

THE ISSUES CONCERNING TERMINOLOGY OF LEGAL REGULATION OF USING UNDERGROUND SPACE

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Abstract: In the context of modern conditions of the development of public relations, the issue of legal regulation of using underground space for the construction and operation of underground structures becomes of particular importance. The purpose of the academic paper lies in analysing and solving the problem connected with choosing the optimal terminological unit, taking into account the differences in the conceptual scope and features of functioning, for the name of the subsoil resource, the useful properties of which make it possible to use them as an operational basis for human activity. The underground space is a set of all natural conditions and processes, including those that have undergone changes in the process of production and economic activity, which are inextricably linked and create a single system. This system is characterized not only by natural, but also by natural and social patterns. The latter is due to the fact that underground space can act as a condition and means of the person's life, a territory in which it is possible to carry out his life activity, the main means of production (mining), a location for production and other economic facilities (construction and operation of underground structures). Underground cavities are a type of subsoil resources that occupies part of the underground space not covered with rocks. This concept has features inherent in the concepts of "subsoil resources" and "underground space". The interrelationship which encompasses the concepts of "underground cavities" and "underground space" can be used as a basis for determining the meaning of the concept of underground cavities.

Keywords: subsoil, underground space, subsoil resources, underground cavities, use of subsoil, use of underground space, use of underground cavities, regulation of subsoil resources.

1 Introduction

In the context of modern conditions of the development of public relations, the issue of legal regulation of using underground space for the construction and operation of underground structures becomes of particular importance. The low efficiency of legal regulation of relations in the field of underground space causes the lack of an effective mechanism in Ukraine for legal regulation of underground cavities as a type of subsoil resources; this, consequently, raises a number of issues requiring appropriate investigation and solution. One of the significant problems of legal support for the use of underground space is the lack of proper conceptual and categorical apparatus. A significant number of key concepts used in the field of legal regulation of relations concerning using and protection of subsoil have not received a legislative definition yet. The following terms remain undefined in the legislation of Ukraine on subsoil, namely: "subsoil use", "use of subsurface", "use of subsoil resources", "subsoil resources", "subsoil resources", "underground cavities", "underground space", "use of underground cavities", etc. As a result, this leads to problems in the practical application of the norms of the current legislation of Ukraine on subsoil and the identification of concepts that are different in their legal nature.

The above mentioned provisions make it possible to talk about two aspects of the problem of the formation of legal concepts in the legal literature. The first aspect is associated with the denomination, that is, the legal term used to designate the corresponding concept, the second one – with the formulation of the definition of the concept, the definition of its content.

2 Literature Review

Legal aspects on the use of underground space for the construction of underground structures are of particular interest to scholars from different countries (Belayev, 2018; Barker, 1991; Mielby et al., 2017; Volchko et al., 2020; Wiranegara, 2017; Zhang et al., 2020).

From among the systemic case studies in the scientific literature, the review of the legal aspects of the use of underground space following the activities of the special working group of the International Tunnel Association (ITA) is of particular importance (Barker, 1991). Later, this topic was also constantly

considered in the framework of international forums organized by the ITA, as well as at similar forums of the International Association of Organizations-Researchers of Underground Space (ACUUS) (Belayev, 2018).

Representatives of the legal scientific community have repeatedly noted that the use of subsoil for purposes not related to the extraction of minerals is a complex legal phenomenon that has many varieties, a wide range of subsoil users and provides for the need for a system of specific legal norms, currently scattered in separate laws and regulations (Shemiakov & Khokhlova, 2011). The following issues area of particular scientific interest in the outlined area of public relations, namely: the issue of legal support for subsoil use not related to mining (Shemiakov & Khokhlova, 2010), legal protection of subsoil in the process of their use for purposes not related to mining (Oliinyk, 2011, p. 94–100), legal regulation of subsoil use for construction and operation of underground structures not related to mining (Plotnikova, 2000), management of subsoil use for construction of underground structures not related to mining (Surilova, 2016), definition of "use of subsoil for purposes not related to mining" (Barabash, 2020), use of underground space of land plots (Ripenko, 2012), legal support for the use of land for the construction and operation of underground facilities not related to the extraction of minerals (Barabash, 2014), the correlation of the categories of "subsoil use" and "land use" in the use of underground space (Kharytonova et al., 2021) some problems of integrated development of underground space (Ihnatenko, 2015; Ihnatenko, 2016), rights of using underground cavities (Kirin, 2017). In parallel with these issues, the scientific community is considering the formation of conceptual tools, development of basic categories and concepts in this area.

In the scientific space, one can find legal investigations devoted to studying the content of some concepts used in the legislation of Ukraine on subsoil. Nevertheless, another aspect of the formation of relevant concepts – the problems of terminology of legal regulation of the use of underground space – remains insufficiently studied.

Taking into account the scope of issues of formation of conceptual tools concerning subsoil law, it is not possible to conduct its systematic analysis and study within the framework of the present scientific work. In this regard, it is proposed to start considering the problems of terminology of legal regulation of public relations in the field of using the underground space relating to studying the concepts of "underground space" and "underground cavities". These concepts are key ones in determining the content and scope of other related concepts used in the field of legal regulation of subsoil use, namely: "use of underground space", "use of underground cavities", "subsoil use", "use of subsoil resources", "subsoil", "subsoil resources", etc.

Taking into account the significant relevance of the topic, the purpose of the present research is proposed as follows: to consider in the form the analysis and the problem solution connected with a choice of the optimal terminological unit, taking into account the differences in the conceptual volume and the peculiarities of functioning, for the name of the subsoil resource, the useful properties of which allow them to be used as an operational basis for human activity.

The implementation of the purpose involves the achievement of the following goals, namely: 1) to identify the types of subsoil resources; 2) to analyse the concepts of "underground space" and "underground cavities", which are used to denote the specified type of subsoil resources; 3) to answer the question concerning co-relation of these concepts; 4) to choose a term in order to denote the resource of the subsoil, due to the useful properties of which the subsoil can be used for purposes not related to the extraction of minerals.

3 Materials and methods

In the process of identifying, analysing and solving the problem of naming the subsoil resources, due to the useful properties of which the subsoil can be used as the operational basis of human activity, a complex of general and specific methods of scientific investigation has been applied, in particular:

- the dialectical method has been used in identifying and considering the issues of legal regulation concerning the use of underground space;
- the system and structural method has made it possible to apply a differentiated and integrated approach to the separation of subsoil use and subsoil resources;
- the formal and logical method has contributed to the formation of terms and such legal concepts as “subsoil resources”, “underground space”, “underground cavities”;
- the comparative legal method came has proved to be useful when comparing the subsoil legislation of Ukraine and international legal norms governing the use of underground space;
- the formal and legal method has provided an opportunity to analyse the content of legal norms of national legislation governing relations in the field of use and protection of subsoil;
- the method of technical and legal analysis has been used to assess the quality and effectiveness of legal and regulatory framework concerning using the underground space in Ukraine.

These and other methods of the scientific research are used in their interrelationship.

4 Results

The Code of Ukraine On Subsoil (2021) defines the subsoil as a part of the earth's crust, which is located below the land surface and the bottom of reservoirs and extends to depths available for geological study and development.

Types of subsoil resources are defined in detail in mining and geological sciences. For instance, from among the subsoil resources, Agoshkov (1982) proposed to distinguish six main groups, namely: 1) mineral deposits; 2) dumps of bursting and enclosing rocks, waste heaps of coal mines, dumps and warehouses of off-balance minerals; 3) waste from mining and processing and metallurgical production (tailings dumps of concentration plants, metallurgical slag, washing plants at placer deposits), waste water from processing and metallurgical production, containing useful components; 4) deep sources of fresh, mineral and thermal waters; 5) internal (deep) heat of the Earth's interior; 6) natural and man-made cavities in the massif of rocks (caves, mine workings, suitable for placement of industrial and medical facilities, burial of industrial waste and for other purposes).

The first three groups are mineral resources of the subsoil: the first group – natural resources, the second and third – wastes from their extraction, enrichment and processing. Accumulations of the latter, significant in terms of reserves, in particular dumps of industrial importance, are called technogenic deposits of minerals. The provisions outlined require some clarification in terms of referring of the subsoil of the fourth group to the mineral resources. Fresh, mineral and thermal waters (underground waters) are minerals of national importance. Mineral deposits in their totality are mineral resources that make up part of natural resources (living and non-living) in the bowels of the Earth, not created by man, and containing an element of certain benefits that are already in social demand at the moment. In the legal literature, two subgroups are distinguished in the structure of mineral resources, namely: 1) natural (geogenic) mineral resources (primary); 2) man-made mineral resources (secondary, tertiary).

It should also be noted that the heat of geothermal waters together with the internal (deep) heat of the Earth's interior are

special natural resources. These resources are not material in nature; however, their nature is mostly energy-based. Within the framework of energy resources, these natural resources form a group – geothermal resources.

The natural classification of subsoil resources does not fully reflect the legal division of subsoil resources by types of their use. R.S. Kirin believes that the key, basic classification feature is the physical characteristics of the resource, and additional – the genesis of its origin. According to these features, georesources are divided into four groups, namely: matter; space; energy (primary); geoinformation. Thus, from among the subsoil resources (georesources) the author identifies as follows: mineral resources; underground space resources (cavities); geoenery resources; geoinformation resources. Each of the above groups includes subgroups – geogenic (natural) and technogenic (artificial) (Kirin, 2007, p. 19–20). Other representatives of subsoil law also adhere to the represented classification of subsoil resources (Perchyk, 2002; Trubetskoi et al., 2000).

When determining the scope of the concept of “subsoil resources”, it is necessary to proceed from the position of environmental law and legislation, which define generic concepts – “natural resource management”, “use of natural resources”, “natural resources”, etc. The latter term will be the generic category for subsoil resources. Dubovik O.L. (2006) points out the expediency of applying the provisions of environmental law.

In order to solve the problem outlined, it is necessary to state the need to use the achievements of other sciences, such as logic, linguistics, etc. In the case of defining natural resources forming the scope of the concept of “subsoil resources”, the conceptual range should be taken into account, which forms such interdependent concepts, as natural resources → subsoil resources → type of subsoil resources. Along with this, in this case, the other regularity is revealed: the concepts of a less general level of generalization must correspond to the features of concepts of a higher level of generalization. In fact, the methodological aspect of the formation of legal concepts and the conceptual range of legal science is revealed in this expression. Disarrangement of this logical and gnoseological pattern of the formation of the conceptual apparatus will lead to errors not only in determining the system of legal norms in each of the legal sciences, but also to errors in law-conducting and law enforcement.

Some considerations regarding the isolation of subsoil resources are expressed by Ibragimov (2011). Firstly, when the case in hand is related to subsoil resources, one means all natural resources in the depths of the earth – both living and inanimate ones. Secondly, these are primary resources, but not secondary ones. Secondary resources should be understood as production and consumption wastes that are generated in the national economy (in this case – in the mining industry) and can be reused there. Thirdly, the use of the term “energy” in the context of defining the types of subsoil resources is unsuitable; it would be more correct and logical to replace the term “energy” with more focused term, such as “geothermal” (possible options “geothermal energy”, “internal deep heat of the earth”).

Without resorting to a detailed analysis of the division of subsoil resources, taking into account the above recommendations and analysis of scientific achievements on this issue, it is necessary to propose to reduce the list of these resources to three categories, namely: mineral resources, including minerals (solid, liquid, gaseous); geothermal resources; underground cavities.

Scholars in the field of environmental law note that currently difficult searches are conducted for the necessary words that best express the essence of legal categories and phenomena. Analysis of the provisions of legal science provides an opportunity to single out such legal terms that are proposed to denote the subsoil resources, the useful properties of which make it possible to use the subsoil as an operational basis for human activity,

which is ensured by the location and (or) operation of structures for various purposes not related to the extraction of minerals, namely: 1) underground space (cavities); 2) underground cavities; 3) underground space; 4) spatial resources of the subsoil; 5) underground void space (cavity) in the subsoil; 6) underground space resources (cavities); 7) underground resources. The existence of such a number of terms for the denomination of this category, proposed by the scientific community, will contribute, according to the viewpoint of Kolbasov (1999), a kind of terminological wandering, which is quite justified in the development of law. However, as the scientist emphasises, the only problem is not to get lost, which is extremely important for the process of formation and development of the theory of subsoil law.

According to the viewpoint of Koziakov (2002), if in legal science as a whole there is no clear understanding of a certain category or different terms are used to define the same social phenomena, it is not considered as a disadvantage. Hetman (2003) believes that the development of environmental legal concepts and categories, their formation and official introduction into the current environmental legislation, the optimal use of legal terminology in the text of regulatory legal acts is a task that requires an urgent solution in order to promote the idea of creating an ecological state of the European standard on the territory of Ukraine.

Subject to the existence of an effective mechanism for legal regulation of the use and protection of subsoil as an object of nature, obviously, only one term should be used to designate the subsoil resource, the useful properties of which allow using subsoil as an operational basis for human activity, which is ensured by the location and (or) operation of certain structures not related to mining. Parallel synonymous use of various terms that define the specified subsoil resource is unacceptable, and not only because synonyms, as a rule, have semantic and stylistic differences, but primarily forasmuch as there is a general requirement of terminology: one concept – one term.

In order for the concept to be correctly and clearly denominated, it is necessary to solve the problem of choosing the optimal terminological unit from a number of synonymous, doublet or variable names competing with each other in legal speech, taking into account differences in conceptual scope and features. In order to select derivational means from the variety of words that are close in meaning, avoiding multivariance, it is necessary, according to the viewpoint of Artykutsa (2009), to take into account the various (semantic, etymological, derivational, grammatical and stylistic-functional) parameters, choosing that version of the term, which has the greatest advantage and potential in these major linguistic parameters.

5 Discussion

The above mentioned legal terms proposed to denote the subsoil resources, the useful properties of which make it possible to use the subsoil for purposes not related to the extraction of minerals, including for the construction and operation of structures for various purposes, expressed using certain word combinations, among which the key words are as follows: “underground”, “space”, “cavity”, “resources”.

According to the Explanatory Dictionary of the Ukrainian Language (n.d.), the word “underground” is used in the meanings indicating that in this case the place is underground, in the depths of the earth.

In the legislation of Ukraine, the term “underground” is used in relation to various concepts, among which it is necessary to note those used in the field of legal regulation of underground space and in determining which the etymological meaning of this term is taken into account, namely: 1) underground types of work; 2) groundwater; 3) deposit of thermal energy groundwater; 4) underground structure; 5) underground development of deposits; 6) underground gas storage; 7) underground storage of oil, gas or products of their processing.

Legal institutions regulating the use of certain types of intangible natural resources have been formed in domestic natural resource law. Such legal institutions include legal regulation of the use of space as a special type of natural resources. The specific nature of these resources makes it possible to combine them into a single category “intangible natural resources”. Such resources also include atmospheric air, airspace, climate resource, radio frequency resource, solar radiation, wind energy, geothermal heat, tidal energy, sea waves, lithospheric plates, earthquakes, volcanic eruptions, natural radiation, the earth's gravity, magnetic fields and geomagnetic anomalies, etc. (Karakash & Kharytonova, 2018).

The detailed analysis of the lexeme “space” carried out by Yakovenko (2016) has made it possible to conclude that the concept of space in Ukrainian phraseology has a certain limit, finitude connected with the limitation of human sensory perception. Space is determined by the fullness of things, that is, it is closely connected with the place that the object occupies in reality, as well as with the place in social and mental space. The foregoing makes it possible to consider the lexeme “place” as the main representative of the category of space in the composition of phraseological units.

In historical terms, one can point to different interpretations of space – “space as cavities” and the opposite approach: “space is inseparable from a special material substance that penetrates everywhere and is all-embracing”. From this perspective, space is not a cavity.

In the legal sense, space, according to the viewpoint of Ripenko (2012), covers both underground and aboveground “parts” of the land. It should be noted that according to the laws of those countries belonging to the legal system of the Anglo-Saxon family, in particular, the United States, subsoil and the surface of the land lying above them, form a single object in respect of which the right of ownership is exercised. This object is defined as “the entire conical part of the globe formed by the surface of its area and the radii drawn from it to the centre of the Earth” (Koziakov, 2002). Along with this, in the American legal literature (Campbell-Mohn et al., 1993; Hill, 2006), it is also indicated that it is advisable to preserve in the future the same fundamental legal principle of reaching the land plot “to the core of the Earth”.

This approach is justified in the legislation of those countries, in which there are no such legal formations as resource branches of law (land, water, forestry and mining) between the branches of civil and environmental law as regulators of relations in the use of natural resources. Fundamentally, the definition of a land plot in this case means that the concept of a land plot as an object of ownership and other rights includes natural resources covering and located in the depths of the land and on its surface (minerals, forests, water, etc.).

In the legislation of Ukraine, the definition of a land plot concept cannot include both an “air column” above its surface, or a part of the subsoil below its surface, forasmuch as such a definition would constitute going beyond the scope of land law and intrusion into the “competence” of another resource-based branch of law.

There is a common viewpoint among the representatives of the legal community, according to which such a concept as “underground spaces of the earth” does not exist and we are talking about the subsoil, their spatial resources (Surilova, 2016). The regulation of the use of underground space by the norms of different branches of legislation (land, civil and subsoil legislation) is based on different approaches to understanding the concept of “underground space”, namely: civil and natural resource – based which makes it possible to consider it as a land plot or subsoil.

The basis of the civilist approach is the Roman principle “*cujus est solum, ejus est usque ad coelum et ad inferos*”, which, however, is adapted to modern conditions. According to this

concept, it is not possible to define clear legal boundaries of land and subsoil, and subsoil is not defined as a separate object. According to the natural resource approach, subsoil and land are independent objects.

It should be noted that the term “space” is often used in the legal scientific and educational literature to interpret the concept of “subsoil”. (Shemiakov & Khokhlova, 2004) consider that the subsoil as a natural resource is a volumetric-planar space, heterogeneous in structure, located under the land surface and the bottom of water bodies within the territory of Ukraine, including the continental shelf and the exclusive (marine) economic zone. This space is quite diverse object, forasmuch as it contains minerals, waste fills, rare mineralogical, paleontological formations, groundwater and areas of such space, which act as natural and man-made cavities, areas that are used for or without purposes of extraction of minerals or not used at all, as well as mineral deposits that come out and are on the surface of the earth. Erofeev (1969) defined the subsoil as the geometric space and all its contents below the earth's surface. According to viewpoint of Plotnykova (1999), the subsoil should be understood as the geometric space within the lithosphere, the operational basis of human activity.

There is also an opinion that the subsoil is, first of all, the space in which mineral and other natural resources lie. In addition, the subsoil is not only the underground space with all the minerals contained in it, but also other useful properties of the subsoil, including cavities, energy and other resources (Perchik, 2002). Ybrahymov (2011) offers several options for the definition of subsoil, using different approaches: clarifying, resource, structural, combined. In this case, each variant of the legal definition contains such essential features of the concept as a component of the natural environment (generic feature) and location in the underground space (one of the species features).

In the scientific literature of geological direction, the resource of geological space is understood as the geological space necessary for the settlement and habitat of biota, including for human life. In the general systematics of ecological functions of the lithosphere, the structure of geological space resources includes biota habitat, human habitat, the environment of terrestrial and underground structures, etc. When considering the lithosphere as an environment of human engineering and economic activities, two ways of estimating geological space resources are clearly separated, namely: the assessment of the “plane resource” of the lithosphere space surface and the assessment of the resource of underground geological space (or volume) for different types of its development. The division of geological space resources into surface and underground components is to a great extent conditional. However, it is accepted forasmuch as underground construction and underground facilities have a pronounced specificity.

In the legal literature, a differential approach on the issue of legal regulation of space use is traced: rights to use land, water, underground or atmospheric space must be registered in a special manner. The right of special use of space is regulated by the relevant acts of natural resource legislation.

According to the viewpoint of Karakash & Kharytonov (2018), the use of the underground space includes the construction and operation of underground facilities not related to the extraction of minerals, including facilities for underground storage of oil, gas and other substances and materials, disposal of harmful substances and waste production, wastewater discharge; creation of geological territories and objects of important scientific, cultural, sanitary and health significance (scientific landfills, geological reserves, wildlife sanctuaries, natural monuments, medical, health facilities, etc.).

When analysing the concept of “use of underground space”, it is necessary to take into account the scope and content of the category “underground space”, consideration of which is one of the objectives of the present research. In the above mentioned case, the use of underground space is practically reduced to the

use of subsoil for purposes not related to the extraction of minerals. However, the list of purposes for the use of subsoil, not related to the extraction of minerals, is already a list of purposes for the use of underground space, forasmuch as the use of the latter involves the use of subsoil not only for purposes not related to the extraction of minerals, but also for their geological study, as well as for the extraction of minerals. The list of purposes for the use of underground space includes the purposes of subsoil use, not related to the extraction of minerals.

In the international law, the concept of “space” is widely used in relation to various components of the natural environment, namely: “land space”, “water space”, “airspace”. Subsoil is no exception in this case. The compilers of the UN glossary, covering the terms used in the Convention on the Law of the Sea (1982), believe that the subsoil is, first, cavities, the space in which “every” natural substance is located, including natural resources; and secondly, the natural resources are also found. From the standpoint of international law, the meaning of the term “space” is clearly distinguished from the meaning of the term “natural resources”, and, consequently, also from the term “subsoil resources”. The first term refers to the environment in which these resources are located (Vyilegzhanin, 2007).

A slightly different approach to the definition of underground space is traced in another international legal document of a regional nature, that is, the Model Code on Subsoil and Subsoil Use for the CIS Member States (2002). This act has established that the underground space is one of the types of subsoil resources, which is defined as part of the subsoil, used as an environment for people, accommodation of industrial, scientific and other activities, as well as an environment for processes that have practical implementation.

This definition is used when determining the meaning of the concept of underground space by some representatives of natural resource law of Ukraine, according to which the underground space is part of the subsoil, the boundaries of which are defined in the Code of Ukraine On Subsoil (2021), namely: this is a part of the earth's crust, which is located below the land surface and the bottom of reservoirs and extends to depths available for geological study and development (Karakash & Kharytonova, 2018).

The objects of the underground space may be natural or artificial cavities, as well as other areas of the subsoil suitable for use for the purposes specified above. Other resources within the subsoil area, including minerals and energy, are not recognized as part of the subsoil space. The underground space also does not include natural cavities, which are completely filled with solid, liquid, gaseous substances and (or) their mixtures in their natural state.

In the mining literature, underground space is considered in several aspects as follows: 1) as natural or artificial cavities in the depths of the earth, used for economic or other purposes; 2) as one of the types of natural resources used in human economic activity. Representatives of this approach are convinced that the first approach does not provide an opportunity to take into account the possible state of this type of resources and leads to their unjustified losses due to irrational mining operations in neighbouring areas. For this reason, the authors define the underground space as a type of subsoil resources used as a habitat, location of objects or processes; as an unused resource for the effective development of urban infrastructure in densely populated areas; one of the promising areas of urban development of the city.

In the doctrine of mining law, there is a position on the possibility of the formation and consolidation of underground space as an object of mining legal relations. An analysis of the process of using subsoil for purposes not related to the extraction of minerals, or rather, a potential that is of interest to legal entities in this form, makes it possible to conclude that it is an underground space in principle. In this case, the value of the subsoil user in this type of subsoil use will have the properties of

this underground space (empty cavities). Melgunov (2018) proposes to denominate this object as specialized subsoil cavities.

The specified provisions of the legislation of Ukraine, international law, legal doctrine, statements enshrined in the scientific literature, confirm, unfortunately, the lack of a unified approach to defining an important concept in the field – underground space. Consequently, attempts to focus on any one principle, legal doctrine or legislative act, although useful, as noted in legal scientific sources, in terms of comparative analysis, but are not always justified in methodological terms.

In the scientific and educational literature, the categories of “integration” and “differentiation” are often used by representatives of legal science to explain the processes or laws of human existence. According to the viewpoint of Krasnova (n.d.), integration and differentiation in environmental law should be considered as a system-structural method of cognition, which makes it possible at the appropriate scientific level to explain not only the objects and sources of this branch of law, but also its subject, system, as well as other important components. At the same time, the principles of integration and differentiation are the basis of analysis and synthesis as methods of scientific cognition (Sydorenko & Dmytrenko, 2000).

The differential approach to the coverage of certain types of subsoil use – geological study of subsoil, mining, use of subsoil for purposes not related to the extraction of minerals, along with the existence of a uniformity of norms for regulating all types of subsoil relations, is clearly traced in the legislation of Ukraine on subsoil, including Code of Ukraine On Subsoil (2021).

At the present stage of development of science and scientific knowledge, new forms of interaction of differentiated and integration processes are observed. A striking example of this in the science of modern subsoil law can be the application of the categories “integration” and “differentiation” in the allocation of integration, differentiated and complex subsoil resources. It is proposed to include the underground space in the integration resources of the subsoil, which is a kind of container for the whole complex of subsoil resources in their unity. The underground space is a total subsoil resource containing mineral resources, cavities, geothermal resources. It should include the unique microclimate of this geological environment itself, which has been used for a long time for the treatment and prevention of certain diseases (salt caves and mines). As it has been previously noted, this space is fairly diverse object, forasmuch as it contains minerals, hollow rocks, rare mineralogical, paleontological formations, groundwater and areas of such space, which act as natural and man-made cavities, areas which are used for the purpose or without the purpose of extraction of minerals or are not used at all, as well as the deposits of minerals which come out and are on a surface of the earth.

It should be noted that the underground space exists as a whole, not just as a collection of all subsoil resources. The underground space is a set of all natural conditions and processes, including those that have undergone changes in the process of production and economic activities, which are inextricably linked and create a single system. This system is characterized not only by natural, but also by natural and social patterns. The latter is related to the fact that the underground space can be a condition and means of human life, the territory, in which it is possible to carry out its activities, the main means of production (mining), a place for industrial and other facilities (construction and operation underground structures).

The determination of a definition through a generic trait and species difference is the most convenient for construction and use, and, therefore, the most common type of definition of a concept, both in science and in legislation (Liubchenko, 2015). In the case, where the concept cannot be defined due to genus and species difference, the meaning of the concept is revealed by listing its individual parts or features. Such definitions are called descriptive (casuistic), and the variety of these definitions must

be recognized as the listed (extension) definitions (Podorozhna, 2008). The peculiarity of these definitions lies in the fact that they do not list the features of objects, and the objects themselves, which are covered by a term (Liubchenko, 2015). Most scientists believe that this type of definition, when individual features or parts of an object are listed, is less felicitous than defining a concept through the closest genus and species difference. However, this statement cannot always be accepted. It seems appropriate that the choice of a method of formulating a definition depends on the content of the term and its nature (Pigolkin, 1968). Quite often, the closed list, with the help of which the volume of the corresponding concept is formed, can be more useful in life when applying a legal norm than an abstract definition (Zahynei, 2013).

Taking into account the above provisions for the formulation of a scientific approach to understanding the underground space, it should be noted the possibility of defining this term by listing the components of the object and disclosing its content, using essential features. At the same time, in order to achieve a specific goal of the research, it is more useful to use the closed list, which will form the scope of the concept of underground space. This will also provide the understanding of the relevant concept of special specificity.

The formed understanding of the underground space also makes it possible to conclude that it is impossible to use this term to designate the subsoil resource, the useful properties of which provide an opportunity to use the subsoil for the construction and operation of underground structures for various purposes. Otherwise, the rule of proportionality will be violated, which states that the volume of the defined concept should be equal to the volume of the defining concept. The consequence of violation of the above rule is revealed in double errors: the definition may be too broad, or too narrow.

In this case, this rule is violated, forasmuch as the scope of the defining concept (underground space) is wider than the scope of the defined concept (subsoil resource, due to the useful properties of which subsoil can be used for non-mining purposes – as the location of facilities for different purposes). As a result, a logical error such as “too broad definition” is revealed. In a similar way, this error will arise when the term “underground resources” is used to designate the type of subsoil resources under study, forasmuch as the underground resources (in other words, in view of the etymology of the word “underground”, subsoil resources) by volume will include not only such a subsoil resource, the useful properties of which allow the use the subsoil as an operational basis for human activity, but also other subsoil resources (mineral resources, geothermal resources).

From among the given list of terms used to denote the subsoil resource defined in the present research, there are the concepts of “underground space (cavities)”, “underground void space (cavities) in the subsoil”, “underground space resources (cavities)”, “spatial subsoil resources”. The scope of these concepts is one and the same; it completely coincides, therefore, the term “underground cavities” has the greatest advantage for designating a subsoil resource, the useful properties of which make it possible to use the subsoil for purposes not related to the extraction of minerals.

In its natural state, underground space can be occupied by solid, liquid or gaseous substances. Areas of the subsoil not occupied by solid matter, but limited to it are called underground cavities (Rudyak & Umnov, 2003). Underground cavities are divided into natural (geogenic, those created by nature under the influence of geological processes) and artificial (man-made, those created by man using appropriate techniques and technologies) (Kirin, 2017).

Natural and anthropogenic cavities are suitable for the construction and operation of underground structures. Such cavities include as follows: caves, grottoes, catacombs, galleries, deep cuts, quarries and other mining, that is, pristine cavities and

cavities that are the result of mining (Shemiakov & Khokhlova, 2011).

In natural and anthropogenic cavities of the subsoil, the placement and operation of capital stationary or temporary structures is possible, which implies the need for special engineering arrangement of the walls of such voids. Herewith, the possibility and expediency of such an arrangement, which depends on the geological and physical properties of such walls, as well as geological resources adjacent to them (for instance, groundwater), type, engineering and potential complexity of the underground structure, duration of its operation, other factors are of fundamental legal importance (Shemiakov & Khokhlova, 2010).

However, in the absence of natural or anthropogenic cavities and in cases of economic necessity in underground construction, special construction of such cavities is carried out by extraction from the subsoil of geological rocks, that is, the implementation of a special kind of mining activities (Shemiakov & Khokhlova, 2011).

Taking into account the foregoing and the prescriptions of the Model Code on Subsoil and Subsoil Use for the CIS Member States (2002), from among the man-made cavities one can distinguish as follows: 1) cavities specially created to perform certain purposeful functions (transport highways, gas storages, waste disposal, construction of underground nuclear power plants, mines for the defence industry, etc.), – primary (special) cavities; 2) cavities formed as a result of exploration and development of mineral deposits – secondary man-made cavities. According to the Mining Law of Ukraine (2020), a cavity in a mountain massif after the extraction of minerals and other rocks is called mining output.

The normative definition of the natural underground cavity is enshrined in the legislation of Ukraine (About the statement of the Instruction on development of the plan of liquidation of accidents on objects of the underground, 2017) as follows: natural underground cavity – a void in the depths of the earth, created as a result of the impact on the mountain massif of natural and geological phenomena. Nowadays, the legal act, which defines the term, has expired. Nevertheless, the above definition requires particular analysis in order to determine the meaning of the concept of “underground cavities”. The study of this issue goes beyond the objectives formed to achieve the purpose of the present academic paper; it cannot be fully clarified in this scientific work, and, consequently, requires a separate legal investigation. In the framework of the present academic paper it is proposed to define the interrelationship between the concepts of “underground space” and “underground cavities”. A predetermined understanding of underground space makes it possible to clarify its interrelationship with the concept of underground cavities, the content and volume of which in general are also given within the framework of the present publication.

All concepts in the process of cognition and practice often have to be compared with each other in some respect. In logic, among compatible concepts, three types of relations are distinguished, namely: equivalence (identity), overlap and subordination (Zharebkin, 2008; Karamysheva, 2000). The interrelationship between the volumes of concepts in general (traditional) logic is graphically represented by Euler's circles (named after the German mathematician who has introduced them into logic to denote the volumes of concepts). Each circle is a special class of objects that make up the scope of the concept, and the element of this volume (class) is denoted by a certain sign in the middle of the circle (Karamysheva, 2000). The relationship of subordination between the studied concepts is observed. In this relation, there are concepts, one of which is included as part of the volume of the other (Zharebkin, 2008).

In this case, the concept of “underground space” is called the subordinating concept, forasmuch as it has a larger volume (in addition to underground cavities, underground space also

contains mineral and geothermal resources), and the concept of smaller volume – “underground cavities” is called the subordinated concept.

In terms of content, there is the following interrelationship between subordinating and subordinated concepts: the subordinated concept includes in its content all the features inherent in the subordinating concept, plus features specific only to the subordinated concept. At the same time, what has been said about the subordinated concept cannot be extended to the subordinating one, forasmuch as the specific features of the subordinated concept are not included in the content of the subordinating concept (Zharebkin, 2008).

6 Conclusion

Speaking of underground voids, one should not forget that they are a kind of subsoil resources occupying a part of the underground space, not occupied by rocks. This concept has features inherent in the concepts of “subsoil resources” and “underground space”. The interrelationship between the concepts of “underground cavities” and “underground space” can be used as a basis for determining the meaning of the concept of underground cavities. In this case, the specified concept will be defined through the genus and species difference, where the genus will be called the subordinating concept, and a species concept – the subordinated concept. When defining the difference through a genus and species, the concept of underground cavities is brought under the underground space, a broader concept that is its closest genus, and the signs that distinguish underground cavities from other concepts included in this genus are indicated.

The issues of terminology of legal regulation concerning the use of underground space are far from being limited to certain aspects within the framework of the present research, which usually makes this issue very relevant for further scientific investigations.

The promising direction for subsequent scientific investigations in this area can also be considered as follows: the definition of the concept, types and place of the right to use underground cavities among the types of rights to use subsoil, analysis and solution of the problem of delimitation of the concepts “subsoil use for purposes not related to mining”, “use of underground space”, “use of underground cavities”, exploration of logical and legal aspects of establishing types of underground space use, study of foreign experience of legal regulation of underground space use.

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