participates in organizing the next higher suprasegmental speech unit — a phrase. The syllable takes part in organizing supraphrasal unities — semantic groups of phrases united by sense. And finally the syllable achieves its main goal. It is involved in organizing the text — the highest unit of speech.

Thus, there are some *universal* characteristics of the syllable:

It is a primary minimal undivided basic phonetic unit of speech.

Units of primary perception on sensory level are not speech sounds but syllables. The syllable in perception is a minimal undivided unit.

The syllable is an integrated and an integrating speech unit. On the one hand it consists of speech sounds, on the other hand it is the base for all the other units of speech. It is creating the segmental speech unit — phonetic word and all the supra-segmental speech units — sense-groups, phrases, sub phrasal unities and the speech unit of the highest level — the text.

Contrastive analysis of English and Ukrainian syllables makes it possible to observe that the nature of the main principles of formation and division are the same in the two languages. The rules of correlation between the two components of the total energy — intensity and duration do not coincide,

which is defended by the phonematic structure of the English and Ukrainian languages. There exist some specific features in the structure of syllables, in the rules of syllable division, position of the active articulating organs in pronouncing sounds, which constitute the syllables in English and Ukrainian.

Intensification of a syllable or syllables of a word by phonetic means is called *word stress*. Word stress is one of the main distinctive features of a word. Word stress singles out the accentual centre of the word, organizing the word as a structural unit of speech (Багмут, Борисюк, Покидько, 2000).

Word stress is a constituent of the word, a part of the model, a mode of the phonetic organization of the word as an independent segmental unit, that is characterised by some degree of acoustic energy, which appears as a result of greater speech organs muscles' tension in the process of speech production. Word stress, like the syllable, is one of the most important and complicated phonetic phenomena. A definition of word stress must include peculiarities of physiological, acoustic and perceptual problems of its production. In most cases word stress is defined by linguists from the physiological and perceptual points of view as a degree of force with which a syllable is pronounced; as a syllable which is perceived as more tense and louder than other syllables in the word.

Common characteristics of word stress in English and Ukrainian is in its nature being energetic and dynamic. The main physical essence of word stress is an increased impulse of the acoustic energy.

In English and Ukrainian there are syllables of three linguistically relevant degrees of stress — primary, secondary and unstressed syllables; the latter depend on one of the principal physical features of a syllable — total acoustic energy. The total acoustic energy is a complex physical characteristic which might be a coordinated effort of intensity and duration, defined as intensity over time. Thus, stressed and unstressed syllables are similar in nature. The difference between stressed and unstressed syllables is purely quantitative — the stressed syllable is characterised by a bigger degree of acoustic energy than the corresponding unstressed syllables in the same word.

The auditory analysis testified that most stressed syllables were perceived by the listeners as stronger, louder and longer. The higher pitch of voice of the stressed syllables was perceived by the listeners in rather rare cases. It should be taken into consideration that perception of stressed syllables as longer and louder in both in English and Ukrainian depends on the total energy (the correlation of the two components — duration and loudness)

where the share of duration is prevailing in Ukrainian word stress while in English loudness comes forward. This may be explained by the phonogical length of vowels in English, while in Ukrainian the length of vowels is phonologically irrelevant.

Phoneticians have described many problems, dealing with phonetic characteristics of individual segments (vowels and consonants, syllables) and some processes that influence these segments (assimilation, elision, aspiration and others) and the mechanisms evolved in the process of combining these segments into greater units (syllables and words) were dwelt on. There are some phonological features characteristic of speech segments larger than sounds. These features cannot be derived out of the individual characteristics of vowels and consonants, which compile the phrase. They do not involve one segment but spread over a larger number of segments. This type of phonetic characteristics are called *suprasegmentals* or *prosody*. In modern linguistics the phonetical characteristics of the suprasegmental level are united by the general term intonation. The term intonation is derived from the Latin word that means 'to speak loud'. Nowadays, the linguistics term intonation is much more complicated than its etymological meaning and includes the whole spectrum of phonetical means of an utterance at the suprasegmental level. This refers to the following: melody, loudness, tempo (pauses included), timber, sentence-stress and rhythm.

Common characteristic of intonation in English and Ukrainian. The intonation in the function presenting the communicative type of an utterance practically always tightly interacts with the function conveying the attitudinal meaning. The interaction of communicative and attitudinal functions of intonation is characterized by certain typologically common features in the two compared languages. Specific suprasegmental peculiarities are caused by the systematic difference in intonation in English and Ukrainian.

In spite of the availability of a number of specific language peculiarities in the intonation of utterances, where the intonation simultaneously fulfills several functions under the real conditions of communication, the character of the correlation mechanism «intonation-meaning» is completely identical in the compared languages. More than that, the most essential features of these mechanisms could be treated as language universals.

When an intonation contour is formed under the condition of two or more functions of intonation being realized in a speech act the result is not straightforward and depends on a variety of factors. Note the following:

- the degree of stability in correlation between suprasegmental models and semantics;
- the degree of semantic character intensity conveyed by the intonation model:
- the degree of similarity between the original intonation structures that are interacting and the degree of proximity among the functions involved in the interaction.

The analysis of the character of the functional and semantic factors that influence the degree of stability of intonation models demonstrates that different functions of intonation possess various possibilities of providing such an effect. The most stable are the prosodic models executing the function of speech division into sense groups, function of a communicative type, attitudinal function. In correspondence with this status and the poly-functional character of intonation in an utterance, the resulting intonation contour mainly preserves the relevant prosodic features of the dominating intonation function under definite circumstances. This interaction determines the isomorphism of mechanisms of prosody functions mutual development.

Conclusion. The results of the research demonstrate the significant amount of typologically similar characteristics in English and Ukrainian on segmental and suprasegmental levels. The presence of front and back vowels, plosives, fricatives, voiced and voiceless consonants, such phenomena as reduction and assimilation in producing fluent speech in both languages testify to it. Similar mechanisms of word stress in both languages that are reflected in syllables' total energy (dynamic characteristics and duration time) is another mark of typological similarity of English and Ukrainian.

The intonation models, the principles of their dependence on functional and semantic factors, the degree of stability of intonation models, sentence stress variability, intonation functions in the possess of oral speech production demonstrate multiple possibilities of prosody interacting parameters that contribute to providing semantically distinct phrases. The most stable prosodic models in both languages are those presenting attitudinal and emotional functions of intonation. The status of prosody functions (the attitudinal function, sense-group delimitation, sense-groups relation, communicative type of utterances, sentence stress) changes from the subordinate one (as in the function of division into sense groups) up to the dominating one (as in the function reflecting the speaker's emotional state). In correspondence with this status and the poly-functional character of intonation in an utter-

ance, the resulting intonation contour mainly preserves the relevant prosodic features of the dominating intonation function in English and Ukrainian.

The qualitative and quantitative differences of segmental (phonematic length of vowels in English, phonemic length of consonants in Ukrainian, backlingual constrictive consonants in Ukrainian, syllable forming sonorants in English, some difference in articulation) and suprasegmental units (variety of melody contour structure, prevalence of dynamic characteristics in English and temporal in Ukrainian) in the languages under investigation are explained by linguacultural peculiarities of the communities, their historical development.

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ФОНЕТИЧНА ТИПОЛОГІЯ

Тетяна М. Корольова

доктор філологічних наук, професор кафедри філології Одеського національного морського університету, Одеса, Україна e-mail: kortami863@gmail.com

ORCID ID https://orcid.org/0000-3441-196X

Світлана Ю. Юхимець

кандидат педагогічних наук, доцент кафедри філології Одеського національного морського університету, Одеса, Україна e-mail: yukhymets.svetlana@gmail.com ORCID ID https://orcid.org/0000-0003-3350-7310

АНОТАЦІЯ

Незважаючи на численні роботи в галузі фонетики, деякі проблеми типології досі потребують систематизації як на сегментному, так і на надсегментному рівнях. Експериментальні дослідження — одна з таких проблем. Метою роботи ϵ визначення фонетико-типологічних характеристик англійської та української мов на сегментному та надсегментному рівнях.

Результати дослідження демонструють значну кількість типологічно подібних характеристик в англійській та українській мовах. Про це свідчать такі явища, як наявність подібних механізмів продукування звуків у мовленні (передньоязикових і задньоязикових голосних, вибухових, фрикативних, дзвінких і глухих приголосних; редукція й асиміляція) носіїв обох досліджуваних мов. Подібні механізми наголосу в словах, тобто загальні енергетичні характеристики наголосу (динамічні характеристики та час тривалості), становлять ще одну ознаку типологічної подібності англійської та української мов.

Інтонаційні моделі, ступінь стійкості інтонаційних моделей, варіативність фразового наголосу, однакові функції інтонації в процесі продукування мови демонструють подібні механізми взаємодії параметрів просодії. Найбільш стійкі в обох мовах — просодичні моделі емоційної функції інтонації. Статус різних функцій (емоційне ставлення, делімітація смислових груп, об'єднання смислових груп, комунікативний тип висловлювань, фразовий наголос) інтонації змінюється від підпорядкованої (як у функції поділу на смислові групи) до домінантної (як у функції, що відображає емоційний стан мовця). Відповідно до цього статусу та поліфункціонального характеру інтонації результативний інтонаційний контур переважно зберігає відповідні просодичні ознаки домінантної інтонаційної функції в англійській та українській мовах.

Визначено якісні та кількісні відмінності сегментних (фонематична довжина голосних в англійській мові, фонетична довжина приголосних в українській, певна різниця в артикуляції) та надсегментних одиниць (різна конструкція контурної структури мелодії, перевага динамічних характеристик в англійській та часових в українській) у мовах, що досліджуються. Ці відмінності пояснюються лінгвокультурними особливостями спільнот, їхнім історичним розвитком.

Ключові слова: типологія, фонетика та фонологія, спільні характеристики, сегментний та супрасегментний рівні.

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