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SEMANTIC FEATURES OF THE ARABIC WORD ‘ILM (based on the treatise ihsha’ al-’ulum by al-Farabi)

The treatise ‘Encyclopedia of Science’ or ‘Ihsha’ al-’Ulum’ by Abu Nasr al-Farabi is a comprehensive work that encompasses various science fields of that time, where the author was able not only to classify and systematize the sciences of his time but also to carry out an additional classification of each science with a definition of goals and objectives. The word ‘ilm, is one of the most frequently used in the treatise and, perhaps, as the most recurrent, has not become the object of research to this day. Al-Farabi, a native of Farab and a non-native speaker of Arabic did not limit the meaning of the word to only ‘knowledge’, but also used it in the meaning of ‘science’. This article attempts to study the meanings of the word ‘ilm with its cognate variants in the treatise of Abu Nasr al-Farabi’s ‘Encyclopedia of Science’ in the original Arabic text. Such research of a separate frequently used root in the original is being done for the first time in Farabi studies. The research aims to study the root ‘ilm and its single-root models used by al-Farabi in the above-mentioned treatise. The research will also conduct a quantitative analysis of all single-root words from the root ‘‘ilm’ to identify the frequency of their use.

Key words: Encyclopedia of Science’, ‘ilm, science, knowledge, single-root words, al-Farabi, Arabic.

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‘Илм сөзінің мағыналық ерекшеліктері (Әл-Фарабидің «Ихса’ Ул-’Улум» трактатының негізінде)

Әбу Насыр әл-Фарабидің Ихса’ ул-’Улум немесе «Ғылымдардың жіктелуі» трактаты оның заманындағы ғылымның әртүрлі салаларын қамтитын ғылыми-энциклопедиялық еңбек. Трактат авторы ғылымдарды тек жіктеп-жүйелеп қана қоймай, сонымен қатар мақсат-міндеттерін айқындай отырып, әрбір ғылымға қосымша классификация жүргізе білген. Әрбір ғылым саласына жеке тоқталып, мақсаты мен міндеттерін айқындай отырып, жеке-жеке классификациясын жүргізген. Қазақ тіліне ілім, білім, ғылым ретінде енген араб тілінің «‘илм» сөзі трактатта жиі қолданылатын кілт өздердің бірі болғанына қарамастан, бүгінгі күнге дейін зерттеу нысанына айналмаған. Ана тілі араб тілі емес Фараб өңірінен шыққан әл-Фараби қарастырылып отырған түбір сөзді білім және ғылым (ілім) мағынасында қолданылады. Бұл мақалада Әбу Насыр әл-Фарабидің «Ғылымдардың жіктелуі» трактатының түпнұсқа тілі – араб тіліндегі ‘илм сөзі мен онымен түбірлес сөздердің мағыналары қарастырылады. Жиі қолданылатын түбірлес сөздерді әл-Фарабидің трактаттарының бірінде анықтау фарабитану саласында алғаш рет қолға алынып отыр. Зерттеудің мақсаты – әл-Фарабидің жоғарыда аталған трактатында қолданылған ‘илм түбірі мен оның түбірлес үлгілерін зерттеу. Сондай-ақ зерттеу барысында анықталған бір түбірлі сөздердің қолданылу жиілігінің сандық талдауы да жүргізіледі.

Түйін сөздер. ғылымдар жіктемесі, ‘илм, ғылым, білім, бір түбірлі сөздер, әл-Фараби, араб.

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Смысловые особенности слова ‘илм (на материале трактата Аль-Фараби «Ихса’ Уль-’Улум»)

Трактат «Классификация наук» или в оригинале «Ихса’ уль-’Улум» Абу Насра аль-Фараби представляет собой научно-энциклопедический труд, включающий в себя различные области науки того времени, где автор смог не только классифицировать и систематизировать науки сво-

его времени, но и провести дополнительную классификацию каждой науки с определением цели и задач. Слово ʻилм как одно из частоупотребляемых в трактате и, пожалуй, как самое ключевое, не стала объектом исследования по сей день. Само слово у аль-Фараби – выходца из Фараба и не носителя арабского языка не ограничивается лишь значением «знание», а используется и в значении «наука». В настоящей статье предпринимается попытка изучить значения слова ʻилм с его однокорневыми вариантами в трактате Абу Насра аль-Фараби «Классификация наук» в исходном – арабском тексте. Подобное исследование с изучением отдельного частоупотребляемого корня в оригинале в фарабиеведении делается впервые. Цель исследования заключается в изучении корня ʻилм и его однокорневых моделей, использованных аль-Фараби в вышеназванном трактате. В ходе исследования также будет проведен количественный анализ всех однокорневых слов от корня ʻилм для выявления частотности его употребления.

Ключевые слова: классификация наук, ʻилм, наука, знание, однокорневые слова, аль-Фараби, арабский.

Introduction

The treatise ‘Ihsha’ al-'Ulum’ by Abu Nasr al-Farabi, known in the English version as ‘Encyclopedia of Science’, ‘Classification of Sciences’, al-Farabi’s classification of knowledge, ‘Enumeration of the Sciences’ and ‘Categories of Science’ became a theoretical and practical work in the Middle ages, gradually gaining popularity among scholars of the East and West. In the 12th century, the treatise became an integral part of teaching and research (Gafurov, Kasymzhanov 2019, 154-p.) and by that time it had been translated twice into Latin (Kobesov 2004, 33-p.). The author of the treatise deservedly received the status of ‘the Second Teacher’ after Aristotle or ‘Aristotle of the East’; on the one hand as a result of translation activity, and on the other due to his commentary, i.e. the enormous work done in translating the Greek heritage belonging to the pen of Aristotle, and on the other hand, commenting, hence al-Farabi was a translator and commentator. It was his connection with ancient science during his lifetime that gave him this nickname (Kedrov, Esenov, Kasimzhanov 2019, 38-p.). At the same time, A. Kubesov, referring to the Egyptian researcher Osman Amin, emphasizes that this glory was given to him precisely due to the ‘Encyclopedia of Science’ (Kobesov 2004,, 46-p.). At the same time, al-Farabi, developing the thought of Aristotle, also conducts a critical analysis, thereby making his contribution to science. M. Rozali and N. S. Lubis emphasize that in this treatise al-Farabi “…only does division or classification of knowledge both ontology, epistemology and axiology. Al-Farabi, mentions various terms that are almost the same but semantically contain hierarchical meanings” (Rozali 2023, 54-p.). The treatise became one of the treatises demonstrating its encyclopedic facets, which reached the West (Weber 2019). The sciences reflected in the ‘Encyclopedia of Science’ testify to the functioning of science as a whole, al-Farabi’s deep knowledge in almost all areas of science of that time, which resembles the Arabic word ‘'ilm’ that can be translated into English as both science and knowledge. It was the desire to gain knowledge, to know and study new things, to plunge into science, or thirst in one Arabic word – ‘'ilm’ that guided him throughout his life from Farab to Damascus. Abu Nasr al-Farabi connects the goal of education with the highest good, the path to which lies in encouraging the desire to perform good deeds. And it is the knowledge that makes it possible to distinguish good deeds from evil, good from bad (Ashilova 2012, 176-177-p.). As a result, the deep and versatile knowledge had a positive impact on the formation of al-Farabi’s encyclopedic heritage, which continues to attract the attention of researchers to this day. As K. Tajikova notes, “The multifaceted scientific heritage of Abu Nasr al-Farabi includes the entire range of disciplines that took place in his time. ... Al-Farabi managed to systematize and codify all these branches of knowledge, define the subjects, tasks and goals of their research, an illustration of which is his treatise ‘Encyclopedia of Science’ (Tajikova 2020, 42-p.). In addition, all these branches indicated by al-Farabi in the treatise are not the entire list of sciences of that time, which is confirmed by K. Idrisov: “The sciences that existed in the era of the Second Teacher, including rational and religious, are not limited to the eight types of sciences that he cites in his book. For example, among the religious sciences, in addition to Muslim law and kalam, there were other sciences, like the interpretation of the Quran and the science of the Prophet’s tradition, which were considered the basics of the religious sciences and had the root status concerning Muslim

law" (Idrisov 2009, 115-p.). The result of these efforts (in harmony between the rational and religious sciences) is a unique system of sciences that he outlined in the famous book "Ihsa' al-'Ulum". The classification contains sciences that are not found in the Aristotelian classification, for example, the science of language and logic.

Research methods and materials

This research is based on one treatise by al-Farabi in the original Arabic language named 'Ihsha' al-'Ulum', which translates to 'Encyclopedia of Science'. When studying the source text of the 'Encyclopedia of Science', all the pages of the treatise, including the title page, were viewed. Ali Bu Mulhim (علي بو ملحم) transcribed the manuscript into the machine (computer) form (Abu Nasr Al-Farabi 1996). When considering the Arabic text, attention was paid to the root 'ilm (عِلْم، العِلمْ) and 'alima (عَلِم) and their various derived forms, including the plural of the word ''ilm' and its derived forms – single-root words. For Arabic letter 'ع' [ayn] symbol (') and for 'ء' [hamza] symbol (') are used. Arabic is an inflectional language (lat. flectivus – flexible) capable of enriching itself from the inside and outside with the help of inflexions, which allows you to attach affixes, infixes, and prefixes. Eastern Aristotle quite skillfully uses the internal resources of the Arabic language, which was noted by the Farabi scholar-translator K.Tajikova, "al-Farabi lists all kinds of affixes, including prefixes, proclitics, suffixes, enclitics, case endings" (Tajikova 2020, 7-p.).

Next, a list of ''ilm' usage and its derivative versions was compiled with the definition. At the final stage of the study, the frequency of use of the root ''ilm' and its derived models in Arabic was determined using a quantitative method. It should be noted that ''ilm' in this article is an object of research in 'physical form', respectively, the cases when it was omitted or replaced by a pronoun and a synonym were not considered in this research. It is known that al-Farabi, for example, sometimes used 'al-Manthiq' ('المنطق'logic) instead of ''ilm ul-Manthiq' ('علم المنطق' the science of logic) or instead of ''ilm ul-Handasah' ('علم الهندسة') and ''ilm ul-'Adad' ('علم العدد') – just al-Handasah (الهندسة) and al-'Adad (العدد) respectively. Al-Farabi's word 'science' in some cases is replaced by the word 'art' (in Arabic Sina'a), for example, 'Sina'at ul-Mantiq' ('صناعة المنطق' the art of logic), 'Sina'at un-Nahwu' ('صناعة النحو' the art of grammar), and in some cases, to avoid tautology, replaced with pronouns, including indicative, personal and connective. It is also possible that the types or subsections of a particular science, al-Farabi, along with the word ajzaa' ('أجزاء' lit. parts, sections) from singular form juz' (جزء) – ''ilm ul-Lisan wa ajzau' ('علم اللسان وأجزائه'), ''ilm ul-Mantiq wa ajza' ('علم المنطق وأجزائه'), uses the word science itself, for example, Mathematics – ''ulum ut-Ta'alim' (علوم التعاليم) is divided into ''ilm ul-Handasah', ''ilm ul-'adad', ''ilm ul-Manazir' ('علم المناظر' optics), etc.

Analysis and Results

The Kazakhstani researchers A. Nyssanbaev, G. Kurmangaliyeva, N. Seytakhmetova consider *'ilm* in the heritage of al-Farabi both as education and as science, and pay attention to the use of this word in the Quran 750 times (Nysanbaev, Kurmangalieva, Seitakhmetova 2019, 17-p.). Deborah L. Black makes an attempt to consider 'ilm as knowledge in al-Farabi's epistemology (Deborah 2024), that is, the study of the word we are considering in epistemology differs from the linguistic point of view, but at the same time the researcher considers it (the word), first, as an analogue of the Greek episteme in the meaning of knowledge. J.K. Sharipov, in his study on the classification of sciences by al-Farabi and Koshoni, notes that in the 9th century there were two types of knowledge: traditional sciences (Islamic sciences) and sciences natural to the human mind, which arose under the influence of the Greek heritage. Moreover, both types were conveyed by one word ''ilm' (Sharipov 2009, 121-p.). M. Ashilova, studying the pedagogical ideas of al-Farabi, al-Kindi, ibn Sina and other thinkers of the Middle Ages, pays more attention to the role of knowledge in the heritage of each scholar in general (Idrisov 2009). Sh. Taubayeva considers the pedagogical concept of al-Farabi as a whole; accordingly, individual concepts are not examined (Taubayeva 2024). Farabi scholar-translator Zh. Sandybaev in his article 'Classification of al-Farabi's sciences' conducts a study of the treatise as a whole, giving meaning to the names of sciences and their subsections in the Kazakh language (Sandybayev 2020). Unlike the other, carried out jointly with other researchers, where, speaking about the four virtues of al-Farabi, leading to happiness, they focus on the first of them – theoretical, which consists of knowledge that is

formed already in the womb (Sandybaev, Abzhalov, Berkimbaev 2020, 9-p.). G.A. Shadinova and A.A. Qojan, considering state power in the legacy of al-Farabi, in particular touching on the Encyclopedia of Science, emphasize civil science as one of the five key sciences (Shadinova, Qojan 2021, 10-p.). In addition, linguistics is one of the humanities, presented in al-Farabi's treatise 'ilm al-Lisan (also known as 'اللسانيات'; 'اللغويات'; 'علم اللغة' in modern Arabic), as not just one of key sciences, but also a priority, which the translator of al-Farabi's treatises K.Kh. Tajikova draws attention to: "The science of language is at the very beginning of all the sciences he [al-Farabi] lists, it is ahead of logic, mathematics, physics, metaphysics, and civic science. Attaching great importance to knowledge of language" and further quotes al-Farabi "As for how one should teach and learn, how one should express one's thoughts, pose questions and answer, in this sense I affirm that the very first of all sciences is science of language" (Tajikova 2020, 6-p.). At the same time, according to an Arab researcher Alaa Faruq Mahmud Ibrahim, Abu Nasr al-Farabi, when studying the science of language, he is not limited to one language or another but generally has language in mind. For example, even if al-Farabi considers the singular, dual, and plural numbers typical for Arabic, where there are three numbers and not two as in most languages, he also believes the past, present, and future verb tenses. However, Arabic has a past, present, and imperative (Mahmud Ibrahim 2023).

Al-Farabi's contribution to the development of the Arabic language, particularly its terminology, is beyond doubt. Along with other Arab and non-Arab medieval scholars, he played a significant role in the conception of philosophical terminology, giving abstract philosophical meaning to existing words (Tajikova 2020, 11-p.). In another study dedicated to the philosophical terminology of al-Farabi, K.Kh. Tajikova notes, "Arabic-language philosophical terminology was developed along with the emergence of philosophy as a special branch of knowledge. In the Arab world, the emergence of special vocabulary is associated with translation activities. ...Translation activity vastly contributed to the flourishing of scientific thought. ...Thus, thanks to translators, up to the X century, a base for the Arabic-language philosophy was created" (Tajikova 2020, 19-p.). The Antique Heritage, which aroused the interest of Eastern medieval scholars, was not just automatically translated from the source language, but was subjected to commentary and analysis, and then to the creation of equivalents in the translated language, Abu Nasr al-Farabi became famous not only as an encyclopedic scholar but also as a translator and commentator. Al-Farabi, like his contemporaries, studying the Greek heritage, came across a terminological apparatus, necessitating to delve into the etymology of terms and find an Arabic equivalent for its comprehension (Tajikova 2020, 19-p.). When reading al-Farabi's treatise, one rarely sees a borrowed term from the Greek language; in most cases, the translator-commentator, based on the interpretation, created the term through morphological, semantic, and syntactic methods of word formation. One of the words he often uses is the Arabic 'ilm, which "simultaneously means both knowledge and science, which, according to al-Farabi, should in no way be confused with education and knowledge, because both education and knowledge when comprehending a subject are based on general signs and properties of an object, while science is aimed at revealing the internal causes of an object; it operates with specific concepts, which are the subject of knowledge with the help of reason" (Tajikova 2020, 77-p.). It is difficult to find one equivalent for 'ilm, mentioned by al-Farabi, for instance, in Kazakh ilim, ğylym, bilim, in Russian nauka and znanie, in English science and knowledge, etc. Even in Kazakh, where a borrowed version from Arabic is used – ilim, it is narrowed in meaning compared to the original Arabic. P.M. Suleimenov, studying knowledge in al-Farabi's works, in the Kazakh language uses the phrase 'ğylymiyi bilimder' (Suleymenov 2023, 9-p.), which directly means scientific knowledge that in our opinion approximately describes 'ilm and relates along with other terms such as cognition, character, temperament, etc. to pedagogical science. Knowledge for al-Farabi is knowledge that has been proven, i.e. reliable and genuine (orig. 'العلم اليقين'), respectively, knowledge that was obtained as a result of proof. Regarding 'ilm in the heritage of al-Farabi, in particular in the treatise 'Ihsha' al-'Ulum', it (the word) forms izafet phrases with the terms 'اللسان' language, 'الموسيقي' music, 'المنطق' logic, 'النجوم' stars, form fields of science, respectively 'علم اللسان' literally means the science of language (Lingustics; Language Studies); 'علم الموسيقى' the science of music; 'علم المنطق' the science of logic; 'علم النجوم' the science of stars, etc. Further, outside the izafet construction, consistent with the

subsequent word in gender, number, and case, *'ilm* also forms a certain series of sciences ‘العلم الطبيعي’ (lit. Natural Science) Physics, ‘العلم الإلهي’ (lit. Divine Science) Metaphysics and ‘العلم المدني’ Civil Science. The name of the treatise ‘إحصاء العلوم’ in the original language – Arabic is formed from two members of the izafet construction – ‘إحصاء’ (classification) and ‘العلوم’ (sciences), respectively, the first word is the masdar (action name) of the fourth type of the verb ‘أحصى’ (ahsa), and the second – the plural of the word ‘علم’ ('ilm), which will be discussed in detail in this article based on the above-mentioned treatise.

Abu Nasr al-Farabi, in his treatise ‘Encyclopedia of Science’, considers five main branches of science: 'ilm ul-Lisan (علم اللسان the science of language), 'ilm ul-Mantiq (علم المنطق the science of logic), 'ulum al-Ta'alim (علوم التعاليم science of teaching/mathematics/), 'ilm un-Nujum it-Ta'limiy (علم النجوم التعليمي Science of Stars, pedagogical, educational / astronomy/) and 'ilm Musiqa (علم الموسيقى the science of Music). Further, the encyclopedist classifies each science into sub-sciences, for instance, in the science of language or linguistics, he considered 'ilm ul-Alfaz il-Mufradah (علم الألفاظ المفردة the science of simple words), 'ilm ul-Alfaz il-Murakkabah (علم الألفاظ المركبة the science of compound words), 'ilm ul-Asha'ar (علم الأشعار the science of poetry /poetics/), 'ilm un-Nahwu (علم النحو the science of grammar), 'ilm qawanin al-Kitaba (علم قوانين الكتابة science of the laws of writing), 'ilm qawanin al-Qira’ah (science of the laws of (correct) reading). The izafet phrase 'ilm ul-Qawanin can be translated into English, as knowledge of laws and science of laws ('ilm qawanin al-Alfaz (علم قوانين الألفاظ the science of the laws of simple words), 'ilm qawanin al-Murakkabah (علم قوانين المركبة science of the laws of phrases). Furthermore, in the second part dedicated to logic, the author of the treatise 'ilm ul-Mantiq unambiguously uses ‘sina'at ul-mantiq’ (صناعة المنطق the art of logic; فصناعة المنطق regarding the art of logic; وهذه الصناعة تناسب صناعة النحو this art corresponds to the art of grammar). The Second Teacher equates science with art and uses them interchangeably. Regarding examples with the root ‘'ilm’, al-Farabi mentions in the part of Logic 'ilm ul-'Arudh (علم العروض the science of verse /prosody/) and 'ilm un-Nahw. The third section, studying mathematics, 'ilm ut-Ta'alim (علم التعاليم), includes 'ilm ul-'Adad (علم العدد), 'ilm ul-Handasah (علم الهندسة), 'ilm ul-Manazir (علم المناظر science of species, panoramas), 'ilm un-Nujum (علم النجوم), 'ilm ul-Musiqa (علم الموسيقى), 'ilm ul-Athqal (علم الأثقال the science of weight), 'ilm ul-Hiyal (علم الحيل the science of skilful techniques). The fourth section of al-'Ilm ut-Tabi'yi (العلم الطبيعي) Natural science (Physics) and al-'Ilm ul-Ilahy (العلم الإلهي) divine science (Metaphysics), the fifth section al-'Ilm ul-Madani (العلم المدني) Civil Science, 'ilm ul-Fiqh (علم الفقه) Jurisprudence and 'ilm ul-Kalam (علم الكلام) Dogmatic Theology. Consequently, in his list of sciences, al-Farabi used 'ilm ul-Mantiq – 13 times (2 – 'ilm ul-Mantiq wa an-Nahw; 'ilm qawanin al-Mantiq), 'ilm ul-Lisan and 'ilm ul-Musiqa – 6 times each of them, 'ilm un-Nujum and 'ilm ul-'Adad – 5 times each, 'ilm ul-Manazir, al-'Ilm al-Ilahy, al-'Ilm ul-Madani and 'ilm ul-Fiqh – 4 times each, 'ilm ul-Astqal, 'ilm ul-Handasah and 'ilm ul-Kalam – 3 times each, 'ilm ul-Hiyal – 2 times and 'ilm ut-Ta'alim – 1. Additionally, the plural forms of the two branches (Math and science of weights) were used twice each.

In some cases Abu Nasr al-Farabi uses the plural form 'ulum (علوم sciences), including as noted earlier in the title of the treatise itself, Ihsha’ al-'Ulum (إحصاء العلوم lit. the list of sciences); in the introduction Maratib ul-'Ulum (مراتب العلوم enumeration of sciences), al-'Ulum ul-Mashhura (العلوم المشهورة known sciences), 'ulum ul-Ta'alim (علوم التعاليم sciences of education), 'ulum ul-Hiyal (علوم الحيل skilful techniques sciences), min al-'Ulum (من العلوم from, of sciences), baina al-'Ulum (بين العلوم among the sciences), min sair il-'Ulum (من سائر العلوم from all the sciences), ibtal ul-'Ulum (إبطال العلوم renunciation of the sciences), jumlat ul-'Ulum (جملة العلوم all sciences), mabadi il-'Ulum (مبادئ العلوم foundations of these sciences). Most of it is formed according to the izafet construction; among them, the first member ('ulum ut-Ta'alim, 'ulum ul-Hiyal); the second member (ihsha’ ul-'ulum, maratib ul-'Ulum, sair ul-'Ulum, etc.).

The treatise contains sentences in which the encyclopedist uses both the singular 'ilm and its plural, 'ulum. For example, al-Farabi writes: “ قصدنا في هذا الكتاب أن نحصي العلوم المشهورة علمًا علمًا” (Abu Nasr Al-Farabi 1996, 15-p.) /qasadna fi haza al-Kitab an nukhsi il-'ulum al-Mashhurah 'ilman 'ilman/, which means “In this book, we sought to list the known sciences – science by science” or in another sentence “إذا أراد أن يتعلم علمًا من هذه العلوم” /iza arada an yata'allyam 'ilman min hazihi il-'ulum/, which translates to “if he /person/ wishes to study the science of sciences”. Thus, in one sentence, al-Farabi uses single-root words three times, in the first – 'ulum and twice 'ilm, in the second – yata'allyam,

'ilm and 'ulum. The verb /yata'allyam/ (يتعلم) refers to the present tense of V type, formed by combining t ت in the root and doubling the second root letter l ل. The author resorts to this type a total of eight times, of which six are masdar and two are verbs. Although in most cases ‘علم’ 'ilm or 'alima is used as an action name, in some cases it is used as a verb. In the treatise, the phrase ‘علم قوانين’ 'ilm qawanin can be translated as the science of laws and knowledge of laws depending on the context; “يحتوي على علم” (Abu Nasr Al-Farabi 1996, 24-p.) /yakhtaui 'ala 'ilm/ contains knowledge or includes knowledge; sometimes a verb is used: (“بل ينبغي أن يكون علمنا أي طريق” (Abu Nasr Al-Farabi 1996, 131-p.) /byal yanbagi an yakun 'ilmuna ayi tariq/, but we must know which way, “وكيف ينبغي بأذهاننا علم شيء شيء منها” /ua kaifa yanbagi biazkhanina 'ilma shai shai minha/ how to recognize things with our minds one after another (lit. how to recognize with our minds thing by thing). The verb 'alima was used 15 times in the treatise, 9 of them in the present tense and 6 in the past tense. In the following sentence from Mathematics section, the Second Teacher also uses root 'ilm in three words: “أما علم العدد فإن الذي يعرف بهذا العلم علمان” [Abu Nasr Al-Farabi 1996, 49-p.], which translates as “As for arithmetic, two sciences are known under this name”, accordingly, only the last word “two sciences” has been retained (in Arabic this is one word formed by adding the ending “-ani” (أن) of a dual number). So, arithmetic in Arabic ‘علم العدد’, translates as the science of quantity, is included in mathematics or mathematical sciences, which by al-Farabi sounds like ‘علوم التعاليم’ (in some cases in the singular) consists of two words formed from one root 'ilm. Astronomy in the list of sciences is given as ‘علم النجوم التعليمي’, consisting of three words, of which two have the same root – the first 'ilm (علم) and the third at-ta'limiy (التعليمي), where ‘تعليم’ is masdar of the II type of the verb ‘علّم’ to teach with added ‘ي’, forming a relative adjective. These two branches of science in Arabic are connected not only by the keyword ‘علم’, but also by ta'alim in mathematics and ta'limy in astronomy. The II type, in particular its masdar, finds its active use in the work under consideration. So, if the word ta'alim (التعليم) – masdar was found only once and the word with ‘ي’ attached to it twice, then its plural at-ta'aliim (التعاليم) is used nine times in total, two of them with the word 'ilm or 'ulum, the remaining seven are used separately. In some cases, al-Farabi allows the use of ta'aliim (التعاليم) instead of ilm ut-ta'aliim (علم التعليم), al-Mantiq instead of 'ilm ul-Mantiq, al-Musiqa – 'ilm ul-Musiqa, an-Nahw – 'ilm un-Nahw, etc.

Aside from the above-mentioned masdars and verbs, al-Farabi resorts to the use of the active participle ‘عالِم’ ('aalim) in three cases in the meaning of knowledgeable, scholar from the verb 'alima (عَلِمَ). In the other three cases, the medieval encyclopedist uses akhlu ul-'Ilm (‘أهل العلم’ people of science) in a similar meaning.

The participle of the passive voice in the same I type ma'luum (‘معلوم’ known) is also used in three cases, of which two are in the masculine (‘ترتيب معلوم’ the known order, ‘عدد معلوم’ the known number) and one in the feminine (‘أعداد معلومة’ the known numbers; the plural of inanimate objects in Arabic is considered feminine). Among other single-root words, but not related to types, one can include the word al-'Alyaama (‘العلامة’ sign), which al-Farabi used in the plural in the present treatise a total of eight times, seven of them in only one paragraph (Abu Nasr Al-Farabi 1996, 24-p.). Finally, the word al-'Aalyam (‘العالَم’ world, earth, universe), similar in spelling to the previously mentioned al-'Aalim ‘العالِم’, the difference lies in the vowel of the second root letter ‘ل’, respectively fatha (َ) in the word earth and kyasra (ِ) – scientist, scholar.

Conclusion

Thus, the Arabic word 'ilm, consisting of three root letters, along with its verb ‘alama (to know), became the base for other word formation. Abu Nasr al-Farabi is rightfully considered the Second teacher after Aristotle, in Arabic sources – ‘المعلّم الثاني’ (lit. Second teacher), where the word ‘al-mu‘allim’ – is the active voice participle of the second type, in the direct translation ‘teaching’ from the verb ‘to teach, educate’ ('allyama), also derived from 'alama and 'ilm. The translator-commentator of Aristotle, researcher al-Farabi in his works resorts to the use of masdar (verbal name or name of action) of this type ‘التعليم’ ta‘aliim (teaching), then its plural ‘التعاليم’ /ta‘alim/, relative adjective, formed by combining ‘التعليمي’ ta‘aliim+yi. Al-Farabi also uses V type in the verb ‘التعلّم’ ta‘allum (to study) and the verbal noun ‘التعلّم’ ta‘allum (studying). The inflective nature of the Arabic language allows it to develop not only from the outside sources but also from the inside when a letter or letters enter the root. From

the word in question, ‘عالم’ 'aalim (scientist, knowledgeable) was formed similarly – the active voice participle of the first type – the producer of the action, respectively, in the direct translation, ‘the one who knows’, the knowledgeable; also ‘معلوم’ ma‘aluum (known) – passive voice participle of the 1st type, directly translated, ‘something known’. In the first case, the letter *alif* was added to the first radical, and in the second, the letter uau was added to the second radical.

Abu Nasr al-Farabi in his treatise ‘Ihsha' al-'Ulum’ uses the root 'ilm in the names of sciences, including in the names of subsections of sciences and its meaning as knowledge. At the same time, sometimes replacing it with the word Sina'at – art. 'Ilm as a science finds its greatest application, and its plural form in most cases is in its key meaning (classification of sciences, all sciences, other sciences) and in rare cases in the name of scientific branches (mathematics, the science of skillful techniques). The word ‘scientist’ (or scholar), ‘scientists’ in the treatise is used in the form of the active participle ‘العالِم’ al-'Aalim and the izafet construction – ‘أهل العلم’ ahl al-'Ilm. In derivative forms, the root 'ilm finds its application in I, II and V types. In the type I, in addition to the verb in the present and past tenses and masdar (action name), it is used in the active voice (‘عالم’) and passive voices (‘معلوم’) participles. Unlike the type I, the type II is used extremely rarely, and most from its word-formation models (‘التعليمي’ at-Ta‘limi, ‘التعاليم’ at-Ta‘alim). Al-Farabi uses the type V relatively actively, including masdar at-Ta‘allum (التعلم) and the verb ta‘allama (تعلم).

In total, in this treatise the root 'alima (عَلِمَ) was used 215 times, of which as a verb – 15 (6.97%) times (in the past tense – 6, the verb is written similar to 'ilm in Arabic, their distinguish between vowels (characteristics); 'ilm masdar (or name of action) 140 (65.11%) times (98 – in the names of sciences and their subsections; 4 – in the meaning of scientist6 scholar together with the word ‘ahl, forming (ahl ul-'Ilm), which in literal translation is ‘the people of science’; 38 – in the meaning of knowledge), 29 (13.48%) – its plural form 'ulum (including 4 – in the name of sciences), 3 – active participle in the meaning of scientist, scholar (al-'Aalim) synonymous with the previous one, 4 – passive participle in the meaning known (al-ma'luum). For other types, masdar II type (at-Ta'lim) – once, its plural (at-Ta'aliim) – 4 times and a relative adjective formed with the ending -yi – (at-Ta'limyi) – 3 times. Masdar of the V type and the verb in the present tense found in the work 2 times each. Outside those types, among single-root words, words such as ‘al-'Alamaat’ and al-'Alam were identified, 7 times and 5 times respectively. The most active type was I – 191 words (88.83%), II and V – 8 (3.72%) and 4 (1.86%), respectively, the rest (single-rooted, out of the verb type) – 12 (5.58 %).

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