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The library of nature: reality and metaphor in the botanical classification

Ioan Milică*

Faculty of Letters, "Alexandru Ioan Cuza" University, Bd. Carol I 11, 700506 Iași, Romania
"Mihai Eminescu" Central University Library, Str. Păcurari 4, 700511 Iași, Romania

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Abstract

The metaphorical network that permeates the scientific knowledge and discourse currently attracts the interest of many researchers. In the light of the growing body of references which reveal that the use of metaphor is both beneficial and detrimental to science, the aim of the present paper is to explore the relevance of some metaphors generated by writing and boosted by the prestige of this communicative technology. The close reading of the foundational texts in science would undoubtedly reveal their metaphorical architecture. If one considers them as nodes in a network, the major works of science act as inflection points that drive changes in the trajectory of scientific inquiry and (re)shape the way we understand reality. It clearly falls beyond the scope of this paper to chart the metaphorical map of the reference works in science. Instead, I choose to focus on the writings of Carolus Linnæus, the founder of modern classification in botany, in order to highlight his use of metaphors rooted in the tradition of writing. More precisely, I approach the library metaphor in order to show that the Linnæan conceptualization of nature as a library acted as the testing ground for his theories, accelerated the internationalization of many scientific plant names and consolidated the stability of the vernacular botanical terminologies.

„Nomina si nescit perit et cognitio rerum"
Carolus Linnæus, *Philosophia botanica*, 1751

1. Preliminaries

As writing became the best means to preserve human knowledge, the relevant aspects and activities entailed by it, from alphabets, writing instruments and text types to reading and writing techniques, have acquired multiple values destined to promote the prestige of the respective communicative technology. From a semiotic angle, each of the stages in the evolution of writing, namely handwriting, typewriting and, more recently, e-writing, sheds light on its array of metaphors which pervade the historical landscape of knowledge. Under the communicative umbrella of language, this fine, yet resilient web of correlations and analogies serves a plethora of cognitive, argumentative, illustrative and expressive roles (Gafton & Gafton, 2015).

Following Cassirer's (2008, p. 109–111) eloquent comments on the philosophical interpretation of the organic as a universal speculative principle, a unity which exists in the totality of the individuals, one can assume that the reticular metaphors of writing are organically embedded in the fabric of scientific language. Over time, some of the network constituents developed their own autonomous constellations. Symbolic matrices such as ALPHABET, LANGUAGE or BOOK, with numerous instantiations in arts, religion and science are prime examples of this ongoing evolution based on cultural selection.

*Email address: *ioanister@gmail.com*.

2. The book as metaphor

As a cultural artifact of paramount importance in the development of the historical traditions of writing, the book stands at the core of some of the oldest metaphorical outlooks on the status of writing. When Christianity inherited the Greek and Roman ancient legacy, this inheritance was further enriched by an exceptional reverence for the book and its interpretation. Even if there is no ground to assume that the understanding of nature as a book is an exclusively Christian symbolic matrix, we know that the metaphor has a rich and vivid representation in the early Christian literature. More precisely, as shown by Crease (2006, p. 16), "for centuries it had been an accepted part of religious doctrine that the world contained two fundamental books. Nature, the first book, is full of signs that reveal a deeper meaning when interpreted according to scripture, the second book, which supplies the ultimate meaning or syntax of nature's signs. Under-standing involved reading the books together, going back and forth between what one finds in the world and what one reads in scripture.". According to the Christian vision on existence, "both books were given to us by the same unique God; we received the first one from the creation of the world, while the second one was written thereafter. The book of nature seems to have a certain priority , for it is said that our knowledge of it precedes and confirms the book of Scripture; it is like a door to enter the Bible and a light to illuminate its words" (Tanzella-Nitti, 2005, p. 241). The pre-Rennaissance Christian view outlines the harmonious coexistence of *liber naturæ* and *liber scripturæ*, since the content of the first book is mirrored in the second. Nature reveals the sacred alphabet of creation, the Scripture reveals the will and the universal creative might of the divine author. The non-conflictual reading of the two books leads humans to understand that they stand as the most important words in the grand book of Creation (Tanzella-Nitti, 2005, p. 241).

During the Rennaissance, the record of empirical observations and experiments which laid the ground for the discovery of many natural laws set a new perspective on the relation between the book of nature and the book of scripture. Without defying the idea that God Almighty is the architect and the mason of the world, scholars such as Galileo Galilei and Johannes Kepler stated that, in order to understand the mysteries of the universe, human beings must first learn to master the technical language[1] used to write the great book of the world. In contrast with the early Christian tradition which claimed that anyone can read the signs of the book of nature (Augustine), some of the scholarly works written during the Rennaissance forecast a divergence between *liber naturæ* and *liber scripturæ*. To put it differently, the divine work suggests a conflict between the codes and the readers of the two grand books of creation (Tanzella-Nitti, 2005, p. 243) and, as Crease notices, such a tension reveals a shift in the interpretation of the two symbolic books: „To understand nature one did not need to rely on the Bible as an allegorical aid; studying nature was an independent activity best carried out by a separate, professional class of scholars. If anything, the book of nature now became the primary text—the blueprint, written in technical language—and scripture the user's manual, written in popular language" (Crease, 2006, p. 16).

In line with the new perspective, the 17th century brings forth a challenge in the balanced reading of both books. The technical language of the book of nature entails a rational decoding stemming from observation, whereas the scripture carries a revelated meaning, in the light of its divine message. Therefore, demonstration-based arguments and the revelation of faith stand in dialectal opposition. This rationalization of knowledge illustrates a change of accent placed on the value of observation, on the one hand, and of interpretation, on the other hand. As the laurel wreath of intellectual prominence passes from the theologian or the philologist to the geometer or the naturalist, the centuries-old equilibrium between *liber naturæ* and *liber scripturæ* turns into a metaphorical inequality: the expansion of the rational, orderly and intelligible universe implies the contraction of the world governed by revelation, faith and the alleg-

[1] According to Galilei, the language that provides access through the otherwise shrouded labyrinth of the universe is none other than mathematics (cf. Tanzella-Nitti, 2005, p. 243). Following Kepler, the astronomers are "priests of the most high God with respect to the book of nature" (Harrison, 2004, p. 59–84).

orical interpretation of the scriptures. During the Enlightenment, the asymmetry between implicitness and explicitness, between denotation and connotation, between concept and figure shapes the scientific approach towards nature in relation to religion or the arts.

3. The library as metaphor

The book metaphors call forth another symbolic matrix, centered on the notion of the library. According to the medieval perspective, the book and the library were considered excellent sources to symbolize memory. In fact, the ancient use of the metaphors of writing with regard to memory reinforced the idea that "memory is most like a book, a written page or a wax tablet upon which something is written" (Carruthers, 2008, p. 18). This conceptual model of memory, called *tabula memoriæ*, prompted another, *thesaurus sapientiæ*, which designated the internal processes of memory. More specifically, the intuition that "human memory should be most like a library of texts, made accessible and useful through various consciously applied heuristic schemes" (Carruthers, 2008, p. 39) outlined the organized nature of a well-educated memory. Just as library books are classified according to a rational and all-encompasing system, the rigorous ongoing education of memory lays the foundation for a treasury of wisdom. Therefore, the systematic appeal to memory highlights its library-like organization. For many medieval scholars, the Bible stood at the heart of such an imaginary library as the book of books and the supreme symbol of universal harmony (Rieger, 2000).

The connections among such concepts as BOOK and LIBRARY, on the one hand, and MEMORY and NATURE, on the other hand, outline not only the symbolic shifts created during various ages and, consequently, the historical dimension of culture, but also the opportunity to review and to map the variation across different areas or domains of human knowledge. In line with this broader scope, the present paper aims at revealing, with regard to Carolus Linnæus's model of scientific classification, the threefold metaphorical understanding of the library as: 1. a priviledged space of knowledge and observation; 2. a heritage of encyclopædic data and 3. an information organization system. Without losing sight that this specific objective does not reconstitute the entire symbolic array of the LIBRARY concept in the realm of expert communication and knowledge, the paper focuses on the task of identifying and exploring the main veins of the library metaphor network so that further inquiries on other ramifications could follow.

3.1. Taxonomy and nomenclature

In the history of natural sciences, Carolus Linnæus, the reformer of systematic classification and scientific naming, authored a landmark work. His contribution to the progress of biology, in general, and to the development of botany, in particular, makes the object of a rich bibliography. The debate on the intellectual tradition and the sources of Linnæus's view on the natural world raised the interest of both biologists and philologists (Heller, 1983; Stearn, 1959). The Swedish scholar's enduring influence on the course of science in the 19th century (Stafleu, 1971) is as obvious as the Aristotelian foundations (Archibald, 2004; Cain, 1958) of the categorization model mirrored by the Linnean taxonomy and nomenclature.

The portrait created by Stearn (in Blunt, 2001, p. 6) reveals Linnæus's personality from the angle of his foundational work: "extensive though not necessarily profound scholarship; clear and concise expression; great industry and mental tenacity; the gift for methodical organization and the co-ordination of facts, and the awareness of their relevance to current ideas. Additionally, the publications of the Swedish naturalist bear the mark of the Enlightenment and highlight the dominant philosophical tendencies in the 17th century: rationalism, empiricism and the belief in the "great chain of being" (Serafini, 1993, p. 142). An admirer of the classical culture, Linnæus turned to such sources as Greek and Roman literature and mythology to name over four thousand animal species and almost eight thousand plant species (Stearn, in Blunt, 2001, p. 246).

The father of modern botany sought to find the most effective ways in classifying and naming the realities of the natural world. His natural philosophy, conceived as the thourough exploration of nature,

stood on two pillars: the systematic taxonomy and the binomial nomenclature. In works[2] like *Philosophia Botanica* (The Science of Botany, 1751), Linnæus advocates that the two fundamentals of botany, namely the classification of plants and the naming of plants, play distinct parts. Whereas the systematic classification gives prominence to the similarities and differences among plants by virtue of a structural method of description, the scientific nomenclature serves to designate and characterize plants in order to pinpoint the identity of each specimen in relation to the hierarchy of the systematic classification. If one considers that the Linnæan taxonomic ranks (class, order, genus, species, variety) stand related with the scientific description of the plant features, then the binary elements of the scientific names created by means of the denominative formula [generic name + specific name] act as the coordinates of an indicative system, just as latitude and longitude locate a point on the surface of the earth. The binomial nomenclature is the measurement unit and the essential semiotic symbol of an analytic structural description. Both the taxonomy and the binomial nomenclature established by Linnæus suggest a complex process of information transfer. First, the naturalist studies the reality and compiles the concise and systematic description of the specimen used to determine the scientific identity of the plant. Then, the analytic description is sublimated in a scientific name composed of a generic name and a specific name which indicate the identity of the plant within the classification system. This procedural mechanism is empirically grounded, since the naturalist explores the reality and describes it accordingly, it has a rational design, since the description follows the Aristotelian logic[3], by discriminating the specific elements of a certain reality from the features which are common to other related realities, and supports inclusiveness, since it allows the addition of new entities into the system, provided that they are classified according to the same standards.

It follows that the Linnæan divisions outline what Rosch (1999) deems as the traditional view on categorization. In line with this perspective which was critically assessed during the Enlightenment, 1. each category, seen as the product of the mental classification of objects, needs to be exact, i.e. clearly delineated, 2. each category is specified by a set of neccessary and sufficient features in order to include as many members as possible and 3. all members of a given category are equally representative. To put it differently, the taxonomy and the binominal nomenclature adopted by the father of modern botany reveal a classification system characterized by: 1. *precision*, given that any member unambiguously falls within a category; 2. *exhaustiveness*, since the system allows the classification of all natural things, 3. *equipolence*, since all category members share the same degree of representativeness. Last but not least, the Linnean systematic classification has also proven a highly effective metaphorical tool, as we are about to find out from the following sections.

3.2. The library and the labyrinth

The excellent studies devoted by the American classicist John Lewis Heller (1906–1988) to the works of Carolus Linnæus acknowledged that the lapidary, essentialist style of the Swedish naturalist undoubtedly followed a traditional rhetorical trajectory and it was infuzed with numerous allusions, quotations and references excerpted from the Greek and Roman literature (Heller, 1983, *passim*). As Stearn (1959) puts is, Linnæus was fully aware that his new natural philosophy required an appropriate stylistic frame and he sought not to part with tradition but to accomodate it to his vision of science. Therefore, princeps botanicorum (the prince of botanists) adopted from the predecessors the noteworthy elements and resorted to effective compositional strategies that ultimately consolidated and adorned the edifice of his scientific

[2]Organized like a calendar, the work has 12 chapters, a number that most likely symbolizes the months of a year, and includes the same set of rules and comments (aphorisms) as the number of days in the regular year.

[3]Perhaps the most influential model of categorization belongs to Aristotle, for whom "the category signifies both an aspect of language (including the uttered thought) and an aspect of existence" (cf. Florian, 1997, p. 76). According to the Aristotelian view, the cognitive and linguistic identity of the categories reveals the solidarity between thought and language and ought to be interpreted in relation to reality. As Aristotle states, any thing, in itself, constitutes a unity and humans possess the ability to identify and express the properties of things. The categories identified and discussed by Aristotle are distinguished by following a binary method of classification (the absence or the presence of a property profiles a certain categorial identity), and this long-standing model was adopted by Linnæus to classify the basic realities of the natural world (cf. Cain, 1958).

arguments so that the Linnæn style became the standard of clear, concise and adequate expression in natural sciences. It also depicted the natural world in vivid colours, as shown by the recurrent appeal to striking metaphorical matrices such as THE LIBRARY and THE LABYRINTH[4].

In close connection with the ancient perspective on memory as a library, the encyclopædic spirit of the Enlightenment brings forth a metaphor which would enjoy a centuries-old career: *bibliotheca naturæ*, and, as we shall find out, this matrix gains a novel understanding in the works of Carolus Linnæus.

The first aspect to be taken into account is the series of historical and encyclopedic publications printed under the title *Bibliotheca Botanica*. Several of Linnæus's contemporaries like the Swiss scholar Albrecht von Haller (1708–1777) or the French naturalist Jean-François Séguier (1703–1784) aspired to compile catalogues of the contributions devoted to the world of plants since the Antiquity. Such metatextual and presumably exhaustive bibliographies included an impressive range of sources: herbals, pharmacopoeias, dictionaries, travel writings, library catalogues, etc. and suggested that the spirit of the age valued "data derived from the scientific experience and relied on the criticism of false ideas from the past" (Eco, 2016, p. 337). Implicitly, this bibliographical outlook on reality sheds light on a basic mechanism of scientific discovery, namely the demand to investigate the stock of knowledge already accumulated in a certain field or on a certain topic. However, the web of references that uncover a certain fact or reality requires critical assessement and systematization to the point that the lack of trustworthy guides endangers both the journey through the labyrinth of books and the exploration of the larger and more challenging labyrinth of the natural world. That is why, in Linnæus's view, the systematic classification of the bibliographical resources in the field of botany as well as their practical designations are the golden keys to open the gate of science. Without a quick and easy access to this network of bibliographical resources which ensures, like a fertile soil, the growth of science, the expert knowledge should not endeavour to step across the complex labyrinth of reality.

A second point to be made on the matter of the library metaphor is that, prior to its application on plants, animals and minerals, the Linnæan model of scientific classification was tested on the realm of botany books and it served a double function: indicative and mnemonic. More specifically, the Swedish scholar argued that, in order to achieve a correct description of reality, any accomplished naturalist should master the threefold system architecture made of the bibliographical system of references and mentions, the taxonomy and the binomial nomenclature. According to the British naturalist William T. Stearn (1911–2001), this point of view also credits Linnæus's use of a binary formula[5] to mention the scholarly written resources. To put it simply, by the middle of the 17th century, a well-endowed and educated memory—such as Linnæus'—could unmistakably reproduce quotes, references and mentions as well as all ranks and divisions of the natural world together with the scientific names of the things and beings thus classified and named. Like nature, the mind of a scientist is a living library.

Another aspect concerns the close reading of Linnæus's scientific writings, especially of those contributions taking an interest on the correspondence between the botanical taxonomy and systematic classification of books on plants, such as *Bibliotheca Botanica* (1735) or *Philosophia Botanica* (1751), which enabled the specialists to reconsider the multiple layers of impact: scientific, didactic, rhetorical etc. evidenced by the respective publications. Thus, we are granted access in the laboratory of a scientific mind that played a major influence on the evolution of natural history, so it is not wrong to presume that nature and books were the greatest passions of Carolus Linnæus. In fact, if we take into consideration

[4]In cultural studies, the labyrinth is defined as "an anthopologically all-encompasing, multifaceted scheme that highlights the multidimensional vastness of the collective imagery weave which symbolizes the human nature and / or the cosmos" (Bădeliță, 2019, p. 12).

[5]Given that the scientific names of plants consist of a generic name and a specific name, the same mechanism was used to mention the scholarly references: "In every citation the author's name should be given in an abbreviated form, corresponding to the generic name of a plant, and his works, corresponding to the scientific name, since a particular author often owes his fame to more than one work (...), the name of a book should be abbreviated into a single word" (Linnæus, *Critica botanica*, 1737, p. 322, *apud* Stearn, 1959, p. 5).

the structure of the catalogue entitled *Bibliotheca Botanica* (1735), we cannot stand far from the truth when assuming that the metaphorical matrix of the library, understood as 'a heritage of knowledge' or as 'a systematic classification', accentuates the novelty and the polymorphism of the Linnean taxonomy. Following Heller (1983, p. 146–202), the allegorical style adopted in the preface of the catalogue signals not only the germinative power of Linnæus' imagination (Heller, 1983, p. 146), but also the didactic objective of the bibliography, which classifies the relevant contributions according to "a natural method so that students may know what books they ought to choose, and may recognize the authors who have written on this or that part of our science" (Linnæus, *apud* Heller, 1983, p. 155).

Due to this systematic approach, the scientific instrument created by the master for the benefit of his disciples becomes, if we are to call forth a forceful and persuasive Linnæan metaphor, an Ariadne's thread that guides the way through the labyrinth of the botanical library. In another work, *Philosophia Botanica* (2005 [1751]), the life saving thread of Ariadne is none other than the taxonomical system that projects order unto the world of plants. Without it, botany would be chaos, writes Linnæus (2005, p. 113). Therefore, the parallel *books – plants* ‖ *bibliographic classification – botanical taxonomy* leads to the conclusion that the primary meaning attributed to the notion of system is that of "a framework embracing constituent elements" (Heller, 1983, p. 147). The view on nature as a systematically organized library helped the Swedish naturalist to credit his model of classification by drawing the attention on the utility of the method. It also strenghtened the library-like perspective on the natural world. It was not a mere similarity, but an open display of the heuristic impact born by the new model. The Latin titles of the contributions included in the catalogue are ranked as species and varieties. The authors are ranked according to their genus (Heller, 1983, p. 152). The upper divisions of the hierarchy consist of orders and classes (see the annex). This arrangement lets us suppose that the library of an erudite mind reflects an Aristotelian design and, according to this point of view, it seems relevant to state that the 833 volumes included by Linnæus in his catalogue of botanical references outline not the inclusive, but the exclusive character of the bibliography (Heller, 1983, p. 159).

On the one hand, the selection illustrates the interests of the compiler; on the other hand, the catalogue offers the author the opportunity to help his disciples memorize the taxonomy and the nomenclature of the new natural method of classification from the early stage of the library research. Over time, the update and the refinement of the information included in the bibliography printed as early as 1735 contributed to the publication of such works of synthesis as *Philosophia Botanica*. It is not by chance that this later book opens with the chapter entitled *Bibliotheca*, devoted to the systematic classification of the botanical references. The section is annotated with comments on the importance of the selected authors to the progress of the science of botany. Additionally, the names of the very few major contributors are evidenced with capital letters: Konrad Gesner (GESNERUS 1541), Andrea Cesalpino (CÆSALPINUS 1583), Gaspard Bauhin (BAUHINUS 1593), Robert Morison (MORISON 1669), Joseph Pitton de Tournefort (TOURNEFORT 1694) and Sébastien Vaillant (VAILLANT 1717). This discrete hierarchy exceeds the didactic objective of setting boundaries between the works of great impact and the literature of lesser importance, and it reveals, by means of the key-names, the scope of the classification, which is to provide the reader already familiar with the works on botany with access tools to an ideal library (Heller, 1983, p. 165), imagined as a constellation of brilliant minds. Just like Ariadne's thread, the light of science shows the way through the labyrinth of reality.

4. Aristotle's ladder

To the modern reader, the Linnæan library arrangement "is a source of great annoyance" (Heller, 1983, p. 200 ff.). due to the weaknesses that undermine the value and the utility of the catalogue: the practice of translating into Latin all the titles of the referenced works, regardless whether they were written or not in the lingua franca of the 18th century erudites, the lack of precision in recording some basic bibliographic information (the publication year, the edition number) and the obviously arbitrary decision to classify

the works on botany according to their presumed purpose. In spite of such inaccuracies, Linnæus's bibliographic experiment draws the attention to the significant influence played upon the pioneers of science by the hierarchy known as ARISTOTLE'S LADDER. In line with the other metaphorical matrices of writing—THE ALPHABET, THE BOOK, THE LIBRARY and the like—the Aristotelian ranking has been applied to both the sacred and the profane, and lies at the heart of a symbolic archetype, namely THE GREAT CHAIN OF BEING (Lovejoy, 2001). In short, as Archibald (2004, p. 1–7) states, the classification of the natural realities according to their inclusion in genera and species also implied the frame of a hierarchy based on a continuum. In this view, the lifeless forms of nature stand on the lower ranks, whereas the increasingly complex life forms (plants, animal and humans) take the upper ranks. During the Middle Ages, the scale of the worldly things and beings (*scala naturæ*) was extended with even higher orders, the hierarchy of the celestial beings (*scala cæli*), and thus the great chain of creation was complete. From a larger standpoint, the Christian symbolic network of THE LADDER is trully impressive if one is to consider its folk and erudite ramifications. In the 17th century, the post-Renaissance reconsideration of the Aristotelian vision culminated with highly detailed diagrams of nature (cf. Archibald, 2004, p. 7–11), and famous naturalists like Carolus Linnæus embraced the ideal image of life harmoniously created by the might and the will of God.

Moreover, as Stearn reveals, the naturalists of the time aspired to name and classify each and every known natural entity: "Even in 1753 Linnæus believed that the number of species of plants in the whole world would hardly reach 10,000; in his whole career he named about 7,700 species of flowering plants. Now life is not so simple. Modern estimates put the number of known species of flowering plants as between 250,000 and 380,000, many times more than he thought possible for the whole vegetable kingdom, and genera such as *Senecio* and *Solanum* each contain over 1,000 species; between 1900 and 1955 botanists described some 198,000 species of flowering plants as new, undoubtedly with undue optimism! The number of living species of Insecta is estimated at about 754,000 – 850,000 and of animals as a whole 930,000 – 1,120,000. It is indeed fortunate for biology that Linnæus passed his life in blissful ignorance of such frightening statistics." (Stearn, 1959, p. 8–9).

The studies on the Linnæan taxonomy and nomenclature outlined that the Aristotelian prototype of the systematic classification led the father of modern botany to simplify the classic polynomial description of plants by equating it with a binary formula composed of a nominal indicator of the genus, called the generic name, and a nominal indicator of the species, called the specific name, so that the unity of the two key-elements could become the emblem of the details included in the analytic description: "the genus and the differentia taken together are the definition of the species, the statement of its essence" (Cain, 1958, p. 145). In other words, the plant name acts as a systematic classification indicator similar to the vehicle registration plate. This is how we ought to understand the Linnæan aphorisms from *Philosophia Botanica* concerning the names of plants[6]: "In the verbal description of a vegetable, all the names are either *silent*, as those of the class (160) and the order (161); or *enunciated*, as those of the genus (159), species (157) and variety (158)" (Linnæus, 2005, p. 170). For any botanist, the scientific names indicate the coordinates which identify the plant in the natural labyrinth of the world.

For instance, if one examines the scientific name of the sunflower, *Helianthus annuus L.*, one finds that, according to the Linnæan tradition[7], the Aristotelian ladder of the plant name could be decoded as follows (Fig.1): the enunciated name indicates the genus (*Helianthus* < Gr. *helios* 'sun' + Gr. *anthos* 'flower') and the species (*annuus* 'annual'), whereas the silent names indicate: the family (*Asteraceæ* < Gr. *aster* 'star' + the suffix *–aceæ*, typical for the family rank), the order (*Asterales* < Gr. *aster* 'star' + the suffix *–ales*, typical for the order rank), the class (*Magnoliopsida* < *Magnolio* 'Pierre Magnol (1638–1715), the French botanist who introduced the family rank in the scientific classification of plants' + the Greek suffix

[6]The numbers in the paratheses specify the aphorisms referring to the divisions of the systematic classification established by Linnæus.

[7]The contemporary studies in systematic botany acknowledge the existence of seven principal taxonomic ranks: kingdom, division, class, order, family, genus and species.

–(o)psida, typical for the class rank), the division (*Magnoliophyta* < *Magnolio* + Gr. *phyta* 'plants') and the kingdom (*Plantæ*).

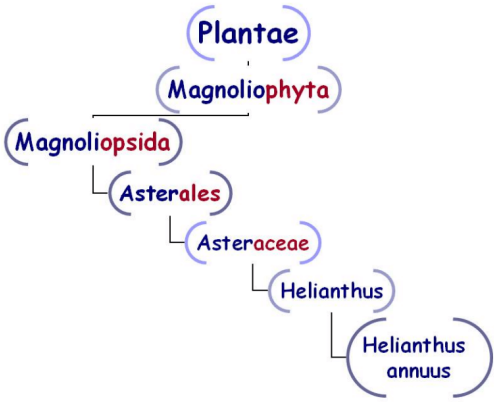

Figure 1: Aristotel's ladder of botanical names: *the sunflower*

Following the onomastic model of anthroponyms, Linnæus stated that the constituents of the binomial nomenclature reveal an important distinction, namely that the specific name cannot possibly exist without the generic name, just as the individual name of a person cannot be parted from the family name in the official records. By stating that the *legitimate* botanical name (Linnæus, 2005, p. 219, aphorism 257) stems from the unity between the specific name and the generic name, the reformer of modern classification in botany took the genus and not the species as the basic taxonomical unit (Stearn, 1959, p. 9) and granted freedom of choice in the selection of names[8], provided that they "are chosen with care, integrity and judgement" (Linnæus, 2005, p. 219, aphorism 256). Consequently, the parallel *generic name* ‖ *family name* – *specific name* ‖ *first name* highlights the double function—designatory and diagnostic (Stearn, 1959, p. 13)—of the scientific botanical names.

While the designatory function serves mainly mnemonic purposes, since it helps in the memorization of plant genera, the diagnostic function serves to identify and to describe the species of a given genus (Stearn, 1959, p. 8). If one regards the botanical binomial nomenclature through the lenses of anthroponimical categories, one might state that the generic name acts similarly to the family name, whereas the specific name acts as a nickname. The two elements of a scientific plant name are explicitly formulated, which means that their composition is based on a set of conventional rules established by scientists. Linnæus' intention to devise rational, essential and binary labels which acted as mnemonic substitutes for the analytic descriptions of the natural entities favoured the creation of *deliberate metaphors*[9].

5. Metaphors beget metaphors

The studies on Linnæan taxonomy and nomenclature outlined both the history of the reforms initiated or inspired by the works of the Swedish naturalist (Stafleu, 1971; Stearn, 1959) as well as the sources of the names attributed by Linnæus (Cain, 1958; Heller, 1983). In the Romanian culture, the influence played by Carolus Linnæus on the development of the natural sciences during the second half of the 18th century and the first half of the 19th century was approached in several papers on the emergence of the first botanical scientific trips and works (Brîndză, 1880; Bogdan, 1919; Borza, 1910, 1921, 1929). The early attempts to standardize the scientific Romanian terminology were also discussed (see, for instance, Coteanu, 1942; Aldea, 2011; Chivu, 2013, 2014; Soare, 2010). There are, however, quite a few unclear points that undermine the precision of the research interested in revealing the interplay of the

[8] "TRIVIAL NAMES can perhaps be allowed in the manner in which I have used them in *Pan Suecicus*; these would consist of a single word; a word freely taken from any source" (Linnæus, 2005, p. 220, aphorism 257).

[9] The debate on the semiotics of deliberate metaphors can be observed by following Steen (2011) and Gibbs (2011).

folk element, stemming from the oral tradition, with the cult influences, due to the prestige of the written sources. In the second half of the 19th century several folklore enthusiasts criticized the harmful influence of science on the language and literature of the folk. In this respect, the lawyer Simeon Mangiuca (1831–1890), published a serial devoted to folk plant names in which he assumed that the scientific works of the time, such as the catalogue of the Bucharest botanical garden [*Catalogul plantelor grădinei botanice a școalei de medicină din București* (1866)], "are very corrupted and bad because their authors did not appeal to the people in order to find out the folk plant names, preferring either to render into Romanian the Greek, Roman of German plant names or to simply borrow those names from the respective languages" (Mangiuca, 1874, p. 512). Without dismissing such pleas advocating the urgent collection of folklore, it becomes clear that the Transylvanian man of letters did not seem to pay attention to such works as the ones published by pharmacists and doctors like J. Benkö, I.C.G. Baumgarten, I. Czihak, J. Szabo and others (cf. Brîndză, 1879–1883), who followed the Linnæan systematic classification of plants. Therefore, the overall picture drawn in the cultural media was, to a certain degree, distorted by the lack of solid scientific information.

In fact, as dr. A. Fătu, the founder of the botanical garden in Iassy, wrote in his assessment of the works on natural sciences published in Romanian up to the middle of the 19th century, "very little interest has been devoted to the development of science, and very little results were recorded in this line of knowledge" (Fătu, 1873, p. 13). In other words, the blame on science was more of a rhetorical artifice than a worrisome reality, given that the small amount of scientific publications and the cultural impact of the institutions[10] that could extend the influence of science over the masses proved "how modest the achievements truly are" (Fătu, 1873, p. 18). To better weigh the facts, it was the delay in the publication of some works of reference (such as the contributions of Gh. Șincai or J. Szabo) or the appalling neglect of the great herbal[11] compiled the pharmacist J. Szabo as the outcome of his botanical trips taken throughout Moldavia after 1840 that proved more eloquent for the general public's lack of interest in the advancement of natural sciences than the prejudice that science undermined folklore. However, the detail that the naturalists of the time translated the foreign plant names into Romanian deserves a closer look, though not in the fiery tone expressed by the likes of Mangiuca[12].

The decisive impulse of the Enlightenment on the culture of the Romanians becomes apparent towards the end of the 18th century, more precisely after 1780, and a clear sign of this influence is the growing interest in the translation of specialised texts whereas the translation of the religious texts is backgrounded (Jeanrenaud, 2014, p. 12). The most recent anthology of writings by the scholars of the so-called Transylvanian School (Școala Ardeleană) shows that the stylistic range of the translations is rather varied: history, literature, morals and philosophy, pedagogy, economy, science, law, theology etc. (Pavel, 2018). After 1830, the translation activity increased with the publication of the first handbooks of natural history and by 1860 the first museums and botanical gardens were founded in Iassy and Bucharest. In line with the foundation of the academic libraries and universities, these cultural and scientific initiatives reflect the desire to develop the adequate infrastructure for the study and the research needs of the first generations of students.

For example, if we take a closer look at the plant catalogues of the botanical gardens in Bucharest (Hofman, 1866) and Iassy (Fătu, 1871) we come across the seemingly bizarre practice of rendering into

[10] "This is how we stand: several scientific societies, two museums, two botanical gardens, a lot of public schools (over 2.400 – my later edit, I.M.) that are supposed to encourage the propagation of physical-natural sciences (...), 15 gymnasia, 6 colleges, 8 seminars, 2 universities, namely the one in Iassy, with three faculties: letters, sciences and law, and the one in Bucharest, as well as a higher medical school, comprising pharmacy and veterinary studies, and 35 mixed private schools, the academic Institute and the new lyceum of Iassy included" (Fătu, 1873, p. 18).

[11] "Since 1842, dr. J. Szabo organized several botanical trips in Moldavia and collected a large number of plants included in a herbal of 2844 different species, but the donwside of this enterprise is that the respective herbal still found in the museum of natural sciences in Iassy has never been classified" (Fătu, 1873, Annex B, p. 75).

[12] "To the great shame of Romania, the already mentioned plant catalogue of the Bucharest botanical garden from 1866 excells in the scorn of the folk botany" (Mangiuca, 1874, p. 513).

Romanian the Latin plant names devised according to the Linnæan system (Fětu, 1873, p. 76). One can but imagine how odd must have seemed to the occasional readers who were unfamiliar with the rules of biological nomenclature[13] names like *Asfodel galben* – yellow asphodel (Asphodelus luteus), *Zambilă moțată* – tassel hyacinth (Muscari comosum Miller) or *Funkia albă* – white funkia (Funkia alba Sweet)! And how exotic must have been, at first, calqued plant names such as *Camelină cultivată* – cultivated camelina (Camelina sativa), *Isatidă plumbia* – leady isatis (Isatis lævigata) or *Miagră străpunsă* – perforated myagrum (Myagrum perfoliatum)!

Public reactions like Mangiuca's unveil, on the one hand, the lack of familiarity with the botanists' perspective on the library of nature and, on the other hand, the shock triggered by the discovery of this surprising labyrinth. When writing that the artificial translation of expert plant names does nothing else but complicate things and mock the old and pure language of the people, the occasional publicists who expressed such a view did not seem to consider the fact that not all the plants of the world were known to and named by the Romanians. Consequently, many plant names had to be coined mostly by loan translation, by borrowing or by recycling the already existant names. Therefore, the semiotic energies of language were put to use in order to forge a style apt to express the scientific thought, but this process of terminological standardization has complex, far reaching implications, since language, just like nature, is also a labyrinth and, "without the thread of Adriadne, one might easily get confused and lost in the semantic web of words." (Laurian & Massim, 1871, p. xii). In this puzzling maze of words, metaphors beget metaphors (Laurian & Massim, 1871, p. xiii).

6. The spiral of translation

Despite that, in the 19th century, Latin ceased to be used as the lingua franca of science, the Greek and Roman foundations of expert communication continued to flourish in the creation of new scientific terminology. The terminological stability in the language of science catalyzed the internationalization of many specialized vocabularies. In the field of botany, the "technical words introduced during the past two and a half centuries remain essentially the same. Thus, for example, 'petal' (petalum), 'anther' (anthera), 'polen' (pollen), 'carpel' (carpellum) and 'stigma' (stigma) in English, 'pétale', 'anthère', 'pollen', 'carpelle' and 'stigmate' in French, 'petalo', 'anthera', 'polline', 'carpello' and 'stimma' in Italian, 'pétala' (Port.), 'pétalo' (Sp.), 'antera', 'polen', 'carpelo' and 'estigma' in Portuguese and Spanish, 'petale', 'antere', 'polen', 'carpelă' and 'stigmat' in Romanian" (adapted from Stearn, 2013, p. 44).

The cultural history of the scientific lexicon has rather complex intricacies. Very few Romanian speakers are in fact aware that ornamental plants like the begonias (Rom. *begonii*, cf. Fětu, 1871, p. 20), the gentians (Rom. *gențiane*, cf. Hofman, 1866, p. 20) or the primroses (Rom. *primule*, cf. Hofman, 1866, p. 20) got their "folk" names by the loan translation of the generic name as the plants were cultivated in the first public botanical gardens created around 1860. The evidence of this linguistic naturalization is recorded in the plant catalogues that were met with scorn by the proponents of ethnobotanical studies. However, one can infer that such written records are excellent sources for any researcher interested in the accomodation of scientific plant names as folk names and the vice versa, either by loan translation or by borrowing. They are also scientific instruments that have played an important part in the preservation of the erudite Latin botanical vocabulary referring to the most diverse aspects of plant life: appearance, habitat, uses etc.

A century after the adoption of the Linnæan taxonomy and nomenclature, the adaptation of the botanical terminology to the distinct idiomatic profiles of modern languages required an important update of the rules to be followed in the creation of scientific plant names. Consequently, new laws of nomenclature were adopted at the International Botanical Congress held in Paris in 1867. Therefore, article 6 of the international code included not only the Linnæan axiom of binary Latin names but also the stipulation that the translation of the Latin designations into the modern languages "should preserve

[13] The examples are excerpted from Hofman (1866, p. 4, 26).

as great a resemblance as possible to the original Latin names" (Candolle, 1868, p. 18). The precept was aimed both to support botanical Latin as the definitive tool of scientific nomenclature and to stimulate the adoption of expert plants names in the common language of the folk. The plant catalogues of the first Romanian public botanical gardens reveal that the (loan) translation of the Latin nomenclature into vernacular plant names was regarded as a common practice among the botanists in the first half of the 19th century since it was officially adopted as a rule at the scientific congress held in August 1867. This strategy was undoubtedly useful in helping students of botany to gain a better understanding on the prominent features of plants traditionally encoded in the botanical Latin description and nomenclature. It also favoured the coinage of jargon-like, provisional binary formulas acting as vernacular scientific names. To the non-specialists, the annotation of Latin names such as *Campanula barbata*, *Campanula alpina* or *Campanula glomerata*, with Romanian equivalents like *clopoțăl bărbos*, *clopoțăl de munte* or *clopoțăl adunat* (Szabo, 2012, p. 214) might seem humorous or meaningless. For botanists, however, such annotations are transparent and reveal that the plant's corolla is bearded or tufted with long, stiff hairs, that the plant's habitat is mountainous or that the plant's flowers are small and densely clustered like grapes. Without the link of such descriptive exercises of translation, it would probably be impossible for the speakers of Romanian to describe a certain odour as *fetid* or *fragrant*. Neither would it be possible to speak of aromatic plants (Rom. plante *aromatice*) unless the already mentioned adjectives had not been first used by a small community of scientists.

In the library of nature, the older an expert botanical name is, the longer and more complex the spiral of its cultural history (see Chirilă, 2019). To illustrate the point one can explore the names given to various plants commonly known as *gălbenele* or *piciorul-cocoșului*, and described by botanists under the genus *Ranunculus*. This generic name was most likely adopted by Linnæus from the works of such pioneers of botany like Christian Mentzel or Gaspard Bauhin (Gledhill, 2008, p. 5). The source of this botanical name is the Latin etymon *ranunculus*, a term adopted by Pliny the Elder (23–79 A.D.) to translate the Greek lexical prototype *batrachion* ('little frog'), used by Teophrastus (ca. 340–287/6 B.C.) to designate a flowering aquatic plant (cf. Stearn, 2013, p. 252). In the first dictionary of Romanian that followed the Linnæan system, *Lexiconul de la Buda* (The Lexicon of Buda, 1825), there are five references to the genus *Ranunculus*[14]:

a) *boglari*: a flower, also known as ră(n)unchiu: *ranunculus* Linn.: boglárvirág : der Ranunkel oder Hahnenfuß;
b) *calce-mică*: scînteuță-galcină: *ranunculus ficaria*, *chelidonium minus* Linn.: ara[n]nyal versengő: das kleine Schölkraut, Scharbockskraut, Feigwarzenkraut;
c) *floare-broștească*: a plant: *ranunculus acris* Linn.: réti békavirág: der scharfe, brennende Hahnenfuß, die schmalzblume;
d) *ranunchiu*: a flower: *ranunculus*: boglárvirág, der Ranunkel, Hahnenfuß;
e) *scînteuță*: galbină: *ranunculus ficaria vel chelidonium minus* Linn.: aranny[a]l versengő: das kleine Schellkraut, Scharbockskraut, Feigwarzenkraut;

On the one hand, these lexical entries allow us to notice that many folk plant names are either borrowed (Rom. *boglari* – Hung. *Boglárvirág*) or loan translated (Rom. *piciorul-cocoșului* – Germ. *Hahnenfuß*) among the speakers of neighbouring languages. On the other hand, we can also witness the widespread vernacularization of the Latin name (Germ. *Ranunkel*, Rom. *ranunchi* as well as its translations adopted by the pharmacists and doctors who followed the Linnæan systematic taxonomy and nomenclature: Lat. *ranunculus acris* – Rom. *floare broștească*[15]. Last but not least, the Romanian dictionary of 1825 also reveals the competition created among similar linguistic forms: *ranunchi* – *rărunchi* ('kidneys'). The

[14] See the latest online edition created by the research group led by Maria Aldea: [online].

[15] The Romanian ethnobotanical dictionaries (Panțu, 1906) record the lexical effect played upon the folk plant terminology by the translation of the Latin scientific name: *broschiță* (p. 27).

folk etymology triggered by the homonymy of *rărunchi* ('kidneys', 'viscera') – *rărunchi* (plant) was amplified by synonymic derivation: *rînzișoară* (*Ranunculus sceleratus L.*; Panțu, 1906, p. 232). Therefore, the translation of the Latin binomial nomenclature to the benefit of the non-specialists interested in the mysteries of the scientific plant names acted as the primary strategy used to intensify the wide circulation of the deliberate metaphors coined by scientists. By the beginning of the 20th century, the vernacular translation of the Latin binomials was regarded by botanists not as an eccentric and shameful practice, as Simeon Mangiuca would say, but as a standard mechanism that ensures the terminological enrichment of the scientific discourse: "All nations with a higher culture developed the botanical nomenclature with both folk and scientific names. This is something we should do as well when the Romanian specialists devote themselves to the popularization of science and when the need for appropriate key to determine the plant arises, so as to express our love for flowers and nature. Many plants that live in our native lands are already known by their folk names. Many others must be named with artificial, yet typically Romanian designations coined according to the spirit of language and in analogy with the already existant plant names" (Borza, 1910, p. 376).

7. Concluding remarks

This brief survey of the Linnæan classification and nomenclature in relation to such metaphors of writing as the BOOK and the LIBRARY leads us to assume that the scholarship of the Enlightenment revered the intellectual legacy of writing, which has grown since the 15th century with the advent of print. As Umberto Eco (2016, p. 327–350) points out, at the crossroads of the 17th and the 18th centuries, as the ENCYCLOPEDIA became the symbolic epitome of knowledge organization, the classical metaphorical matrices of writing would be reconfigured to highlight the new and influential valencies. In this respect, great scholars like Carolus Linnæus took the opportunity to redefine the study of nature in terms of library information management. According to this view, the library of nature is but a labyrinth waiting to be systematically explored. While Aristotle's works provided the guiding Ariadne's thread through the maze of the natural world, the great chain of being described the orderly and harmonious arhitecture of God-created nature. However, the seeds of the evolutionary theory that would later grow and bear fruit in the works of such great naturalists as Alexander von Humboldt, Jean-Baptiste de Lamarck and Charles Darwin were yet to be laid in the ground of science with a Linnæan approach, illustrated by the rational, precise and structural description of natural realities.

From a semiotic standpoint, the outreach of the Linnæan natural philosophy goes beyond the biological classification and nomenclature since it brings forth the tree-like design of the categorization model that underlines an influential taxonomy correlated with an ingenious nomenclatural frame. In other words, the Swedish naturalist established a waypoint between tradition and modernity and set the path to the international adoption of a simple, clear and effective method to determine the identity of any given natural specimen within the larger picture of life. Consequently, the Latin binomials acting as system coordinates stand as deliberate metaphors and their translation or borrowing into modern languages of the world has strenghtened the stability and the internationalization of the expert biological terminology. It has also endowed the recipient folk vocabularies with the descendents of the exemplars coined and used in the language of science. In the library of nature every thing is kept in place.

Bibliography

Aldea, M. (2011). *Cîteva observații asupra definiției în „Lexiconul de la Buda" (1825)*, in "The Proceedings of the European Integration – Between Tradition and Modernity Congress", **4**, p. 572–582.

Archibald, D.J. (2004). *Aristotle's Ladder and Darwin's Tree. The evolution of Visual Metaphors for Biological Order*, Columbia University Press, New York.

Bădeliță, C.-G. (2019). *Mitul labirintului în proza italiană a secolului al XX-lea. Modelul greco-latin și valorificarea lui*, Editura Universității „Alexandru Ioan Cuza", Iași.

Blunt, W. (2001). *Linnæus. The Compleat Naturalist*, with an introduction by William T. Stearn, Princeton University Press, Princeton / Oxford.
Bogdan, N.A. (1919). *Societatea Medico-Naturalistă și Muzeul Istorico-Natural din Iași. 1830–1919. Documente, scripte și amintiri*, Tipografia Națională, Iași.
Borza, Al. (1910). *Nume populare de plante*, in "Transilvania. Revista Asociațiunii pentru literatura română și cultura poporului român", (5), sept.–oct., p. 376–377.
Borza, Al. (1921). *Prima istorie naturală românească. Istoria naturei sau a firei de Gh. Șincai*, in "Transilvania", **52** (9–12), oct.–dec., p. 825–836.
Borza, Al. (1929). *Primul dicționar de științe naturale românesc. „Vocabularium pertinens ad tria Regna Naturæ" de Gh. Șincai*, in "Dacoromanica. Buletinul «Muzeului Limbei Române»", **5**, 1927–1928, p. 553–562.
Brîndză, D. (1879–1883). *Prodromul florei române sau enumerațiunea plantelor pînă astăzi cunoscute în Moldova și Valachia*, Tipografia Academiei Române, Bucuresci, p. XI–LXXXIV.
Brîndză, D. (1880). *Despre vegetațiunea României și exploratorii ei, cu date asupra climei și regiunilor botanice*, discurs de recepție în Academia Română, Tipografia Academiei Române, București.
Cain, A.J. (1958). *Logic and memory in Linnæus's system of taxonomy*, in "Proceedings of the Linnean Society of London", **169**, p. 144–163, Crossref.
Candolle, A. (1868). *Laws of Botanical Nomenclature adopted by the International Botanical Congress held at Paris in August 1867*, L. Reeve & Co., London.
Carruthers, M. (2008). *The Book of Memory. A Study of Memory in Medieval Culture*, second edition, Cambridge University Press.
Cassirer, E. (2008), *Filosofia formelor simbolice*, vol. I. *Limbajul*, traducere din limba germană de Adriana Cînța, Editura Paralela 45, Pitești.
Chirilă, A. (2019). *At the far end of diachrony: the evolutive spiral of the emergence of language. A theory*, in "Diacronia", **10**, 7 nov., art. A141, Crossref.
Chivu, Gh. (2013). *Nume de plante în texte vechi românești*, in Oliviu Felecan (ed.), *Numele și numirea. Actele Conferinței Internaționale de Onomastică, ediția a doua, Onomastica din spațiul public actual*, Editura Mega, Editura Argonaut, Cluj-Napoca, p. 1000–1015.
Chivu, Gh. (2014). *Prima listă de plante și începuturile terminologiei botanice românești*, in Oana Uță Bărbulescu, Gheorghe Chivu (eds), *Ion Coteanu – in memoriam*, Editura Universității din București, p. 95–100.
Coteanu, I. (1942). *Prima listă a numelor românești de plante*, București.
Crease, R.P. (2006). *The book of nature*, in "Physics World", **19** (12), Crossref.
Eco, U. (2016). *Scrieri despre gîndirea medievală*, Polirom, Iași.
Fătu, A. (1871). *Enumerațiunea specieloru de plante cultivate în grădina botanică din Iași pênê în annulu 1870*, Noua Typografiă a Laboratoriloru Români, Bucureci.
Fătu, A. (1873). *Despre încercările făcute pentru dezvoltarea științelor naturale în România*, discurs de recepție, Analile Societății Academice Române, seria I, tom V, seria II, Imprimeria Statului, București, p. 1–24, anexe, p. 125–159.
Florian, M. (1997). „Introducere la Categorii", in Aristotel, *Organon*, vol. I, Editura Iri, Bucureşti.
Gafton, Al. & Gafton, E. (2015). *Puterea imaginii, Dominația conceptului, Forța cuvîntului*, in "The Proceedings of the International Conference Globalization, Intercultural Dialogue and National Identity. Section: Language and Discourse", **2**, p. 11–32.
Gibbs, R.W. (2011). *Are "deliberate" metaphors really deliberate?: A question of human consciousness and action*, in "Metaphor and the Social World", **1** (1), p. 26–52, Crossref.
Gledhill, D. (2008). *The Names of Plants*, 4th edition, Cambridge University Press, Crossref.
Harrison, P. 2004. *"Priests of the Most High God, with respect to the Book of Nature". The Vocational Identity of the Early Modern Naturalist*, in Angus J. Menuge (ed.), *Reading God's World. The Scientific Vocation*, Concordia Publishing House, Saint Louis, p. 59–84.
Heller, J.L. (1983). *Studies in Linnæan Method and Nomenclature*, Peter Lang, Frankfurt am Main / Bern / New York.
Hofman, U. (1866). *Catalogulu plantelor grădinei botanice a școalei de medicină din Bucuresci*, Imprimeria Statului, Bucuresci.
Jeanrenaud, M. (2014). *Europa secolului al XVIII-lea: traduceri și traducători*, in Eugenia Dima, Andrei Corbea-Hoișie (eds), *Impulsul Iluminismului în traduceri românești din secolul al XVIII-lea*, Editura Universității „Alexandru Ioan Cuza", Iași.
Laurian, A.T. & Massim, J.C. (1871). *Dictionariulu limbei române*, Noua Typographia a Laboratoriloru Români, Bucuresci.
Linnæus, C. (2005). *Philosophia Botanica*, translation by Stephen Freer, Oxford University Press.
Lovejoy, A.O. (2001). *The Great Chain of Being*, Harvard University Press, Cambridge, Massachusetts / London, England.
Mangiuca, S. (1874). *De însemnătatea botanicei românesci*, in "Familia", **10** (43), 3–15 nov., p. 511–513.
Panțu, Z. (1906). *Plantele cunoscute de poporul român*, Institutul de Arte Grafice și Editură „Minerva", București.
Pavel, E. (coord.) (2018). *Școala Ardeleană*, Academia Română, Fundația Națională pentru Știință și Artă, Muzeul Național al Literaturii Române, București, 4 volumes.
Rieger, D. (2000). *«Des «livres sacrés». Fiction et idée de la bibliothèque au Moyen Âge»*, in "Cahiers de recherches médiévales", **7**, Crossref.

Rosch, E. (1999). *Reclaiming concepts*, in "Journal of Consciousness Studies", **6** (11–12), p. 61–77.
Serafini, A. (1993). *The Epic History of Biology*, Perseus Publishing.
Soare, L. (2010). *Școala Ardeleană. Aspects of Biology Terminology*, in "Analele Universității din Craiova, seria Științe filologice. Lingvistică", **32** (1–2), p. 364–370.
Stafleu, F. A. (1971). *Linnæus and the Linnæans*. A. Ooshoek's Uitgeversmaatschappij N. V., Utrecht.
Stearn, W. T. (1959). *The Background of Linnæus's Contributions to the Nomenclature and Methods of Systematic Biology*, în „Systematic Biology", **8** (1), p. 4–22, Crossref.
Stearn, W. T. (2013). *Botanical Latin*, David & Charles, Timber Press.
Steen, G. J. (2011). *When is metaphor deliberate?*, in N-L. Johannesson, C. Alm-Arvius, & D. C. Minugh (eds), *Selected Papers from the Stockholm 2008 Metaphor Festival (Stockholm Studies in English)*, University of Stockholm, Stockholm, p. 43–63, [online].
Szabo, J. (2012). *Flora moldavica (1841–1842)*, edited by Milian Gurău, Alma Mater, Bacău.
Tanzella-Nitti, G. (2005). *The Two Books prior to the Scientific Revolution*, in "Perspectives on Science and Christian Faith", **57** (3), p. 235–248, [online].

Appendix A. The bibliographic classification established by Carl von Linné: *Bibliotheca Botanica* (1735)