

# Lexical and grammatical difficulties the technical students face when translating texts on specialty

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## ABSTRACT

The article discusses some lexical and grammatical difficulties that students face when reading and translating texts in their specialty. Due attention is paid to the style of modern English scientific and technical literature, which is based on the norms of the English written language with certain specific characteristics that should be known and taken into account when translating texts. Special attention is paid to some terminology issues since technical texts are full of both general scientific and technical terms that carry the main lexical load. The article also examines the main sources of English technical terminology, as well as analyzes the most productive ways of forming English scientific and technical terms. The article emphasizes that the issue of term formation in the scientific and technical literature remains open and is very important for everyone who deals with terminology. As a result, it is suggested that in the near future, the most complete knowledge will allow introducing standards in term formation, which, in its turn, will allow creating software for the most accurate recognition of terms for computers designed to help people.

**Keywords:** Scientific and technical text, Scientific style, Formal and logical style, General scientific, Technical terms

## Introduction

One of the main tasks of teaching a foreign language is to teach reading literature in the specialty in a systematic and graduated process of expanding students' language knowledge, forming basic skills necessary for understanding and extracting information from printed sources, as well as using the information obtained in situations that simulate real communication [1-3].

The main task of translating a scientific and technical text is to convey the reported information very clearly and accurately [4]. This is achieved by a logically sound presentation of the actual

material, without explicitly expressed emotionality. The word "text" comes from the Latin word *textus* - fabric, plexus, connection, which can be defined as a sequence of speech units united by semantic and grammatical connection: utterances, super-phrasal units, fragments, sections, etc.

Each text has a functional style. The language style is a combination of two factors – "what is said" and "how is said", i.e. it is a purposeful set of language tools. "The concept of language style is based on the assessment of the relation of means of expression to the expressed content" [5]. The style of modern English scientific and technical literature is based on the norms of the English written language with certain specific characteristics, namely:

- Vocabulary. A large number of special terms and words of non-Anglo-Saxon origin are used. Words are selected with great care to convey the idea as accurately as possible. Auxiliary words (prepositions and conjunctions) and words that provide logical connections between individual elements of utterances (adverbs) have a large share.
- Grammar. Only grammatical norms that are firmly established in written speech are used. Passive, impersonal,

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and indefinite personal constructions are widespread. Mostly complex and compound sentences are used, in which nouns, adjectives, and nonfinite forms of the verb dominate. Logical selection is often achieved by deviating from the strict word order (inversion) [6].

- Method of presentation of the material. The main task of scientific and technical literature is to bring certain information to readers clearly and accurately. This is achieved by a logically argued presentation of the actual material, without the use of emotionally colored words, expressions, and grammatical constructions. This method of presentation can be called the formal-logical one [7].

Scientific and technical literature has several gradations. Scientific and technical texts differ from each other not only in the field of science or technology to which they relate but also in the degree of their specialization. The above characteristics fully relate to scientific monographs and articles, abstracts, and textbooks. However, the text of technical reference books, catalogs, supply descriptions, technical reports, specifications, and instructions may sometimes contain sentences that do not contain a predicate (when listing technical data, etc.) or a subject (if it is implied by the context). In technical reference books, whole segments are consisting of enumerations. Description of supplies, specifications, technical reports, and catalogs are usually compiled using a strict pattern and are loaded with special terminology. The lexical and grammatical pattern is also inherent in the language of patent literature [8].

## Materials and Methods

As already mentioned, the style of language is understood as a complex interweaving of two factors – what is said and how it is said. Therefore, using the term “style” for describing the way how the English technical literature is presented, it is necessary to simultaneously consider the lexical and grammatical features of this literature described in the previous sections. “The scholar’s style is formal, - writes L. I. Borisova, - he avoids inaccurate definitions, unripe generalizations, sensations, in his works there is always clarity and deep insight into the essence of the subject, which are inseparable from the clarity of thinking and formulas. Caution is inseparable from accuracy: a scientist does not assert what he cannot prove. He doesn’t usually speak in the first person; it’s the facts that matter to him, not what “I” think or do. He avoids abbreviations and phrases of the spoken language” [9]. “The common denominator between the art of writing and the scientific method, - notes V. N. Komissarov, - is logic. A person writing on technical topics has already learned to think while preparing for the specialty. Writing means for him only an extension of the scope of this quality” [10].

When discussing the way of presentation of the technical literature, it should be taken into account that this literature has a limited range of readers, for whom it is the formal–logical style that provides the most complete and effective information. G. M. Strelkovsky believes that this style was imposed on scientists

by the Royal Society (The British Academy of Sciences) [11]. However, this style is also typical for other languages. Also, the norms of the language cannot be decreed. The formal-logical style appeared as a result of the urgent need for this style of a large group of people. It is a natural consequence of the development of the language of technical literature. Those who criticize this style forget that technical texts are intended for specialists who have the appropriate knowledge and for whom deviation from the usual way of presenting material makes it difficult to understand the facts [12].

According to V. V. Vinogradov’s terminology, which distinguishes, in particular, the three most important functions of the language, namely: intercourse, communication, and impact, technical literature pursues the task of communication. Anything that violates this task, makes it difficult to provide information, it is considered to be unnatural, and therefore illegal. So, the main requirement for the language of the technical literature is an accurate and clear presentation, description, and explanation of facts. The main emphasis is on the logical, not the emotional side of information. The author seeks to exclude the possibility of arbitrary interpretation of the subject matter. Therefore, in the technical literature, such expressive means as a metaphor, metonymy, etc. are almost not used, and the presentation is somewhat dry and formal [13].

The characteristic features of the scientific and technical style are its informativeness (content), logic (strict consistency, a clear connection between the main idea and details), accuracy and objectivity, and the resulting clearness and clarity. Individual texts belonging to this style may have these features to a greater or less extent. However, all such texts show a predominant use of language tools that contribute to meeting the needs of this sphere of communication [14].

The scope of the scientific style is very wide. This is one of the styles that have a strong and versatile influence on the literary language. The scientific and technological revolution that is taking place before our eyes are introducing a huge number of terms into general use. If earlier explanatory dictionaries were compiled based on the language of fiction and, to a less extent, journalism, now the description of the developed languages of the world is impossible without taking into account the scientific style and its role in society. Suffice it to say that out of 600,000 words of Webster’s most authoritative English dictionary, 500,000 are special vocabulary [15].

The vocabulary of technical literature is characterized by the use of a large number of technical terms, i.e. words or phrases denoting technical concepts. It is impossible to draw a clear line between terms and words of everyday language due to the ambiguity of many words. In terms, we have the most precise, concentrated, and economical definition of a technical idea. Each branch of science develops its terminology in accordance with the subject and method of its work. A term is a word or phrase that accurately and unambiguously names an object, phenomenon, or concept of science and reveals its content; the term is based on a scientifically constructed definition. M. M. Glushko states that “a term is a word or phrase for expressing concepts and designating

objects, which, due to its strict and precise definition, has clear semantic boundaries and is, therefore, unambiguous within the appropriate classification system" [16].

In each article on a narrow technical specialty, the number of terms does not exceed 150-200 units. With the development of science and technology, unambiguous special (nomenclature) terms may acquire additional meanings and become polysemantic general scientific and technical terms, and polysemantic terms may lose their meaning and become unambiguous.

Both words are used almost exclusively within the framework of this style, and special meanings of common words can be used as terms. Terms should provide a clear and precise indication of real objects and phenomena, and establish an unambiguous understanding of the transmitted information by specialists. Therefore, this type of word has special requirements [17].

First of all, the term must be precise, i.e. have a strictly defined meaning, which can be revealed by a logical definition that establishes the place of the concept designated by the term in the system of concepts of this field of science or technology.

Due to the complex evolution of the English language, synonymy is widely developed, including lexical: the same concept can be expressed in different words, mainly of Anglo-Saxon or Latin (French) origin. In the technical literature, the latter is mostly used. For example, instead of the verb to say, the verbs to assert, to state, to declare, to reply are used; instead of to clean, to purify is used. This is necessary for more accurate differentiation of individual processes, as well as for giving the language of the technical literature a specific language coloring. Also, the combination of numerous terms of Latin and Greek origin with such words makes the language of the technical literature more homogeneous in its lexical composition [18].

The same term in different sublanguages can express different concepts. Polysemy and synonymy contradict the nature of functioning and purpose of the term. However, when describing a specific subject situation, a specific scientific and technical sphere, the terms do not allow their incorrect interpretation [19].

Since the technical text is full of terms that carry the main load, it is necessary to consider the terminology issues in a little more detail. In ordinary speech, words are usually polysemantic, i.e. they convey many meanings that can sometimes differ quite widely. Lexical ambiguity gives speech flexibility and liveliness and allows expressing the most subtle shades of thought.

This is not the case in the technical language; the main requirement in it is the utmost accuracy of expression of thought, which does not allow for the possibility of different interpretations. Therefore, the main requirement for the term becomes unambiguity, i.e. the presence of only one once-for-all set value [20].

Not all terms meet this requirement even within the same specialty, for example:

engine – car, motor, steam locomotive;

oil – lube, lubricant, petroleum.

This circumstance, of course, presents a certain difficulty for the accurate understanding of the text and complicates the work of the translator.

Let's list the main sources of the English technical terminology.

The largest group consists of terms borrowed from foreign languages, or artificially created by scientists based mainly on Latin and Greek as science and technology developed and new concepts appeared [21].

Many terms appeared in England in the 18th and 19th centuries during the rapid development of science, while some of the terms from the language of scientists began to penetrate the general literary language and became common property. These words include: dynamo; barograph; ozone; centigrade; cereal; gyroscope; sodium; potassium.

Such new terms as penicillin, hormone, isotope, photon, positron, radar, biochemistry, cyclotron appeared in the 20th century.

These terms quickly became generally understood due to the close connection of the latest discoveries with everyday life. Nevertheless, it should be noted that the bulk of technical terminology continues to remain outside the general literary language and is understandable only to a specialist in this field of knowledge.

The main ways of forming English scientific and technical terms are syntactic, semantic, and morphological, as well as borrowing from other languages and industry terminology [22]. Borrowing is a word or a term that passes into another language with its concept (for example, computer) or that is used to terminate the same concept.

The most productive way of term formation is the formation of complex terms by adding clarifying definitions (62%). This might be a consequence of the fact that most terms are lexical phrases. Term formation using abbreviations (2%), word combinations (2%), and conversions (2%) is the most common. Most of the terms-words are formed using borrowings from other languages (14%). Borrowing occurs for the most part from the Latin language, for example, the terms – internationalism. This might be a consequence of the fact that with the emergence of new concepts in the process of scientific development, it becomes necessary to create new terms that do not have similarities with others; as a result, scientists turn to other languages using them as a source. The processes of formation of new terms in the modern English language of scientific communication are associated with the emergence of new scientific ideas and research directions, the development of new technology, and the creation of new technological processes [23].

For this reason, new terms that are not included in dictionaries usually turn out to be the carriers of the most important information for the recipient of the message, to extract of which the foreign text is processed.

The dominance of the term formation method by adding clarifying definitions to the term over other methods in the scientific and technical literature is explained by the tendency of modern science and technology to create complex systems and

objects, which, in their turn, consist of many constituent elements [24].

## Results and Discussion

The syntactic method of term formation is one of the main ones (along with semantic and morphological) and has a high degree of productivity because this method creates numerous compound terms or word combinations.

Terms-phrases expressing single integral concepts have different degrees of semantic decomposition. In general, they are more stable in comparison with free phrases of a general literary language in their lexical and semantic organization. They can be attributed to the number of lexical phrases, a characteristic feature of which is that the place of one of the components is not filled with any word of the corresponding category but only with those words that form a certain semantic group [25].

When working with the vocabulary of the English scientific and technical literature, the greatest difficulty for understanding and translating is represented by multicomponent terms – terminological phrases created in a lexical and syntactical way, i.e. phrases formed according to certain models.

The method of creating terms in the form of a chain of words is becoming increasingly common. This is due to the objective reasons related to the fact that, firstly, any language has limited resources in terms of lexical units and, secondly, the results of the scientific and technological revolution lead to discoveries and phenomena that require precise definitions and names. It is noted that in the era of the scientific and technological revolution, the vocabulary of the language is replenished mainly due to the special terminology, which is the most mobile part of the lexical and semantic system of the language; the increase is about 1,000 new terms per year [26].

The lexical-semantic method creates serious competition with such traditional methods as semantic and morphological. In scientific and technical texts, such constructions are among the most common. Terminological phrases are semantically integral combinations of two or more words connected by a preposition or in a no prepositional way. They can be stable and free combinations [27].

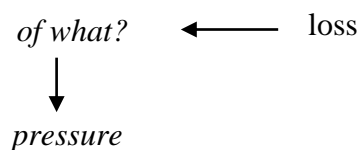
When translating terminological phrases, it is necessary to clearly understand in what order the meaning of this phrase should be disclosed. Terminological phrases are constructed from a combination of a noun usually in the singular form (the core of the phrase) with other parts of speech that can stand before or after it.

A particular difficulty in translation is represented by simple terminological phrases consisting of a chain of words that are not connected by any auxiliary words (articles, prepositions, etc.) [28].

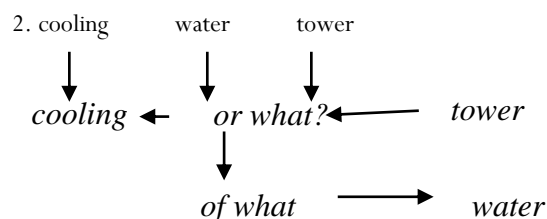
In a simple terminological phrase, the main principal word is the last one, and all the words to the left of it play a secondary role – the role of an attribute. Translation of simple terminological phrases should be read from the main principal word.

Examples:

### 1. pressure loss



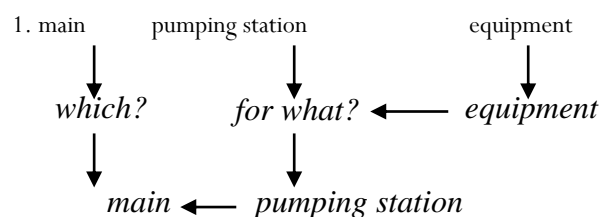
Translation: потеря давления (loss of pressure)



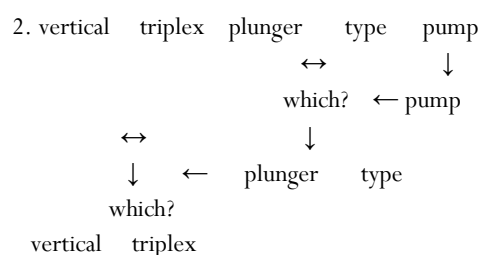
Translation: башня для охлаждения воды (tower for cooling water)

Simple terminological phrases can carry a large amount of information.

Examples:



Translation: оборудование главной насосной станции (equipment for main pumping station)



Translation: вертикальный тройной насос плунжерного типа (vertical triplex pump of plunger type)

Terminological phrases are usually classified according to their lexical composition. There are terminological phrases that consist only of nouns, of adjectives and nouns, of participles and nouns, of adverbs, participles, and nouns, etc. [29].

## Conclusion

The question of term formation in the scientific and technical literature remains open and is very important for everyone who deals with terminology. This applies not only to inventors and

scientists who are discoverers of new concepts, for which it is necessary to use more and more new terms but also to all those people who need the field of term formation to be more illuminated to be able to better understand the terms created by other inventors and scientists [30]. The most complete knowledge may also allow introducing standards in term formation, which will also allow creating software for the most accurate recognition of terms for computers designed to help people.

In conclusion, it can be said that the scientific and technical style is characterized by a logical sequence of presentation, an ordered system of connections between parts of the statement, the authors' desire for accuracy, conciseness, unambiguity while maintaining the saturation of the content [31].

Translation of scientific and technical texts must correctly convey the meaning of the original in a form that is as close to the original as possible. Deviations should be justified by the peculiarities of the Russian language and style requirements. The translation as a whole should not be either a literal or free retelling of the original, although elements of both are necessarily present. It is important to avoid losing essential information about the original [32]. All the considered features of the translation of scientific and technical texts indicate the importance of studying this topic as well as the necessity of further detailed studying of it from all sides.

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