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ARTILLERY TERMINOLOGY: ETYMOLOGY, SEMANTICS, TRANSLATION CHALLENGES

Summary. This study establishes a corpus of 172 high-frequency artillery terms, which are systematically analyzed in terms of their etymological origins, semantic features, and translation challenges, offering a structured insight into the linguistic and translational complexities of artillery terminology. It highlights the complex linguistic nature of artillery terminology and the significant difficulties it presents in English-Ukrainian translation. The etymological analysis reveals a diverse heritage: approximately 50% of terms originate from Romance or Classical languages, 16% from Germanic roots, 3% from Arabic, and 31% are modern English coinages reflecting technological evolution. From a semantic perspective, the terminology is highly specialized and organized into thematic categories. However, it often poses challenges due to polysemy, homonymy, and the use of figurative language. These features complicate the translation process, particularly in cases of interlingual asymmetry, where direct Ukrainian equivalents are rare or absent. As a result, translators frequently rely on descriptive translations, calques, or contextual adaptations. Polysemous and homonymous terms demand precise contextual interpretation to prevent miscommunication. Cultural-historical and doctrinal differences between military systems contribute to conceptual gaps, emphasizing the need for deep subject-matter expertise beyond linguistic knowledge. The widespread use of abbreviations and the necessity for exact, formal register in military texts add another layer of complexity. Translators must apply a range of strategies – including transcription, calque, descriptive translation, and lexical substitution – to ensure both accuracy and functional appropriateness. By providing a detailed analysis of the linguistic and translational dimensions of artillery terminology, this study contributes practical insights for military translators, lexicographers, and educators, promoting clearer international military communication and reducing terminological ambiguity.

Key words: artillery terminology, etymology, semantics, translation strategies, interlingual asymmetry.

Introduction. In the rapidly evolving landscape of modern warfare and international cooperation, the precision of military ter-

minology is of paramount importance. Artillery, as a key component of contemporary armed conflicts, necessitates an exceptionally accurate and nuanced understanding of its specialized lexicon. This study highlights the critical need for military personnel, translators, historians, and linguists to develop a profound grasp of artillery terminology to ensure effective communication, operational clarity, and reliable historical interpretation.

While general military terminology has been the focus of numerous linguistic investigations, comprehensive studies dedicated specifically to artillery terminology – its etymological origins, semantic intricacies, and the challenges of cross-linguistic translation – remain relatively scarce. Existing research often addresses aspects of military language in broader terms but seldom explores the unique complexities of artillery vocabulary with the depth necessary for practical application in translation and inter-military communication. This article seeks to address these gaps by providing a focused and in-depth linguistic analysis.

The analysis of recent research and publications. The study of military terminology – and artillery terminology in particular – has garnered increasing scholarly attention due to its interdisciplinary nature and practical significance in translation studies, linguistics, and defense communication. Nonetheless, research in this domain remains relatively fragmented, often integrated into broader investigations of specialized or technical translation rather than treated as an independent field of inquiry.

Several scholars have contributed to the theoretical foundations of terminology studies in specialized domains. M. Cabré [1], C. Way [2] provide a comprehensive theoretical model, emphasizing the cognitive, linguistic, and communicative dimensions of terminology. Their approaches have been instrumental in understanding how specialized terms, including those within the military sphere, develop and function across various contexts.

Within translation studies, M. Baker [3] offers valuable insights into equivalence, context, and pragmatics – concepts directly applicable to the translation of artillery terms, especially in multilingual and intercultural military settings. Similarly, P. Newmark [4] differentiates between semantic and communicative translation strategies,

providing practical methodologies for translating highly specialized terms when direct linguistic equivalents may be unavailable.

From a military perspective, standardized glossaries such as the NATO Glossary of Terms and Definitions (AAP-06) [5] and national military manuals (e.g., FM 3-09 Field Artillery Operations and Fire Support) [6] serve as critical reference tools. These documents ensure terminological consistency and operational clarity and form the foundation for translation practices involving artillery-related content.

However, a notable gap persists in the etymological and semantic study of artillery-specific terminology. Most existing research treats military terms as components of a general technical lexicon, without exploring their historical development or cross-linguistic variations in detail. This highlights a research gap that the present study seeks to fill through an integrated approach combining corpus-based linguistic analysis and practical translation experience.

Furthermore, although recent advances in computational linguistics and terminology databases have enabled more sophisticated tracking of term usage and evolution, artillery-specific terminology remains underrepresented in these tools. This study addresses that gap by establishing a corpus of 172 high-frequency artillery terms [7], analyzed systematically in terms of their etymological origins, semantic features, and translation challenges.

The primary aim of this study is to investigate the linguistic and translational features of contemporary artillery terminology through an analysis of its etymology, semantic structure, and translation challenges. Specifically, the study seeks to identify patterns in the formation and evolution of artillery terms, examine their functional roles in military discourse, and assess the difficulties encountered in translating this terminology – particularly from English into Ukrainian.

To achieve this aim, the following **research objectives** have been defined:

- to analyze the etymological origins of selected artillery terms, identifying sources of borrowing (e.g., Latin, French, German), neologisms, and semantic shifts over time;
- to examine the semantic characteristics of artillery terms, focusing on monosemy, polysemy, synonymy, and terminological ambiguity within the military context;
- to identify the main challenges involved in translating artillery terminology, including lexical gaps, context-dependent meanings, and culturally bound concepts.

The empirical basis of this study is a curated corpus of 172 high-frequency artillery terms [7], selected from authoritative military reference sources and firing tables. These materials are widely accepted within professional military discourse and official documentation, ensuring the relevance and authenticity of the data set.

The selected terminology represents a cross-section of contemporary artillery vocabulary, encompassing nomenclature related to weapon systems, ammunition types, fire control components, targeting procedures, and ballistic computations. The inclusion criteria were based on frequency of use, functional importance in operational communication, and recurrence in standardized military manuals.

This corpus serves as the foundation for a multifaceted analysis focused on the etymological roots, semantic development, and translational features of artillery terms when rendered from English into Ukrainian. Special attention is given to issues of equivalence, contextual precision, and terminological consistency. The

combined use of reference literature and real-world operational documentation ensures that the terminology under analysis is both theoretically grounded and practically applicable.

Results and discussions. The etymology of artillery terminology provides critical insights into the historical evolution, technological progress, and intercultural interactions that have shaped the lexicon of modern warfare. Many terms used in the artillery domain originate from Latin, French, German, and other European languages, reflecting the multinational foundations of artillery as both a scientific and military discipline. A linguistic exploration of these roots not only uncovers the original meanings of the terms but also highlights metaphorical extensions and semantic shifts prompted by the advancement of artillery technologies.

The term *artillery* itself derives from the Old French *artillerie*, which likely originates from *attiler* (“to equip”), a word related to the Latin *aptare* – “to fit” or “to prepare” [7]. Similarly, *battery*, now referring to a group of guns or missile launchers, comes from the Old French *batterie*, rooted in *battre* – “to beat” or “to strike,” underscoring the offensive nature of such weaponry [8].

Personnel designations, such as *gunner* and *loader*, emerged alongside the rise of gunpowder-based weaponry. *Gunner* stems from Middle English *gunne* (a firearm), which may trace its origins to the Norse female name *Gunnhildr*, pointing to the personification of early cannons [9]. These terms reflect not only functional roles but also symbolic and mythological associations prevalent in medieval military culture.

Various artillery systems carry etymological traces of their design or regional origin. The word *cannon* comes from the Italian *cannone* (“large tube”), itself from Latin *canna* – “reed” or “tube.” The *howitzer*, characterized by its high-arc trajectory, is borrowed from the German *Haubitze*, which in turn derives from Czech *houfnice*, originally denoting a crowd or heap – a reference to area bombardment [8].

The *mortar*, named for its bowl-like shape, shares a root with the Latin *mortarium*, a grinding bowl. In contrast, the modern term *railgun* – referring to an electromagnetic projectile launcher – is a compound of the English words *rail* and *gun*, illustrating how contemporary technological advances generate new terminology through neologism. The discipline of *ballistics*, rooted in the Greek *ballein* (“to throw”) and Latin *ballista* (a siege engine), underpins much of artillery science. Associated terms like *trajectory* and *muzzle* also stem from classical sources: *trajectory* from Latin *traicere* (“to throw across”), and *muzzle* from Old French *musel*, a diminutive of *mus* (“mouth”). Other terms – *deflection*, *dispersion*, and *retardation* – derive from Latin *deflectere*, *dispergere*, and *retardare*, respectively, and emphasize concepts of directional change and resistance, essential to artillery calculations [8].

The term *shell*, originally describing a protective outer casing (*scell* in Old English), evolved to denote explosive munitions. The word *shrapnel*, now generalized to mean fragments of an explosive device, originally referred specifically to a shell invented by British officer Henry Shrapnel in the early 19th century. Precision in artillery operations also relies on terms such as *calibration*, *correction*, and *elevation*, all tracing their origins to Latin – *calibratio*, *correctio*, and *elevatio*, respectively. The *quadrant*, a vital instrument for angular measurement, comes from *quadrans*, meaning a quarter of a circle. Of particular note is the term *azimuth*, with perhaps the most diverse etymological origin: it is borrowed from the Arabic *as-sumūt* (plural of *samt*, meaning “path”), entering European

languages via medieval astronomy and navigation [8]. This reflects the extensive cross-cultural scientific exchange that has influenced the development of military terminology.

Quantitatively, the etymological analysis of artillery terminology reveals a complex linguistic heritage: approximately 50% of terms are rooted in Romance and Classical languages (Latin, Old French, Italian), 16% originate from Germanic sources, 3% from Arabic, while the remaining 31% are modern English neologisms, typically coined in response to technological and tactical developments. This linguistic diversity highlights the dynamic and evolving nature of military terminology.

Understanding these etymological foundations is essential, as they inform semantic nuances and present substantial challenges in translation – particularly when conveying concepts across languages with differing cultural, technical, and historical frameworks. Such insight is crucial for achieving terminological precision and consistency in high-stakes military communication and multilingual translation.

Building upon the etymological foundations, this section explores the semantic characteristics of artillery terminology, focusing on how meanings are structured, interrelated, and contextually nuanced within this specialized domain. The curated glossary of 172 artillery terms serves as the empirical foundation for this analysis, allowing for a systematic examination of polysemy, homonymy, synonymy, and the roles of metaphorical and metonymic transfers in meaning formation. The glossary offers a naturally emergent classification of terms, facilitating a structured semantic analysis. The terminology can be broadly grouped into the following categories (semantic fields): 1. Core Concepts and Classifications form the backbone of artillery discourse, encompassing functional classifications and organizational units (*Anti-aircraft artillery, Artillery regiment, Battery, Field artillery, Heavy artillery, Light artillery, Mobile artillery, Self-propelled artillery, Towed artillery*); 2. Types of Artillery Guns reflect the diversity of gun systems based on design, deployment, and combat purpose (*Anti-tank gun, Autocannon, Howitzer, Mortar, Naval gun, Recoilless rifle, Self-propelled gun*); 3. Ballistic Parameters and Firing Characteristics describe quantitative and qualitative aspects of projectile motion and firing precision (*Angle of elevation, Muzzle velocity, Trajectory, Effective range, Dispersion, Flight time*); 4. Ammunition and Shell Types encompass both traditional and modern munitions, highlighting variation in lethality and targeting functions (*Armor-piercing shell, High-explosive shell, Guided artillery shell, Cluster munition, Rocket, Shrapnel*); 5. Elements of an Artillery Gun denote structural and mechanical components essential to artillery operation and accuracy (*Barrel, Breech, Gun carriage, Muzzle brake, Rifling, Sight*); 6. Firing Preparation and Execution Processes illustrate tactical approaches and procedural phases in artillery deployment (*Barrage fire, Direct fire, Indirect fire, Fire mission, Target acquisition, Suppressive fire*); 7. Artillery Tables and Calculations reflect the scientific and computational underpinnings of artillery accuracy and calibration (*Firing table, Ballistic computer, Correction factor, Wind correction, Probable error*); 8. Aiming and Fire Control describe systems and methods used to ensure targeting precision (*Adjusting fire, Azimuth, Forward observer, Gun laying, Laser rangefinder, Target designation*); 9. Engineering and Auxiliary Support refers to logistical and infrastructural elements that support artillery operations (*Ammunition dump, Artillery tractor, Gun emplacement, Camouflage net*).

This categorization not only enhances lexical clarity but also reveals semantic patterns that are central to the operational logic of artillery communication. Moreover, the presence of polysemous terms (e.g., *battery, shell, fire*), contextual synonymy (e.g., *gun laying vs. adjusting fire*), and technical homonyms (e.g., *muzzle* as part of a gun vs. *muzzle* in a broader context) presents specific challenges in both comprehension and translation. Additionally, metaphorical extensions (e.g., *barrage as a sustained attack*) and metonymic usage (e.g., *gun to denote a crew or unit*) illustrate the dynamic semantic processes within military discourse.

The semantic structure of artillery terminology is both functionally layered and linguistically intricate, shaped by technological evolution, tactical demands, and historical development. This complexity calls for a nuanced understanding to ensure both effective communication and accurate, context-sensitive translation across languages. Artillery vocabulary is highly specialized, with each term precisely defined by its operational role. Despite this precision, challenges such as polysemy (multiple related meanings) and homonymy (identical forms with different meanings) still arise. For instance, *fire* may refer to combustion or to shooting (e.g., *Direct fire, Fire for effect*), and only context clarifies the intended meaning. Likewise, *round* can mean a single shot or a type of ammunition, such as *Sabot round or Cargo round* [8].

While highly technical terms are generally unambiguous, more general military vocabulary can overlap. *Mine*, for example, might denote either a *landmine or a mortar shell* (*міномет vs. міна*). The glossary helps reduce such ambiguity through clear categorization. Strict synonyms are rare due to the need for precision, but near-synonyms exist. *Cannon* and *Gun*, for instance, may be used interchangeably in general usage, although *Cannon* often implies a larger, older weapon. The glossary distinguishes between *Cannon – гармата* and *Gun-howitzer – гармато-гаубиця*, suggesting nuanced functional differences.

Oppositional pairs illustrate key contrasts in artillery operations: *Direct fire – стрільба прямим наведенням vs. Indirect fire – стрільба із закритої позиції*, *Angle of elevation – кут підвищення vs. Depression angle – кут зниження*, and *Light artillery – легка артилерія vs. Heavy artillery – важка артилерія*.

Figurative language, though less common than in general speech, contributes to intuitive understanding. Metaphors include *Barrel (ствол)* likened to a container, *Muzzle (дуло)* compared to an animal's mouth, and *Sabot* (from French "wooden shoe") used for its shape. *Bracketing* suggests enclosing a target within a range. Metonymy also plays a role: *Battery (батарея)*, once meaning "beating," now signifies an artillery unit; *Shell (снаряд)*, originally a "husk," now refers to the projectile.

Variation within this specialized field stems from historical, doctrinal, and technological differences across military systems. Some English terms lack exact Ukrainian counterparts and must be translated descriptively. For example, *Multiple launch rocket system (MLRS) is rendered as реактивна система залпового вогню (PC3B)*. Differences arise from: technological change, introducing new concepts like railgun or digitized fire control; diverging doctrines, where different armies apply distinct classification systems; linguistic choices, with Ukrainian often preferring descriptive phrases over direct borrowings.

These factors contribute to translation challenges. Exact equivalence is often absent, and translators must navigate semantic mismatches. For instance, *Sensor-fuzed munition* becomes *боєпунас*

із сенсорним підризником, a descriptive rather than compound term. Similarly, *Shell* translates to *снаряд*, a broad term that may omit the original connotation of a casing. *Gun shield* as *бронешит захисту* reflects a more specific term in Ukrainian.

Contextual understanding is crucial. *Fire* can mean either *вогонь* (*barrage*) or "to shoot," and misinterpreting it could lead to operational errors. *Mine* must be distinguished between *міна* (*explosive device*) and *міномет* (*mortar*). Accurate translation relies on deep subject knowledge and contextual cues.

Terminological gaps also result from contrasting classification systems – e.g., NATO vs. Soviet-influenced doctrines. Terms like *Howitzer* or *Mortar* may not map cleanly onto Ukrainian equivalents. Translating *Gun limber* as *передок захисту* requires awareness of historical artillery components. Acronyms present another difficulty. While *MLRS* is translated as *РСЗВ*, many abbreviations lack established Ukrainian forms and require expansion, often at the cost of brevity. Military language is highly formal, technical, and impersonal. Maintaining this tone is vital; terms like *Fire adjustment* (*коригування вогню*) or *Target acquisition* (*виявлення цілі*) demand precision and neutrality.

To address these challenges, translators apply various strategies: transcoding, for names without equivalents (e.g., *Shrapnel* – *шрапнель*); calques, such as *Muzzle brake* – *дулове гальмо*, or *Counter-battery fire* – *контрбатарейна боротьба*; descriptive translation, when no concise equivalent exists (e.g., *Sabot round* – *оперений підкаліберний снаряд*); generalization or concretization, adjusting specificity based on context. For example, *Shell* may require specification, while highly specific English terms may be generalized in Ukrainian.

Conclusions. This study into artillery terminology has illuminated its complex linguistic nature, revealing a rich etymological tapestry woven from Romance, Germanic, and other language influences, alongside a significant number of modern English formations reflecting technological evolution. Semantically, these terms are highly specialized and systematically categorized, yet they frequently pose challenges due to polysemy, homonymy, and the strategic use of figurative language. Crucially, these inherent linguistic characteristics directly contribute to substantial difficulties in translating artillery terminology from English into Ukrainian. The pervasive issue of interlingual asymmetry, where direct equivalents are either rare or incomplete, necessitates the use of descriptive translation, calquing, or other adaptive strategies. Polysemous terms and homonymous pairs demand rigorous contextual analysis to avoid critical misinterpretations. Moreover, the divergence in cultural-historical and military-technical doctrines between nations introduces conceptual gaps, requiring translators to possess not only linguistic competence but also profound domain-specific knowledge. The widespread use of abbreviations and the imperative for precise, formal military discourse further complicate the translation process. As a result, translators must employ a variety of techniques – including transcription, calque, descriptive translation, and lexical substitution – to ensure both terminological accuracy and stylistic consistency.

Future research could build upon these findings by conducting empirical studies on actual translation errors in military documents, developing a comprehensive and dynamic context-aware terminological database for artillery, and exploring the impact of AI-assisted translation tools on the accuracy and efficiency of military terminology translation. Comparative analyses with other special-

ized military domains would also provide valuable insights into broader trends in military linguistics and terminology management.

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Запольських С., Погонєць В., Андрєєва І. Термінологія артилерії: етимологія, семантика та труднощі перекладу

Анонція. Дослідження ґрунтується на корпусі з 172 найуживаніших артилерійських термінів, дібраних із фахових довідників та таблиць стрільби, і спрямоване на системний аналіз цієї лексики за етимологічними, семантичними та перекладознавчими ознаками. Етимологічний аналіз засвідчив різнопланове походження термінів: приблизно 50% мають романське або класичне коріння, 16% – германське, 3% – арабське, а 31% становлять – сучасні англійські неологізми, пов'язані з розвитком військових технологій. Семантично артилерійська термінологія є вузькоспеціалізованою та тематично впорядкованою, однак ускладнює переклад через полісемію, омонімію та використання образної мови. Ключові труднощі англо-українського перекладу зумовлені міжмовною асиметрією: в багатьох випадках відсутні прямі відповідники в українській мові, що потребує використання описових перекладів, кальок або трансформацій із глибоким урахуванням контексту. Полісемічні та омонімічні терміни вимагають ретельного аналізу для запобігання змістовим помилкам. Відмінності у військових традиціях та культурно-історичному досвіді посилюють ці виклики, вимагаючи від перекладача високого рівня предметної обізнаності. Окрему складність становить уживання скорочень та вимога до точності й стилістичної відповідності у військовому дискурсі. Ефективний переклад передбачає застосування таких стратегій, як транскрипція, калькування, описовий переклад і лексичні заміни. Отримані результати мають практичне значення для перекладачів військової сфери, лексикографів та викладачів перекладознавства, сприяючи поліпшенню точності й однозначності комунікації у міжнародному військовому середовищі.

Ключові слова: термінологія артилерії, етимологія, семантика, трансформації перекладу, міжмовна асиметрія.