

Cognition's domain distribution

1 Cognition's domains

The human cognition is made-up from the total amount of data stored into the mankind's memory at a certain moment. This cognition consists of two types of information support systems (ISS), either they are *internal* or *external*, which are associated with the two memory types with the same denominations: internal and external memory. The *external cognition* means the total amount of information contained on the ISS which are found outside the human body: rupestral drawings, papyruses, clay slates, architectural monuments, books, magazines, newspapers, pictures, motion pictures, artefacts, CD's, magnetic tapes, so on, and generally, all the artificial objects (produced as a result of a pre-conceiving process).

The *internal cognition*, which exists into the ISS placed inside the human information processing system (IPS) is made-up from the total amount of the information stored into the brains of all humans living at a certain moment on this planet. Obviously, this internal cognition is hard to be estimated because the information with an internal existence into the human IPS is not directly accessible for the outside world, being only partly transmitted to the exterior, by means of languages, as we have seen in chapter 9.

That part from the internal cognition which is transferred on external formats (through writing, drawing, recording, manufacturing, constructions etc.) becomes part of the external cognition. If those external ISS are also accessible to other members of the human community (if they are public), they become a part of the *public external cognition*.

Since the external cognition is separated from the internal cognition in terms of support, it has a major advantage that it can be stored for very long periods of time¹, this type of cognition being the only way to notice the cognition evolution process of the human communities, during long periods of time (long, as compared to the average lifespan of a human individual). Another advantage of the external cognition is that a part of it (for example, the school textbooks) represents the basis for the education of the new human generations, of the cognition transfer from one generation to another.

The education (schooling) is a long process (at least 10...30% from the lifetime of an individual) consisting in the memorization/comprehension of this external cognition data base, process which means the transfer of the data placed on the external format from the external memory into the internal one. This process is absolutely necessary because all the activities (processes) carried out by a human being are coordinated by his brain (IPS), and it operates only with internal ISS.

Due to the fact that on the one side, the education process is very long and expensive, and on the other hand, the memorization/comprehension ability of the individuals is limited, each educated human being learns (memorizes) only a small part from the human external cognition which is available at the moment of his schooling period, which is enough so that the individual to be able to become useful to his community through the activity (profession) in which he has specialized in. This is the way how the *cognition domains* have occurred, the so-called *professional domains*.

A first classification method of the cognition fields is given by the existing types of educational institutions available in the modern states: general, artistic, religious, technical, scientific, medical, military, sports, law, economic, pedagogic, political, so on. These

¹ Internal information of a human IPS, even if it is placed in the long-term memory (LTM), it has a volatile nature, which means that it disappears either because it is not accessed for many years or as a result of the death of its owner body.

educational fields are also divided into sub-domains, the so-called "subject matters" or "disciplines" which are stipulated in the curricula of these institutions. This first categorization method of the cognition fields highlights both the need of the human society for individuals specialized in a certain field and the continuous increase of the number of professional domains, as the human cognition level keeps growing.

The second possible classification method of the human cognition is based on the study methods of the organization of the material and abstract systems, provided by the objectual philosophy. According to this paper, the world we live in is divided in a *material world*, made-up from the total amount of the matter's existence forms, and the *abstract world*, made-up from the total amount of the information's existence forms. The material world consists of the three fundamental classes of material systems: *natural abiotic material systems* (NAMS), *biotic material systems* (BMS) and *artificial material systems* (AMS). The abstract world is also divided in three basic classes: *materially realizable abstract systems* (MRAS), (only *abstract realizable systems* (ARS) and *virtual abstract systems* (VAS), which cannot be achieved neither abstract nor material because they contain an infinite information amount).

2 Domain of the natural abiotic material systems

In the first chapter from *Introduction into the Objectual Philosophy* we have seen the first and brief classification of NAMS, which is stated according to the level of the human cognition at the moment of the XX-th century.

$$? \rightarrow GC \rightarrow GX \rightarrow \dots \rightarrow PS \rightarrow AB \rightarrow NM \rightarrow \dots \rightarrow AT \rightarrow NC \rightarrow \dots \rightarrow EP \rightarrow ? \quad (2.1)$$

The dots from the relation 2.1 [...] represent intermediate organization forms between the well-known levels, forms which either are no longer unanimously accepted by the entire scientific community, or they were let aside in order to reduce the volume of the list (which otherwise, it would not be possible to be written on a single row). As we have minutely discussed in chapter 1, the operator [→] shows a structural implication (organization level) between the operands (organization levels of NAMS).

For the scope of this paper, it is important to notice only that each organization level from the relation 2.1 is associated with at least a field of the current human scientific cognition. Starting from the right side, there will be the particle physics, nuclear physics, atomic physics, molecular physics, physics of the fluid or solid media, geo- and astrophysics, physics of the planetary and galactic systems, so on. The NM-type NAMS are the oldest and best known material systems, with whom the people have a direct interaction and which may be directly sensorial perceived; due to these reasons, they are related to many fields of the cognition, such as: fluid physics (mechanics), physics (mechanics) of the solid body, atmospheric physics, hydraulics, geology and many others. Also, the NM components, systems such as MO, AT, EP, are the subject matter of the chemistry with its numerous sub-branches: physical, organical, polymers chemistry, biochemistry, etc.

3 Domain of the biotic material systems

The BMS classification is much more complex because the bio-systems are also much more complex and varied as compared to a NAMS. At this point, we shall mention only two classification methods, which are enough for the scope of the present paper: the *organizational* or *systemic classification* (structured on organization levels, similar with the classification of NAMS from the previous subchapter, classification which is specific for the objectual philosophy) and the *taxonomic classification*, which is being taught in schools, within the biology classes, which however will not be our topic in this paper.

The systemic classification of BMS, depicted also in the annex X.11, similar in terms of structure with NAMS classification is being given by the relation 3.2:

$$\text{PBS} \rightarrow \text{OGM} \rightarrow \text{OG} \rightarrow \dots \rightarrow \text{CM} \rightarrow \text{EC} \rightarrow \text{PC} \quad (3.2)$$

where

- PC represents the set of the prokaryotic cells (elementary bio-systems);
- EC represents the set of the eukaryotic cells (elements of the pluricellular biosystems);
- CM represents the set of the organization forms of the cellular media (from the bacteria to the tissues);
- OG represents the set of the organization forms of different organism types (systems made-up from organs and functional apparatuses, with functions defined by the generic bio-system model);
- OGM represents the set of the existence forms of the organism-based media (organism population community);
- PBS represents the most complex form of the bio-systems organization at the level of a planet-type AB - planetary bio-system - made-up from the set of all the bio-system sets with the organization forms given by the relation 3.2.

Within the relation 3.2, similarly with the relation 2.1, the dots trace the existence of some intermediate organization forms (such as the organs OR as tissue systems and the functional apparatuses FA as organ systems) but which have not been specified because they cannot have an independent existence, as singular bio-systems (they do not fulfil all the criteria of the general bio-system model presented in Annex X.11, being only the bio-system's components). Similarly with the above-mentioned issues, each organization level from the relation 3.2 is associated with at least a cognition domain (professional): PC and EC is the basis of the microbiology with its numerous sub-fields, CM are a subject matter of histology (as an example, but not an only one), OG systems to which the animals and plants both belong to, are associated with numerous professional domains divided into the medical sciences (either human or animal), agronomical, forest sciences, so on. The organism media (bio-populations, mostly, the human ones) are subject matters for the social, political, military sciences, so on. The terrestrial biosphere has started to become a subject matter for the global ecology.

4 The domain of the artificial material systems

As we have mentioned in chapter 7, the natural material systems are formed based on the formation laws of this kind of material systems, laws which were mentioned in this chapter. In case of the artificial material systems (AMS), the formation laws of the natural MS are valid only for the abiotic support, but the synthesis of this system type is no longer natural, but guided by another class of MS which was minutely presented in chapter 8, that is the information processing systems (IPS).

The basic role of AMS is the fulfilment of a need requested by a bio-system, need which the bio-system, through its genetic "construction" is able to fulfil it either partly or not at all.

If we are talking about the normal, natural needs of the biosystems, without mentioning the artificial needs, specific only to humans, then, their number is not very large, they all being included in the so-called field of physiological needs, required by the general bio-system model. Among these needs, the one of individual and species preservation is in most of the cases the one which leads to the achievement of artificial systems, systems meant to assure an increased protection against the destructive external agents. The snail shells, termites hills, coral reefs so on, are only few examples of abiotic material systems which were formed not by means of natural association (due only to energetic reasons) of the atoms and

molecules, but by means of syntheses guided by some IPS, either they are intracellular (in case of the shells or corals) or extracellular, neuronal (such as the termites).

The animal dens, bird nests, bee honeycombs so on, are also other examples of artificial material systems which could not have been formed only based on the formation laws of the natural material systems, their synthesis processes being coordinated by the neuronal IPS of that particular bio-system. All these AMS belong to the very wide class of the artificial RBS. The artificial RBS are some MS which are meant to provide a better separation (insulation) against the environmental aggressive factors, either for a bio-system (in case of the first rank artificial RBS) or for a group of bio-systems (second rank artificial RBS). Within the human community, the first rank artificial RBS are associated with numerous domains of the cognition concerning the designing, production and marketing of the footwear and garment products and of their related accessories (such as, the lately bulletproof vests #), and, as for the second rank artificial RBS, they are related to other numerous cognition domains concerning the designing and performance of the constructions (civil and military engineering), of the transport means, so on. And because the artificial RBS, either they are of first and second rank, have the role to protect the people from the inside, other people “full of humanism” are involved in the designing, construction and testing of the fluxes meant to destroy (penetrate) these RBS, with all it is found inside them. These latter domains of the human cognition have always been (and moreover, they currently are) a proof of the scientific and technical leap of a nation, the knowledge and ownership of the most efficient destruction means being the positioning criterion into the hierarchy of the current states.

A very important AMS class for the human community is represented by the external ISS class. This class includes the products of all the forms of artistic expression (the seven arts), all the mass-media, didactic materials, so on.

AMS classification is not organizational any longer (although each of the AMS categories has also this kind of structure), but it is a “horizontal” classification, depending on the need which is able to fulfil it:

- RBS of various ranks:
 - First rank RBS (designed for the individual protection: footwear, garments, so on);
 - Second rank RBS (designed for the collective protection): houses, civil and military engineering, car and aircraft manufacturing industry, so on);
 - Third rank RBS (designed for the protection of an entire state: national defence systems);
 - Fourth rank RBS (protection systems available for a group of states, the so-called “shields” anti-all threats);
 - Fifth rank RBS (planetary protection systems, in the event of an extraterrestrial aggression, both abiotic (asteroids, comets etc.) and biotic (in case of a confrontation with other civilizations).
- Synthesis systems, consisting of all the objects’ production forms, from the independent craftsman up to the industrial trans-national corporations;
- Destruction systems (decomposition), which include all the weapon forms, demolishing devices and mass-murder weapons.
- Systems specialized in fulfilling the physiological needs of the society’s members, such as nourishment (food, liquids), hygiene, sex, information means, so on.
- External information support systems

It is worth noticing that all AMS produced by people are the result of a pre-conceiving (designing) process, a process of information processing into a biotic or abiotic IPS (or an set of such IPS), the result of this process being an external abstract object - the design of that particular AMS - an abstract object belonging to the class of *materially realizable abstract systems*. All the other abstract objects existing on the external ISS, but which do not contain

information for the production of some material objects, belong to the class of *realizable* (only) *abstract systems*. As we have previously mentioned, this is the field of the artistic creation, but not only, other domains of the abstract objects from the same category being for instance, the valuables ISS field (money, valuable documents, credit-cards, so on), of the person's identification ISS (ID papers), and in general, all the papers issued by the administration of a state and many others.

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