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# Contents

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# SEMIOTIC ELEMENTS OF THE WORK OF ARCHITECTURE

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1.

In his 1937 lecture titled "Art from the Perspective of Semantics — a New Method for Aesthetics," delivered during the $2^{nd}$ International Congress of Aesthetics and Science of Art in Paris, Mieczysław Wallis included architecture and music into the so-called asemantic arts, or arts which do not use signs (Wallis 1937, 1969).

Although since then various authors published extensively on the semiotics of architecture, even 30 years later Umberto Eco is still considering the work of architecture not as a sign but merely as it were a sign (Eco 1972). This approach, however, ignores an important question, namely: "is architecture an art form?," or, in other words, "is there a language of architecture?." If we were to answer this questions in the negative, we would have to agree that semiotics of architecture breeds pseudo-problems and indulges in pseudo-solutions.

One crucial assumption in semiotics is that sign is something else than its referent (Bocheński 1956). There arises the question whether this relates in any way to the work of architecture.

Sebastian Sierakowski writes: "upon looking at a building what first strikes our eyes is whether it is beautiful, then we consider its convenience, and lastly, whether it is enduring." This briefly sums up the general experience of an encounter with architecture: the work of architecture does not present itself as a whole, we are first confronted with its visual features, which is certainly not everything there is to discover (Sierakowski 1812: 2). A similar

conclusion can be drawn from remarks made by Gerard Ciołek who describes a landscape as a set of external components in the environment with natural confines (Ciołek 1964).

The work of architecture is a complex piece of creation because its formal and visual features consumed in immediate perception are relatively autonomous with regard to the whole.

Thus, one may assume that there are architectural signs which cannot be identified with the work of architecture as a whole. Even if an architectural sign does not relate to extra-architectural meanings, it still at least refers to the work of architecture that is something else than the sign itself.[1]

From a formal perspective, the work of architecture was, and still remains, diversified enough for us to perceive it as a whole system of signs. Therefore, the repertoire of forms recurring in many architectural works can be perceived as a language, that is, a system of signs enabling thinking, expression and communication. This paper aims to develop and justify the claims made above. To this end I shall explore the place which the language of architecture occupies within the structure of architectural work, provide an overview of forms in which it manifests itself, explore morphology, syntax, semantics and pragmatics of the language of architecture, as well as its place among other languages. This will help us approach themes present in the semiotics of architecture in an insightful, if not entirely fashionable, manner (Pelc 1970).

## 2

The work of architecture can be conceived as consisting of three separate layers: physical space, perceptual space and imaginative space. Each can be found in descriptions of Baroque churches built across the province of Lublin:

"(. . . ) spatial lavishness is only emphasized by the liberal treatment of walls, which by softly concaving surfaces, curving cornices and subtle play between the dense and dispersed spacing of pilasters lend dynamics to the architectural interior and employ lighting effects to create an impression of motion, undulation and spaciousness. It seems even that the wall foregoes its material substance that its illusionistic decorative painting struggles to reinstate."

[1]There are forms of spatial division which are designed to be self-effacing, such as curtain walls, or forms that communicate their existence in a very subtle way, such as glass walls that suggest a division between exterior and interior, wrongly perceived as a possibility of passage. Some utopian projects postulated ceilings with systems of electromagnetic fields.

The art here strives to merge the real with imaginary space, the world of here and now with the world of vision, reconcile the believers with the saints in paintings and sculptures, the institute within the interior, a union between the mundane and unworldly (Miłobędzki 1963: 169-170). Architectural sign belongs to the perceptual space and can signify other layers of the architectural work or point to meanings beyond the structure.[2]

3

Architectural sign can also be detached from the work of architecture and the language of architecture can function outside the architectural environment, as in illusionistic painting creating imaginary spaces accessible exclusively by visual examination or scenography, which organizes space for theatrical performance but essentially constitutes an artificial and conventional arrangement designed for the purposes of the stage. Architects use this language as a tool that takes the form of orthogonal projections, perspective drawings or three-dimensional models or compositions. The elements of the architectural language represent the work, further recreated and transformed by projecting it through such media as drawing, painting, photography or film. When the architectural language becomes identified with the work of architecture itself, the latter can vanish into the visual work. It is used to create such para-architectural elements such as details of the interior. In the period of Renaissance, Mannerism and Baroque, columns, pilasters, arcades, along with the whole system of architectural orders, were used to shape altars, pulpits and confessionals, ultimately creating "architecture in architecture."[3]

4

The smallest structural element of the language of architecture must be perceptible, it is, for example, (A) an element of texture, e.g. the granular texture of stone or concrete, the linear texture of wood or a distinctive element of plaster. The texture is not necessarily distinguishable: on smooth or slippery surfaces the reflection of light can easily blur its features or the texture may be worn off. The texture can be a structural part of the material or be manufactured artificially, as it happens with gravel applied on slabs used in residential construction. Such secondary details possess no

[2]This understanding of architecture follows methodology shared by such authors as Honzík 1944, Ingarden 1966, Hesselgren 1970.

[3]Miłobędzki's description of church furnishings is inspired by Summerson 1949.

signification value on their own but great care and attention with which they are often treated shows that they can modulate the overall experience of architecture. If the texture is left unattended, the perceptible element is constituted by (B) such elements of spatial arrangement as ornamental or decorative features. In the ceiling decoration typical to churches built regionally across the province of Lublin one can discover such elements as beads, oeil-de-boeufs and floral motives (Miłobędzki 1963). In bases and capitals of architectural orders these elements come in the form of profiles or, as in Doric columns, flutes. They are distinguishable by virtue of being structured on a single planar or a spatial contour.[4]

Those perceptible elements are part of simple elements such as structural elements (beams, poles, lintels, etc.) or decorative elements — Lublin-type ornaments, for example, include profiles of cupid heads, suns and moons that form ribs, hearts, crosses and plaquettes in the shape of angels, suns, moons.

Simple elements comprise complex elements of spatial divide, such as ceilings, facades, walls, stairs, floors, doorways and windows. The elements of spatial divide comprise functional spatial elements, such as, in the case of sacred architecture, chapels, towers, naves, which can stand as an individual architectural statement but at the same time they are usually a part of a larger whole.

The arrangement of those elements serves to shape formal features of spatial design. The space can be divided into (A) simple spaces, not articulated or divided but only to a very modest degree (such as the spherical buildings of Ledoux or Ronchamp chapel designed by Le Corbusier) and (B) complex spaces.

Spaces can be complex in a regular and irregular way, and the irregularity can be either ordered or disordered. The ordering of spatial elements can be distinct or obscured (the complexity of Baroque spaces was sometimes perceived as chaotic, see Białostocki 1958). In the arrangement of space one can distinguish dynamic or static design, balance and imbalance, openness or closeness, compactness or dispersion (Bohdziewicz 1961: 161-168). When considering complex spaces the problem of syntax arises, which can be divided into the following:

1. linear (Hansen's linear system, linear rural settlement, enfilade),

[4]Seeking to establish the smallest differentiating factor between architectural elements, Porębski, proposes „in the simplest case (. . . ) juxtaposition of black — white" (Porębski 1962: 63).

2. centrifugal (as in layout preferred by Wright),

3. centripetal (central buildings).

Some basic principles followed in design include uniformity (the evening out of lines and height of buildings), accumulation (additiveness), reduction (demolition), contrast (composition by opposition).

Syntactic issues are highly relevant to the language of architecture, but a broader discussion of these matters is beyond the ambition of this paper.

## 5

In architectural elements and forms one can distinguish the following groups of meanings:

A. internal meanings, relating to the work of architecture itself, that is:

a) functional meanings, describing the intended purpose of the building,

b) structural meanings, describing its structure,

c) spatial meanings, describing its spatial division,

and

B. external meanings, relating to the participants of the construction process (investors (founders), designers, constructors, users), as well as meanings relating to the religious, ideological and artistic aspects of architecture, such as

d) prestige, describing place in the social hierarchy of those participating in the construction process, and

e) symbolic, allegoric, etc., meanings (Gębarowicz 1968).

The problem of meaning arises both in the theoretical and practical aspects of architecture. Wąsowski, following Vitruvius, argues that "a column best expresses human body in correspondence of its height, width and arrangements of parts. A capital and a base represent a head and a leg, while the pillar stands for human posture, and which, if fluted, depicts creases in a robe" (Wąsowski 1975).

Sierakowski sought to demonstrate that different classes and strata are privileged to particular orders of architecture because "the façade of a building, very much in a fashion of garment, must testify to a condition and dignity of that who uses it" (Sierakowski 1812: 178). In the early years of the second half of the $19^{th}$ century this function was fulfilled by various degrees of lavishness in the façade's decoration. Housing for craftsfolk designed by Enrico Marconi was praised for, to quote one critic, "moderate decoration

and simplicity (. . . ) lending proper character to the housing of craftsmen." Upper layers of the society were entitled to decorative façades but some harbored different ideas, favouring simple brick structures over ostentatious displays of prestige. "Simplicity of the architecture was meant to represent chastity, frugality and the thrifty exploit of resources, in other words virtues wholeheartedly embraced by those engaged with the ideals of organic work" (Kapliński 1963, quoting Rudowska 1971: 92; see also W. Krassowski 1973).

For the work of architecture to be a message, the language used by the author, or the addresser, must be familiar to the addresses. Ever since Modernism, however, and the advent of the "new art" self-righteously proclaiming that one "cannot rein in art" (Przybyszewski 1899), the artist can indulge in his own language without keeping an eye on the audience. In this new paradigm, the works of architecture representing the "new art" were free to send the message that the building is simply embodying the idea of modernity. It was the theorists of Bauhaus who clearly stated that the purpose of architecture is to express the "character of the age" (Cz. Krassowski 1978).

The work of architecture can have a number of meanings. In formal features of a church one can discover structural themes: a system of pillars, arches, walls, ceilings; functional themes: a gathering space for the believers, liturgy, sermons, a place of reflection; spatial themes: a single-nave interior enclosed by a many-sided choir, elongated and facing a particular direction, where both specific details and the whole structure are designed to carry symbolic meaning.

Meanings and themes are often subject to reductionist practices: if one adapts a church, for example, for a different purpose, say a concert hall or an art gallery, it loses its symbolic and, partially, functional meaning.

Meanings can also undergo deep transformations. Readapting a Gothic church into a restaurant goes against the axial character of the space, effectively destroying its congregational function and dissolving the atmosphere of reflection (Holcerowa, Michalczuk 1972).

Conversely, meanings often pile up. This is usually the case with sites so long embedded in the surrounding environment that they eventually become part and parcel of particular events, biographies, times and ideas.

During the lifetime of a building meanings come and go, and the change of substance or spatial forms can produce a radically different context in which the structure exists. If the idea of reconstruction is often a controversial topic for the theory, then restoration and conservation for the semiotics of architecture questions regarding the installation of a new heating system

or renewed ceiling structure are to a certain degree secondary because the primary concern lies in the preservation of message.

## 6

Not all elements of architectural space are signifying: the visible can signify, while the invisible can be signified. While the part can signify, the whole can only be signified. The exterior can signify, while the interior be signified. In that vein, the silhouette of a building in the metropolitan skyline can signify its location in space. Its height can signify how it ranks among other buildings and display the prestige of its founder, owner or the institution it houses (see Gimpel 1983 for competition between the towers of town halls and churches or among skyscrapers in modern cities).

The outward appearance of the structure may imply features of the interior and its spatial arrangement, but the relationship between the two is not necessarily straightforward or in any way complete. The outside of Romanesque churches still closely correspond with the inside, but as early as in the Gothic style what shrouds, and what is shrouded, was becoming unbundled and increasingly autonomous, while in the Renaissance the façade startedf playing the primary role not only in the spatial arrangement of the design but also signified functions and communicated symbolic meanings.[5]

Size and dimensions can signify too. The sacral space was thought to be reminiscent of Noah's Ark and had to be similar in size to the one described in the Bible (Davy 1964). Similarly, distances between the Stations of the Cross in landscape had to reflect those actually walked by Christ in Jerusalem (Szablowski 1933).

Also light is a signifying component of architecture. "The material lights, both those which are disposed by nature in the spaces of the haven and those

[5]It is interesting to follow the evolving interactions between the outside and the inside. From well-isolated rooms to movable partitions without real isolating value, we finally arrive at the Barcelona Pavillon designed by Mies van der Rohe. It is the first example of architectural design where the continuously articulated and orienting space forces the visitors to walk through the interiors in a meandering movement determined by independently placed walls. This idea was further developed in a building prepared for a Berlin exhibition, where freely spaced walls delineated spatial areas while blurring the distinction between the interior and the exterior by being projected beyond the outline of the roof and vertical plane of windows. This trend is consequently evolving into seamless merging of the inside with the landscape outside, ultimately doing away with the idea of the signified interior and the signifying outside (Chermayeff, Alexander 1963).

which are produced on earth by human artifice, and images of the intelligible lights, and above all of the True Light itself (Panofsky 1955: 151).[6]

One other signifying feature of the building is the floor plan, as in the Chapels of Mary's Heart in Zebrzydowska Calvary and Pacławska Calvary, which were erected on a plan of a heart, or a church in Sidorów built on a plan of the founder's coat of arms.

Another signifying element is the location of the building. Carlo Borromeo, demanding that the church should be built on an elevation, wanted it to rise above nature (this also suggests symbolic associations with stairs, see Borromeo 1980).

Signifying, therefore, is also present in the horizontal oppositions of high and low, hence the origin of *piano nobile*, and various degrees of floor elevation in public spaces (apart from the obvious practical purposes such as visibility), or meanings associated with the attic and the basement.

## 7

Motivation behind the architectural sign can be a) functionalistic, b) formalistic, c) constructivistic, d) illusionistic, e) allegoric, f) anthropomorphic, g) naturalistic, h) traditionalistic and i) historic.

Confining informative content of the sign exclusively to its functional or structural aspects and prioritizing them over other possible meanings is exemplary of functionalism and constructivism. The allegoric aspect of meaning was employed in the Baroque period, for example, where it introduced systematic orders inspired by anthropomorphism. The fashioning of architecture after natural forms culminated perhaps in the monument of Newton: its vaulting sought to emulate a starry sky both during the day and at night. Sometimes an architectural form is vindicated by its traditional value ("one has always built like that"). This should not be confused with citing past periods as a reason for the choice of a particular form in contemporary architecture: Gothic style was once thought to be the most fitting style for sacral buildings, whereas in other times Renaissance architecture was considered suitable for other purposes (Jaroszewski, Rottermund 1976). These reasons are usually not particularly straightforward. The anthropomorphic nature of various orders invited architecture to wade into the psyche.

[6]This passage appears in Panofsky 1955 as a quote from Eriugena which in the original goes as follows: "Materialia lumina [...] sive quae in terris humano artificio efficiuntur imagines sunt intelligibilium luminum, super omnia ipsius verae lucis." The symbolism of light is also explored in Stróżewski 1961.

"A civil prison should instill the sentiment of sadness and melancholy, while a criminal prison that of dread and terror, and for this reason be cruder even than the Tuscan order. Bosses placed harshly and randomly, openings narrow and irregular, brickwork high and double in width, parts lavish and thick, projecting far outwards to give ample shade, doorways as if leading to caves, heavy and deep, slave postures, caryatids, other sculptures and inscriptions to magnify the dread" (Sierakowski 1812: 187-188).

In some examples of Secessionist architecture formalism emerges as a playful discussion with the prevailing style. This approach is exemplified by a tenement in Warsaw, sited at Służewska 3 street and built between 1903-1905, where linear becomes curvilinear, spherically or rectangularly enclosed is now enclosed by a semicircular or flattened curve. Once secondary elements, such as divisions and fittings of woodwork or paving of the yard are now finished with utmost attention to detail. Harmony of tectonic articulation, traditionally valued foremost in the design, is here muted, with contrasts between walls and openings toned down by smaller divisions at the edges of openings. Furniture built into the walls and seamlessly merging with the paneling is gaining in popularity (Cz. Krassowski 1978). One other approach encouraging formalist attitudes in contemporary architecture can be summed up in the formula "this has never been done before."

## 8

The relations between architecture and those experiencing it are partially explored by the psychology and sociology of architecture. The pragmatics of architecture analyzes such processes as the reception and reading of architecture, as well as its clarity and layers of meanings. In engaging with architecture it is important to consider spatiality not purely as a physical property, but also in recognition of its psychical, social and cultural aspects.[7]

This approach is mirrored in conceptions of space as a personal, intimate, social, sacral or secular environment (Chermayeff, Alexander 1963, Hall 1966, Sommer 1969).

[7]To support his view that architecture is a mass medium, Umberto Eco suggests that one experiences it distractedly. This, however, seems to be too much of an oversimplification. Architecture reaches those engaging with it on various levels of consciousness depending on the personal attitude, nature of the building and the context. One can certainly identify architecture that can force itself upon those experiencing it. However, grasping the message associated with a particular building is contingent on one's competence to engage with it (Eco 1972).

Having established his relationship with the forms of space, the user develops his personal attitudes towards the environment, such as sense of ownership or alienation (Chombart de Lauwe 1961).

Attitudes towards the space depend strongly on the personality and in extreme cases can lead to excessive fetishisation or technocratic manipulation (Mournier 1961: 78-81).

The reception and shaping of architectural signs also depend on stereotyped perception and the established way of seeing. It seems that in this regard architecture in the $20^{th}$ century is exploiting ideas already explored in the $19^{th}$ century:

"(. . . ) as early as in the 1880s our pedagogues, taking a cue from their German colleagues, feeling responsible for instilling in their students schemata of perception, encouraged them to perceive geometrically: to see an enfilade as a straight-line succession of rectangular objects, heads as spherical objects, necks as cylindrical objects."

The same pedagogues insisted on seeing landscapes, trees, portraits, etc., as combinations of triangles (W. Krassowski 1971). Thus arises a question whether the ability for the gradual discovering of diversity and the attributing to it the highest aesthetical value, a claim advanced by Edmund Burke, was not due to the particular significance attributed to land features, and whether it was not so that conceiving natural landscape in categories of beauty further contributed to sharpening of perceptions.[8]

Knowing how the sign and its user interact allows for the shaping of architectural form accordingly. It may be intended to flow through intellectual or emotional channels, as in the case of the municipal court on pre-war Leszno street in Warsaw, where its monumental proportions where used to paralyze the intellect and emotionally overpower the passer-by (Cz. Krassowski 1978).

9

Drawing on the findings of Roman Jakobson one may differentiate the following linguistic functions:

A. referential function, B. symbolic function, C. imperative function, D. phatic function, E. aesthetic function, sometimes identified with artistic

[8] "But as perfectly beautiful bodies are not composed of angular parts, so their parts never continue long in the same right line. They vary their direction every moment, and they change under the eye by a deviation continually carrying on, but for whose beginning or end you will find it difficult to ascertain a point" (Burke 1887: 194).

function, F. emotive function and G. metalinguistic function, also interpreted as metavisual function in visual messages (Kalinowski 1976).
A. REFERENTIAL FUNCTION describes a relation between the message and the particular object. In the work of architecture, the message is communicated through the layout, structural components, if they are not obscured on purpose, as well as its function and utility. Entrance, for example, is denoted by an opening at the level of human movement, while shelter is indicated by space-restricting elements.

Referential functions have been already discussed in greater detail beforehand, but it would perhaps be of use to note at this point an observation made by Mukařovský who suggested that the message in the work of architecture is closely related with its practical functionality. Quoting from Valéry's *Eupalinos*, Mukařovský writes: "'Here,' says the building, 'merchants gather. Here judges judge. Here prisoners lament. Here lovers revel"' (Mukařovský 1970: 78). Other elements of the inherent message in the work of architecture become visible when the building is signifying other functions than those actually fulfilled. This happens when a tenement house takes the form of a palace or a factory of a castle: the actual purpose of a building is disguised, while the primary message is associated with that carried out usually by a palace or a castle (Mukařovský 1970).

Such diversionary tactics in architecture are quite popular. A chapel adjacent to a church in the Bernardines' monastery complex in Radom features on its horizontal roof a horizontally placed outline of a dome to suggest that the structure is indeed coped with a spherical form, while a parish church in Chełmno sports a brick wall covered with a mural depicting bricks double the actual size.

B. Architectural message fulfills SYMBOLIC FUNCTION when it refers to functions which are not directly related to its practical purpose and represent ideas and ideologies.

According to Mieczysław Gębarowicz, symbolism in architecture serves as a) a surrogate of theory and history, b) an interpretive guideline, c) a means of technical communication and d) formal basis of the design (Gębarowicz 1968).

Symbolism as a surrogate of the theory and history of architecture explores the origins of architecture, architecture as knowledge, topographical symbolism, the significance of geographical-astronomical moments, materials and techniques, as well as ideologies in monumental structures.

As an interpretive guideline, symbolism invites mathematical, philological or abstract-allegoric associations. Symbolism as a means of technical

communication relates to measurement systems and methods applied to record and document architectural structures.

As a formal basis of the design, symbols may appear as:

the substitutive symbol — in structures reenacting the design of other structures carrying deeper meaning(e.g. churches of the Holy Sepulchre);

the ostensibly comparative symbol — where it serves as a means to evoke associations, illusion or suggestions referring to the unknown or imaginary buildings (e.g. Herod's Palace or Pilate's Praetorium in Calvaries);

the numerical symbol — when one introduces a number carrying symbolic meaning (towers, pillars, columns corresponding with the number of evangelists or apostles);

the object symbol — when one introduces a figure or an object of symbolic meaning.

Contrary to referential functions, symbolic functions present in the language of architecture are addressed to a smaller circle of people. Naturally, the group of addressees in both of those functions can be limited to an individual person or institutional community, or the other way round, extended to cover various social circles, but in the case of symbolic functions their reach is defined with greater clarity, if not decidedly limited.

C. The message sent by the architectural structure has the IMPERATIVE FUNCTION if it enforces a particular activity. This is the domain of superfunctional architecture, such as industrial buildings, train stations or other transportation infrastructure such as rail tunnels or underground passages that necessitate unimpeded movement leaving no time for as small a thing as looking back, or a highway where one has no choice but to cruise at the speed of the surrounding traffic (Cortázar 1973).

In this, the work of architecture boils down to its technical functionality and works as a tool, which entails reductionism in meanings carried by its external features.

Imperative functions can be introduced either by means of coercion or persuasion and predominantly features in functional architecture (Sage 1968: 340).

D. The message fulfills its PHATIC FUNCTION when it appears to be communicating something while merely serving to secure and maintain contact between the interacting parties. This function is partially fulfilled by wayside shrines or other structures of human making, bearing an individual mark and a distinct trace of the creator's personality. The architectural sign can evoke the past or future presence of other people. Architectural forms preserve customary activities of their users or caretakers.

Some details of the architectural form serve the exclusive purpose of demonstrating affiliation with architectural style symbolizing an identity of the particular community. For example, the uppermost parts of the building at Chmielna 30 street in Warsaw are highly reminiscent of the Zakopane style widely identified at that time with a national style. Analogous meaning is sometimes attributed to forms commonly associated with modernity.

Phatic function is fulfilled through recurring forms and gestures. In human interactions this happens when we make a gesture in conversation or follow established patterns of behaviour when passing others close by orata distance. Repeating those messages supports a reassuring and familiar environment for those engaged in communication (Kalinowski 1976).

E. AESTHETIC FUNCTION comes to the fore when the architecture arrests attention for its formal features. Composing complex spatial forms with the purpose of unifying them into perceptible and understandable experience creates a relatively autonomous system that speaks of and for itself. Appreciation for particular aesthetics is heavily contingent on the prevailing tastes: some generations held Gothic, Baroque or Romanesque architecture in disregard. Today, high aesthetic value is associated with quality finishing, fine technical condition and neat form, or, in other words, minimalistic aesthetics of Bauhaus and the legacy of Le Corbusier.[9]

It seems that the broader notion would be that of artistic function, that is, functioning of the work of architecture as a work of art.

F. With EMOTIVE FUNCTION, the message evokes emotional response. Architectural space can be shaped to create an impression of homeliness as much as coldness or detachment, thus form may seem to be heavy or light, quieting or disquieting. Monolithic design is heavy, meshy is light, zigzagging or broken lines are disquieting, wavy lines have a quieting effect. One feels different in a small and cozy room than in a large empty space, when we face a small house the feeling is different than looking at monumental architecture. It is not the sheer size of the form but also its shape that works to evoke emotional response. Lavish ornamentation and numerous details break down and parcellarge spaces, while undivided or undecorated surfaces can bring about the feeling of loss and alienation (Popiel 1959).

[9]This is how a journalist describes the awareness within society: "The new initiative 'Kielce Region Clean and Tidy' has changed the face of towns, municipalities and rural areas. *Squalor is washed away while residential and commercial architecture gradually replaces thatched roofs with eternit sheets*" (*Słowo Ludu* 9 March 1976: 6, my emphasis). Assuming that "le fonctionnel, c'est le beau plus l'utile. L'utile lui-même, c'est à la fois ce qui est moral et ce qui est vrai" (Baudrillard 1972: 245) what lacks utility, thatched roof, a ruin, etc., lacks also in aesthetic value.

Associations and feelings of astonishment, curiosity, fear, pleasure or safety often merge with one's own rhythm of psychic experiences. More than anything else, emotive function is differentiated with regard to cultural background and individual experience. One can, therefore, observe that some spaces are attractive while others are repulsive (Hall 1966), compare for example the main square in Cracow with Plac Defilad in Warsaw, or stylish cafes with waiting areas in train stations. Emotive functions are correlated with the perceived properties of the space, that is, their acceptance not because of their function but one's habits and values, espoused traditions and prevailing fashions (Chombart de Lauwe 1961).

Emotive influence was primarily used in architectural forms of Mannerism and Baroque which sequenced contrasting spaces to surprise and astonish (as in castles built in Baranów and Ujazd).

G. METALINGUISTIC FUNCTION of the architectural message is fulfilled when, by means of shaping mass and air, the particular arrangement of the elements expresses the essence of spatial relations, such as height, width, length, depth, largeness and smallness, distance and closeness, fullness and emptiness, light and darkness, silence and sound. Such building becomes an architectural dictionary of sorts thanks to an unusually large number of elements as compared to all available or possible elements.

All functions discussed above can co-exist in a single architectural message. In most buildings functions overlap and interrelate, even if one tends to dominate the message.

There are reductionist tendencies in architectural design, primarily focusing on imperative function, but one is beginning to introduce the aesthetic function of buildings, however limited in scope it may still be. With the processes of industrialization and typification, however, phatic and emotive functions fade away and cannot be reestablished. Also, other means of communication reduce the significance of the architectural message in its referential and symbolic functions.

The development of metalinguistic function encourages changes in referential functions and reinvents architecture while its other functions are being taken over by microspatial messages (print, film, telephone, television, neon, road signs, painting, sculpture, etc.).

Linguistic functions are also presented through other schemata.[10]

[10]If we were to define language as a system of signs designed for the purposes of thinking, expression and communication, one may single out reflective, expressive and communicative functions of language. Reflective function overlaps partially with symbolic function ("symbol provokes thought"), expressive function overlaps with

## 10

Mieczysław Porębski observed that

"in modernity, image and architecture part their ways. At that time mysteries of the universe are being increasingly explored by easel painting, followed by print, freed from the confines of space and time, first in the form of etching and then that of a book, finally culminating in the cinematic experience merging image and literature: the screening room becomes a contemporary cave for collective initiations and metonymic participations, while a more private TV set presides over our residential interiors" (Porębski 1972: 167).

Similar remarks were made earlier by Victor Hugo in *The Hunchback of Notre-Dame* (see also Mallion 1962).

We may therefore make the following claim: with the development of means of human communication, functions present in the language of architecture are reduced and fade away as they are taken over by verbal and visual languages, which in turn causes disintegration of architectural form along with the declining awareness of its meaning (this is particularly clear if we consider historic monuments).

The language of architecture is also becoming increasingly similar to contemporary literary conventions. It is perhaps not purely coincidental that the same period provoked the emergence of both Dadaism and architectural movement that advocated reducing architecture to monotonous repetition of rectangles and triangles. Much like "dada" in literature sought to emulate the verbal behaviour of children, architecture boils down to block-building.

Despite reductionist tendencies in the language of architecture, no other sign save for the architectural sign has the power to unite so broad a range of references, from the most proximate to the most distant ones.

## 11

Unique languages of architecture are developed along differences between various cultures, resulting in a broad range of formal repertoires, meanings and applications.

In this sense we may speak of unique languages of the Gothic style, Renaissance, Baroque, Classicism or the Avant-garde. Having recognized those various languages one must face the problem of understanding and

emotive function, while communicative function with referential and phatic functions.

translation.[11] The language may be intelligible but strike as foreign because of its forms, much like a Gothic arch and its dimmed interiors seemed downright barbaric to the people of Renaissance. The reach of language can be limited to one nation, continent, social stratum, or even a single architect employing highly idiosyncratic forms (with Antonio Gaudi featuring prominently in this category).

Seeking inspiration for a national style during the first half of the $19^{th}$ century, the architects of the Golden Chapel in Poznań, Greater Poland, eventually chose to model their designs after Byzantine churches built in Ravenna.

Around 1875, Russia declared the Moscow-Byzantine style as a model for imperial architecture. For this reason, Saint Florian's Cathedral in Warsaw built in a "Vistula-Baltic" style came to be regarded as the epitome of Polish sacral architecture across Congress Poland and the entire Russian Empire. Things were quite different in Galicia which culturally gravitated towards Vienna and its Saint Stephan's Cathedral. In effect, in Cracow it was the arcades of Cloth Hall or the Słowacki theatre that one associated with the "native" architecture (Cz. Krassowski 1978). In this particular case the uniqueness of the architectural language was constituted not by the formal repertoire but rather the particular feeling associated with it.

The attempts at creating a universal language of architecture have so far failed, this is so because what is ultimately decisive for its uniqueness is the attitude it inspires rather than uniformity of its formal repertoire.[12]

This makes the categorization of architectural expressions all the more difficult. It may be the case, and indeed there seems to be much evidence to support this claim, that a single architectural structure can be analyzed as

[11]Miłobędzki writes that "[Abbé Jean-Louis de Cordemoy's] ideal was Gothic cathedral wholly translated into Greek" (Miłobędzki 1969: 426).

[12]Until the $19^{th}$ century the Gothic and Renaissance styles at one time or another featured prominently on the European continent, if not to the same degree. Baroque managed to spread further to South America while Classicism was also successful in North America and Russia. In the $20^{th}$ century, the "cardboard box" design sprawled across all continents. Paradoxically, as styles increasingly spread through the continents one observes their formal repertoire and its possible interpretations simply reproduced on a larger scale. Jean Baudrillard approached this problem in the following way: "La formule du Bauhaus, c'est en résumé: il y a pour toute forme et tout objet un signifié objectif déterminable-sa fonction. Ce qu'en linguistique on appele le niveau de dénotation-tout le reste [...] c'est l'enfer de la connotaton, le résiduel, le superflu, l'excroissant, l'exentrique, le décoratif, l'inutile, le kitsch. Le dénoté (objectif) est beau, le connoté (parasite) est laid. Mieux encore: le dénoté (objectif) est vrai, le connoté est faux (ideologique)" (Baudrillard 1972: 244-245).

belonging to more than one language.[13]

12

We may thus speak of not one but many languages of architecture, which allows for a different approach to the problems of history and theory of architecture.

Observations and remarks presented in this paper constitute perhaps a sufficient argument for treating the language of architecture as an opportunity for combining various methodologies (Miłobędzki 1973). In syntactic studies one can apply metrological and morphological methodologies, in semantics — iconology, in pragmatics — psychology and sociology of architecture. This approach by no means exhausts what the discipline can achieve but nevertheless permits a more universal view on various perspectives without limiting their scope.[14]

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[13]This concerns not only structures often repeatedly remodelled over time, but also structurally uniform buildings erected at the crossroads of ages and cultures.

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**Józef Japola**

# METAPHOR: A QUEST FOR A NEW ASPECT

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In an attempt to find the manifestation of human activity most associated with metaphor, and its most appropriate context, one must undoubtedly think of language. Understandably, a metaphor is thus encountered in a number of areas where language is used. This obvious and natural statement of fact (surely, the scope of "metaphor" is more than that, though) was neither clear nor certain when we see it from a historical perspective. A far narrower range of conditions was more easily accepted, which held that in analyzing the essence and functions of imagery, metaphor or symbol, we above all engage in reading poetry.

However, this in turn implies the aesthetics, which is unthinkable without philosophy. Literary scholars themselves pointed to some interdependencies in this logically self-explanatory sequence. Emphasizing the philosophical "background" of metaphor, Edmund Wilson wrote that: "a revolution in the imagery of poetry is in reality a revolution in metaphysics" (Wilson 1931: 5—6). Another literary critic, Rosemond Tuve, made such a generalization about her research "It seems to me that we must admit that the radical difference in philosophical outlook stands behind and is even responsible for a radical difference between the imagery of these earlier poets and much poetic imagery in our day" (Tuve 1947: 245). As we can see, literary scholars**,** aware of the importance of metaphor, which is placed on a par with thought and speech, have also paid attention to its other than literary and artistic values, and handed it over, as it were, to philosophy. Meanwhile**,** what representatives of this discipline did was to show resentment or, at best, a lack of interest in metaphor.

No wonder that in a situation where "to draw attention to a philosopher's metaphors is to belittle him — like praising a logician for his beautiful handwriting," Max Black, author of the famous paper on metaphor, had to write: "but since philosophers (for all their notorious interest in language) have so neglected the subject, I must get what help I can from the literary critics. They, at least, do not accept the commandment "Thou shalt not commit metaphor," or assume that metaphor is incompatible with serious thought"[1] (Black 1962: 25). Let us ponder why the subject was — as Charlton put it — "hitherto lit only by the tallow candles of groping students of literature" (1975: 273).

It is hard to prejudge what caused the change of attitude on the part of philosophers, who finally have engaged in the study of metaphor. This did not happen overnight, though. After the Aristotelian approach, which was valid and unchallenged through the ages, the first step was taken by Vico and the romantics, even if their ideas caused no concrete, directly observable effects. These results came much later. It is possible to risk the hypothesis that a change in an attitude to metaphor was made possible by the changes in philosophy itself and the changes in the sphere of philosophers' interests. The subsequent stages of this evolution were accurately, though lightly, summarized by Gordon Baker in an otherwise serious essay:

> Once upon a time philosophers were intellectual gadflies who tormented other intellectuals with ultimate questions as they sought to reveal the deepest and most general truths about the world. 'What is truth? What is the essence of beauty? What is the nature of reality?', they asked; and the answers, they hoped, would fit together to constitute the Queen of Sciences. Though potentially dangerous or subversive, philosophers were not yet truly venomous. This was the next stage of their evolution: they grew stings and became hornets. 'How do you know?', they asked of persons who claimed that God existed, that there were minds peopling other bodies, that the world contained physical objects, or that science could predict the future. With this relentlessly repeated question they aimed to set men free from obscurantism, dogma, arguments from authority, and *argumenta ad verecundiam*. Even if no fruitful answers emerged, they would succeed in diffusing the spirit of protestantism into all intellectual inquiries. Philosophy should reign as King of the Jungle, having the ecological function of curbing excessive growth in the other sciences. Suddenly and rather inexplicably degeneration set in. Philosophers lost their stings and

[1] It is worth noting that even out of about 60 papers on metaphor written in Polish approximately 10% of them are those written by philosophers or people associated with philosophy. Such a ratio speaks for itself in the context of this article and testifies to yet another case of our backwardness.

became gnats; they buzzed about asking 'What does "..." mean?' or "What do you mean by "..."?' Ceaseless repetition of this question merely spreads irritation and the widespread complaint that they had turned their backs on the world and its real problems. They themselves fortified this impression by describing their activities as second-order inquiries which yielded no truths, theories, or explanations; and some even trumpeted that most of the important ultimate questions were meaningless. The gain from the linguistic turn, it was urged, would be clarity. (Baker 1974: 156)

Therefore, in the final stage of the history of philosophy its linguistic "climate" came to foster the research on metaphor. This, however, has not changed its still negative attitude towards metaphor.

Philosophers' reluctance to metaphor, most conspicuous in neo-positivists' interest in language, might have been caused by the rejection of metaphysics since the two are frequently linked, not only in literary scholarship. Trying to determine what metaphorical utterances are, Edward Ballard refers to a tradition that is to certain extent established (e.g. in W. M. Urban's works) and assumes that metaphysical utterances are: 1. supra-empirical, 2. non-literal, i.e. metaphorical, 3. referential to the whole only (Ballard 1948). The non-literal quality is the most important for us here. A conviction about the existence of a clear link between metaphysics and metaphor could undoubtedly cause such a strong dislike of the latter. Historically, yet another fact is significant: beginning with the Lockean concept it was assumed that the claims of natural sciences are exact replicas of the real world,[2] while metaphysical claims are always metaphorical, but not the other way round. Thus, the prestige of philosophy, already weakened, was in further jeopardy from a new threat: of "being unscientific," which could be warded off for instance by rejecting its strong imprints, for what was thought to be a metaphor.

Philosophical research on metaphor, initially conducted with caution and not without reservations, meant to provide its better understanding, resulted in the acknowledgement of the benefits of metaphor's usage. In addition to the interest in metaphor as a component of language, metaphor began to be studied as a means of expression which afforded unmatched

[2]A peculiar pendant of this thesis, occurring to this day, outside the so-called world of science (but in it, too) is a distorted and vulgarized, crass and mythical belief that the label "scientific" determines the truth of facts or judgments, particularly in natural sciences. It is a nuisance that in these cases science is understood intuitively and vaguely; as it is equated only with one of its properties, i.e. an empirical or rational one.

possibilities. This is how Beardsley's "indispensability thesis" was explicitly formulated, gained ground and came to win followers, which stated that some views and philosophical assertions cannot be rendered by linguistic means other than a metaphor.

The process, once begun, advances with new aspects of the problem constantly appearing. Philosophers study not only the philosophical background of metaphor, received as legacy from literary scholarship, but they investigate the role of metaphor in philosophical discourse. Also, they do not neglect any opportunity to make metaphor itself a subject of philosophical reflection.

The three philosophical aspects as well as the poetic role do not represent the totality of the issues connected with metaphor; the "environment" of metaphor is not limited to poetry and philosophy. An increased awareness of metaphor, that is, its importance and universality that lies also beyond language, is coupled with the acknowledgement of its tremendous role in a variety of scholarly disciplines, in conceptual thinking and, simply, in life.

This new situation in the research of metaphor was most succinctly expressed by Dean Rohovit, a psychiatrist — a practitioner of a science which, along with psychology, has the highest expectations of metaphor. He follows E. Freeman Sharpe saying: "The motivation behind the study of metaphor has progressed beyond simply an interest in literary style. The philosopher, rhetorician, linguist, and psychiatrist each look to the other for their respective contributions." (Rohovit 1960: 293)

A contention of the famous scholar, Ernest Nagel, provides a testimony to great transformations in opinions on the role and meaning of metaphor, as well as to its scholarly elevation of a kind:

> The widespread use of metaphors, whether they are dead or alive, testifies to a pervasive human talent for finding resemblances between new experiences and familiar facts, so that what is novel is in consequence mastered by subsuming it under established distinctions.[3]

Nagel's attitude is clear proof of the legitimacy of the presence of metaphor and its beneficial and relevant functions in one more field: science.

Yet, are the two types of research on metaphor — in rhetoric and philosophy — exhaustive of the accomplishments in the field? Are these philosophers and other scholars who are trying to learn about consequences of metaphor still within the bounds of these two investigative aspects or,

[3]One can find examples of the role of metaphor as an important tool in a scientific process in Ernest Nagel's book. These can be also found in H. Nash (1963).

perhaps, do they delineate a third orientation? Let us find out how thoroughly the practical effects of metaphor usage have been recognized and elaborated on, particularly in situations where metaphors are indispensable or, worse still, where we have forgotten that we are using metaphors and we believe we "touch" reality, or its fragments. This group of scholars is not interested in metaphor seen as: 1. a dominant feature of language, 2. a unique usage of a word, a unique meaning; they study 3. a range of results, consequences of its use as a "technique of depicting" reality. This seems to be the most promising type of research on metaphor and also the future of its studies.

Let us take a closer look at this issue by analyzing some texts from the perspective that will be arbitrarily called a "language — reality relationship." Though, naturally, in practice this will come down to analyzing the relationship between metaphor and reality, or in other words to studying the role metaphor plays in expressing and representing reality. Although an awareness of the existence of this linguistic relationship or function — and indirectly of a metaphor too — is not a recent discovery, some of its aspects still seem not quite well known and appreciated. Let us begin with the renowned Whorf-Sapir hypothesis, which still sounds innovative:

> [...] the 'real world' is to a large extent unconsciously built up on the language habits of the group. No two languages are ever sufficiently similar to be considered as representing the same social reality. [...] We see and hear and otherwise experience very largely as we do because the language habits of our community predispose certain choices of interpretation. (Mandelbaum 1949: 163)

On the other hand the philosopher Wilbur Marshall Urban in his 1939 book devoted to the language — reality relationship expresses a conviction that the issue of establishing the connection between language and reality is important for the theory of metaphor in view of the fact that if language determines reality, and a large part of it is a metaphor, then the latter is of great importance in a verbal shaping of reality. Urban wrote: "the limits of my language are the limits of my world [...] the problem of what we can know is so closely bound up with the question of what we can say" (Urban 1939: 21—22), what was assumed to mean that although the world can exist without people describing it, the world as it is described does not exist without those who describe it. It never happens that we KNOW the world without a discourse. There is no source of information that would be independent from the discourse. What we cannot talk about or what cannot be described does not exist for us. This is not to say that language conforms

to reality or that reality cannot exist without being known. It only implies that OUR cognition of reality requires communication.

Undoubtedly, Pepper's *World Hypotheses* is one of the remarkable and original works on the role of metaphor in describing reality. Pepper's book is an attempt to construct a notion of root metaphor and to record the most important metaphors of the kind. These root metaphors have been shaping our conception of reality and the way it is verbally expressed. In analyzing various philosophical systems Pepper came to a conclusion that their beginning and their progress is always associated with the so-called root metaphor. The book can be divided into two parts: 1. establishing the research procedure, the methodology, and 2. its practical application as a test of the value of the analyzed hypotheses. The path that leads to the former is a rejection of dogmatism,[4] that means all those theories that refer to the obvious, certain, undoubted, meaningless, etc.[5] In positive terms, we need to recognize that "the method of hypotheticality is one and maybe the only way to build metaphysical hypotheses" (Pepper 1935: 15).

Research conducted by means of the method established by Pepper demonstrates that the hypothesis that describes the world which — according to the theory of root metaphor — is supposed to encompass all facts, originates from a scheme based on a small set of facts, which later expends in such a way as to include all the facts. A thing, an idea or a set of facts underlying such a hypothesis is a genuine root metaphor. Establishing or revealing root metaphors takes place through an insight into theories or hypotheses that describe the world. Eclecticism, combining elements of different root metaphors, leads to confusion. Concepts that have lost ties with their root metaphors are pure abstractions. Of the many hypotheses that Pepper analyzes, quite a number does not stand trial and needs to be rejected. Pepper sees the following as relatively fruitful root metaphors:

[4]Dogmatism is harmful in the cognitive process as it avoids analysis, does not attempt to investigate the research material, i.e. does not try to question some things, treating them as e. g. self-evident. Pepper thinks that the self-evidence is not a cognitive criterion but, conversely, a refusal to apply a cognitive criterion.

[5]Without denying some research achievement to the people applying dogmatic methods, Pepper rejects the traditional method of deduction (implies evident axioms), the traditional inductive method of discovering rules by a generalization that derives from "unquestionable" facts, the Cartesian method of doubting as well as its extension known as solipsism, Kant's method of shaping phenomena on the basis of categories and intuitive forms adopted a priori, a mystical method of calling unreal whatever is not determined by emotion, a positivist method of calling insignificant that which goes beyond an arbitrary definition and meaning or that which does not lend itself to being expressed with atomic propositions.

similarity; it generates immanent realism;
form + matter; generates transcendent realism;
push + pull; generates mechanism;
organic whole; generates objective realism;
temporal process; generates contextualism (metaphysical pragmatism). (see Pepper 1935: 15)

Alas, none of these hypotheses can be sustained in its totality. The scholar discusses in more detail four relatively apposite hypotheses describing the world: formism,[6] mechanism, contextualism, and organicism. Similarity is the root metaphor in formism. The hypothesis occurs in two forms: immanent and transcendent formism. In each, there are three categories; in both variants the category of forms and the category of forms appearing in nature are adopted. It is the first of these categories that differentiates them: "characters" is the category for immanent formism, while a norm is for transcendent formism.

A machine is the root metaphor within mechanism. The types of mechanisms considered to be fundamental differentiate this philosophical orientation into its different kinds. The metaphor that stands for it is significant not only in physics, as can be expected, but also in biology or psychology; we see it already in the doctrine of the ancient atomists.

Unlike the two preceding (analytical) ones, contextualism is a hypothesis of a synthetic nature. This is why it is more difficult to detect its root metaphor. Pepper claims that a "historical event" might, perhaps, be one, and not necessarily a past event but "the event alive in its present" (Pepper 1966: 232), in its context. Pepper admits that linguistic examples should include verbs only: laughing at a joke, solving a problem, building a boat, removing an obstacle, creating a poem, talking to a friend. Contextualists believe that everything consists of such events (Pepper 1966: 233).

Difficulties in finding the root metaphor in organicism are similar to those found to be true of contextualism. Here metaphor always appears as a process, and, of course, an organicist is interested in the INTEGRATION of a process and not its CONTINUITY. Among categories of organicism

[6]To avoid the discussion of the names of the philosophical orientations, Pepper made use of the four labels, which are not necessarily known. Formism is REALISM in its many varieties (Plato, Aristotle, the scholastics, neo-scholastics, neo-realists and modern Cambridge realists); mechanism is actually NATURALISM or MATERIALISM (linked to Democritus, Lucretius, Galileo, Descartes, Hobbes, Locke, Berkeley, Hume, Reichenbach); contextualism refers to PRAGMATISM (Peirce, James, Bergson, Dewey, Mead); organicism means ABSOLUTE (OBJECTIVE) IDEALISM (Schelling, Hegel, Green, Bradley, Bosanquet, Royce) (Pepper 1966: 141—142).

are, on the one hand, a record of the stages of an organic process and, on the other, the recording of the significant features of the already attained organic structures. An accomplished structure is an ideal objective of the subsequent stages of the process.

Although some similarity of intentions can be detected, metaphysical and rather 'philosophizing' book, *World Hypotheses*, is clearly different from the book — a collection of essays — entitled *Science as Metaphor* (Olson 1971), which describes the changes that the subsequent trendy analogies, metaphors and scientific models caused in the outlook of Western man. The stages of these changes are: a new philosophy of scientific revolutions associated with the names of Copernicus, Kepler and Galileo, which demolished traditional beliefs about the cosmic order; the $17^{th}$ century mechanical philosophy, where God has ceased to be a father and become the divine engineer; the decline of religion and a deification of fight; a precedent, established by the spread of Darwinism, together with subsequent discoveries, had an impact on energetics and thermodynamics (sciences dealing with the transmission and processing of energy), which became the "natural" sources of inspiration. Thermodynamics, in particular, already present in such domains as chemistry, cosmology, mechanics, geology, electronics, etc., became a temptation[7] strong enough to be used in psychology, sociology or even religion (cf. Hiebert 1966).

A very powerful influence, which still is visible in Western society, is also analyzed in *Science as Metaphor.* This influence is related to the ideas of Sigmund Freud, who once more referred to the animal nature of man. In the USA in particular, there are extensive data indicating that the impact of Freud and psychoanalysis cannot be overestimated. (This will be discussed below.)

Researchers not only take specific concepts from the sciences, but also sometimes they transfer whole scientific methods or techniques to other disciplines. The already mentioned case of Henry Adams, whose work oscillated between science and philosophy, occasioned some more general

[7]Henry Adams, an American historian and humanist, is a particular case of submissiveness to these sciences**.** On the basis of the I and II law of thermodynamics, the theory of evolution, the phase rule and some $19^{th}$ century astronomical and cosmological concepts, he tried to create the science of history in the manner of the sciences. The collected data led him to an assumption, contradictory to common sense, that evolution is not tantamount to progress and growth, but that it indicates a progressing biological and social degeneration of mankind. J. Mindel's article (1965) contains concise bibliographical information on what was written about such an interesting figure as Henry Adams.

observations on metaphor, presented by the historian of ideas Joseph Mindel (1965).

In Mindel's opinion, practice proves that even if we nowadays easily accept the role of metaphor in the formulation of theory, we fail to remember the metaphorical contents of some empirical laws. Yet, the essence of the chosen metaphor not only determines the kind of conducted experiments but also an interpretation of the observations.

The evidence can be found, writes Mindel, in the interesting book by J.B. Conant, discussing the story of phlogiston and other forgotten concepts in natural sciences (Conant 1937). The author also mentions more contemporary problems related to metaphor, which resulted from the fact that scholars underestimated its illusive nature and offered too far-reaching speculations. Behaviorists erred in this way; in their design of educational machines, they almost literally merged the laws of animal learning (the known) and the laws of human learning (the unknown). The methods of animal learning — well researched and developed for animals — failed because they were transferred mechanically and in their entirety to the educational process in schools, rejecting the uncharted components of the human learning processes.

Mindel's observations suggest that metaphor does not have to be "true" to be useful. Its value lies in stimulating the author's thought, indicating new directions. The metaphor should elucidate the intentions and the line of reasoning of the writer. However, because metaphor is something very personal, it does happen that "the window it opens for its inventor may be an opaque wall for his audience" (Mindel 1965: 99).

As we can see, we are faced with a reflection which, in reading some "scholarly" settlements anew, looks at them from a very peculiar perspective, leads to their verification: either confirmation or rejection. Hermann G. Stelzner's paper is close to these principles (Stelzner 1965).

Stelzner's article illustrates the relevance of Rohovit's observation. Although the author's reflection heads towards a much narrower issue than was the case in the two books mentioned — as he seeks to establish what sort of language is used in contemporary research on linguistic communication — more general observations and conclusions are corroborated.

The researcher focuses on three circles of concepts: mechanistic, biological or evolutionary and military. The reason behind this kind of interest on the part of Stelzner is the fact that "The predominant interests and ideas of any period are reflected in its figurative language which in turn affects and influences the subjects to which it is applied. Figurative

descriptions may suggest properties and relationships which in reality do not exist. Thus the consequences of figurative expression, both substantively and methodologically, cannot be minimized" (Stelzner 1965: 52).

Mechanism is one of the first basic metaphors, conspicuous and ever-present in the reflection on various aspects of discourse. The very conception of metaphor of mechanism goes back to the $17^{th}$ century and is inseparable from the figure of Isaac Newton. Stelzner demonstrates that the titles of the following works testify to its influence: *Elements of Rhetoric* or *Elements of Logic* (even today books are written in Poland "*On the Tools and Objects of Cognition*" [I. Dąmbska]); definitions make it even more emphatic: "Regarding language as an apparatus of symbols for the conveyance of thought, we may say that, as in a mechanical apparatus, the more simple and the better arranged its parts, the greater will be the effect produced" (Spencer 1930 quoted by Stelzner 1965: 53).

Whatever man discovered — according to the then unquestioned and irrefutable Newton's conception — was considered to be a copy of Nature, which in itself was considered a perfect machine. It was claimed that the order and organization proper to machine ought to be transposed onto "speech composition", that is, to organize it "into a carefully integrated whole". Among the speech tools, bibliography, note-taking and lexicon expansion are mentioned. Discourse is the "basic tool of all social activity" (Stelzner 1965: 54).

Not only did the image of mechanism have an impact on the analysis of speech and the speaker, but it also modeled the study on figures in official orations. The instrument of analysis used in these investigations was made up of the carefully established and connected elements (usually along the structure: man — message — addressee), which interact to provide a product conforming to the exactness of machine and dependency upon it.

The biological metaphor, for which Darwin indirectly bears responsibility, is another seminal and readily used base metaphor. Thanks to it, a new view of reality was made possible: from abstraction — as W. James put it — a turn was made towards the concrete, from the incomplete towards the adequate; verbal solutions were replaced by facts; activity was placed above a priori given principles. The value of connection (mechanics) was questioned; evolution became the basis of appropriate analogy; biological organism became an appropriate image. Terms such as: living, growth, change, adaptation, function and process began to circulate. Idea, recognized as a "cell", was forced to "fight for its place," selection was associated with the survival of the fittest. Thoughts could be vivid and sound, speech gained its

identity. Talking was to require, as it was claimed, no methods and rules, but an "object", which in itself should be "stimulating," yet it ought to be additionally "revived" while being transmitted. Stelzner doubts whether this could be achieved without rules and methods (machines and tools).

Military figures, such as strategy, attack, defense, storm, position are the last of the group of metaphors discussed in Stelzner's article. The author noticed that "militarization" of metaphors occurs where biological metaphors are poor, e.g. in the description of rhetorical activities and in the oratory art. While the analysis of the line of argumentation suggests that, particularly in more sizeable books, where it is done in a separate chapter, authors recourse to language of description that is "demilitarized."

The conclusions from the observations confirm the unavoidable need for the use of figurative language. Metaphors have power that is unknown to literal expressions as they can constrict and underscore the image presented. While fresh — they act upon emotions and they get too familiar before we realize that we have not in fact revealed their identity but only an analogy. A change of the image causes the change in the method and unless we notice that the picture is metaphorical, reification may occur. Instead of the planned and expected explication, something quite the opposite might take place; it is not always easy to distinguish metaphor from literalism.

One should not that much refrain oneself from using metaphors, but rather should bear in mind the effects of using metaphors, so that they will not impose properties on the object or demonstrate relations that do not exist in the object. It is also significant to recognize the consequences of this fact for the analysis itself and the teaching of metaphors. Stelzner indicates a number of issues that still need to be resolved.

The third orientation in the research on metaphor shows particular richness and appears particularly interesting in psychological and psychiatric studies. We owe psychology its particular contribution in the understanding of imagery. One could after all speak of three stages of the evolution of these studies: 1. naïve mentalism, 2. rejection (under the influence of behaviorism) of the theses advanced in the initial period and 3. a new appreciation of studies on imagery, which has been the case since the 1960s.

It was in the last period that, apart from the growing number of papers, several books[8] were published: chronologically, these include A. Richardson, *Mental Imagery* (NY: Springer 1969), M.J. Horovitz, *Image Formation and Cognition* (NY: Appleton 1970), S.J. Segal (ed.), *The Adaptive Functions*

[8]McKellar's *Imagination and Thinking: a Psychological Analysis* (1957) is the only book of this kind that was published in the 1950s.

*of Imagery* (NY: Academic 1971), P.W. Sheenan (ed.), *The Function and Nature of Imagery* (NY: Academic 1972).

Robert R. Holt sees the cause of the rise of this kind of research on the one hand in the interest taken in cinema and television (McLuhan's theses) and, on the other, in the large-scale abuse of hallucinogenic substances, what could be observed in particular in the 1960s. Those caused interest in conscious phenomena of subjective nature, dreams, daydreams, fantasies, attention, feelings, and the other altered states of consciousness. This orientation of research in its totality is beyond the purview of this article. Therefore, noting only its existence, attention will be focused on the psychological-psychiatric section of this research that concentrates on the issue of metaphor (Holt 1972).

Before the psychological interest in metaphor nearly turned against itself, undermining the existence of imagination, "images" and imagery, psychologists restrained themselves to some less radical observations. They noticed that subjective experience can best be expressed by means of metaphor. Fromm, a neo-analyst, asserts that

> symbolic language is language in which we express inner experience as if it were a sensory experience, as if it were something we were doing or something that was done to us in the world of things. Symbolic language is language in which the world outside is a symbol of the world inside, a symbol for our souls and our minds (Fromm 1957: 12).

— tying two realities that used to be separated before.

So is the case with the concept of isomorphism in Gestalt psychology. Köhler maintains that making use of metaphors leads to the existence of "some degree of similarity between some specific experiences of the inner and the outer world" (Köhler 1929: 244—245).

Consideration was also given to largely unnoticed role of metaphor in expressing and receiving inner states. In Skinner's opinion, metaphor is among the few ways in which society can avoid personal and intimate issues and, as a result, impose verbal labels on private and inner states of stimulation (Skinner 1957). Similarly, Miller is convinced that having just a few public terms for inner states, we can share them by including them in the descriptions of whole situations that could evoke similar experiences (Miller 1951). Gendlin sees in metaphor one of the few ways of generating and expressing utterly new meanings (Gendlin 1962).

The endeavors of Freud, who researched the symbolism of dreams, gained influence also thanks to his disciples and followers. A separate and

multifaceted Freudian orientation in the research of metaphor is worth mentioning. Let's mention just two names. Ella Sharpe, a disciple of Freud's, uncompromising in her views of metaphor, believes that, through language, metaphor connects sensual experiences with thought. Metaphor is — like for Aristotle — a transfer of meaning from one word to another, but this time a transfer from the physical to the psychological. Similarly to etymology, which allows an unearthing of a past civilization, a person's metaphors reveal one's previous experiences. Clinical research ought to reach the genuine basis of the patient's past experiences through his/her metaphors because a metaphor is not only a compromise between *ego*, *superego* and *id* but also a vicarious channel for physical relief (Sharpe 1940).[9]

Pederson-Krag, another Freud scholar, illustrated how Freud used metaphors, a personification in particular, in his elaboration of the concept of linking ego's libido and object libido. She also signaled possible misunderstandings which occur if we, too faithfully, want to follow the implications of particular metaphorical formulas of psychoanalysis (Pederson-Krag 1956).[10]

Anderson, in opposition to Pederson-Krag, maintains that there is a link between the low repute of psychology as a discipline and the fact that it "appear[s] to change and discard [its] metaphors with discouraging speed" (Anderson 1964: 176). Mind, usually featured metaphorically, is a notable and perfect example. To describe it "technological parallels have been favored and behaviour has been variously studied as a sort of physiological, biochemical, or engineering product, to be most adequately described and analyzed by mathematical methods of the physical sciences" (Anderson 1964: 176—177). One of the most recent metaphors in this matter — "brain is a calculating / computing / logical / digital machine" (Anderson 1964: 176) — also has numerous shortcomings if consistently applied. One should, in fact, avoid literal treatment of metaphors in psychology, while appreciating their ambiguity (Anderson 1958).

Robert H. Knapp seeks to make a unique tool out of metaphor. He strives to establish a list of poetic adequacy of metaphorical expressions patterned on the Bogardus seven-grade scale. He made a list of metaphors on the basis of random examples of the metaphoric language from Bartlett's *Familiar Quotations*, and featured six abstract categories concerning important aspects of life. These include: time, conscience, death, success, love and self-image. Knapp demonstrates how the metaphor scale functions as measure of people's attitudes (Knapp 1960).

[9]W. Muncie (1967), a physician, is also a Freud scholar.

[10]C.C. Anderson (1964) opposes some theses of proposed by Pederson-Krag.

Referring to Asch,[11] he reminds us that psychic states or people are described with the same means in different cultures (usually pertaining to physical phenomena). Psychoanalytical literature speaks of "two kinds of thought processes [in metaphorical usage]: primary and secondary. The primary thought processes govern essentially the mechanism of the dream construction and some types of psychologically primitive conscious fantasy such as found in schizophrenia. The secondary thought processes are those typically associated with the reality principle and are directed towards the effective coping with the environment. [...] The secondary... are... dominated by Aristotelian logic while the primary thought processes are ruled by a paleologic (Knapp 1960: 389; cf. Domarus 1946).[12] It is assumed that metaphor, on account of its "capacity to equate two widely divergent objects or situations by virtue of a common attribute," yields in effect a relationship between deep and unconscious attitudes and their open expression in language. A patient, estimating the poetic appropriateness of a metaphor, expresses, according to Knapp's hypothesis, his/her own attitude — the one which is deeply hidden and dependent upon the six a priori categories of metaphoric utterances.

Dean Rohovit, the aforementioned psychiatrist, states that psychiatrists, increasingly more conscious of a need in psychotherapy for precise comprehension of a patient's utterance, focused their attention on the remarkable role of metaphor. Clinical observation informs that the content describing the past and present life problems of the person undergoing therapy tend to be partly expressed by metaphor (Rohovit 1960).[13]

Rohovit's interest in metaphor emerged from listening to the tapes of interviews with patients. Rohovit believes that the patient's decision to use a particular metaphor during the conversation with the therapist is explained in the context of its associations with unique and unconscious processes.

[11] S. E. Asch (1958) proposed the metaphorical scale as a measure of attitude for such a research.

[12] In Aristotle, two objects are equivalent if they are substantively identical**.** In the paleological system they are considered identical when they possess certain "salient attributes" (even though they are profoundly different substantively); a shared attribute may be configurational, utilitarian, and functional likeness, or presence/appearance in precise time or place. According such an analysis, metaphor as a literary and poetic device shows striking similarity to dreams. Its effectiveness and applicability comes above all from the possibility of combining two distant situations or objects on the basis of a shared attribute. The skill of a poet lies in this capacity.

[13] Having reviewed a range of positions taken by various scholars towards metaphor, Rohovit concludes that there is great confusion and puts forward his own proposal, which he calls a psycho-dynamic interpretation of metaphor.

Idiosyncratic examples were selected for the analysis, i.e. metaphors evidently significant for the patient. The metaphors that simply placed the interviewee in a subculture were not taken into account.

During the next appointment the patient was asked about his/her "free association" connected with a given metaphor. On the basis of these associations and the metaphor itself, Rohovit presented his comment. It so happened that the three analyzed metaphors (*gotten on me, he sails into me and takes it out on me, come over me*) have overt sexual connotations and are interpreted in this vein by the therapist and the patients alike.

Jonathan Culler's claim that two types of explorations — which he calls *via philosophica* and *via metaphorica* — are one of the standard ideas concerning the types of reflection on metaphor. The first type of analysis would place metaphor in the "space" between sense and referent or an extra-textual equivalent; it would be a reflection on an object AS something. The second one keeps metaphor on the level of meanings, between two meanings, between what is literal, verbally proper and periphrastic, vicarious. As a consequence of the first position, metaphor is an indispensable, salient feature of language whose "verbal detours gestures obliquely towards" objects. The second way of thinking presents metaphor as a special use of language, noticeable and studied against the background of the language used non-metaphorically (Culler 1974: 219).

My observations may lead the readers to feel that the sheer number of cases presented here suggests the existence of another orientation in the study of metaphor and that the two ways of thinking about metaphor proposed by Culler are not enough. A number of offered examples share something, what can be called, *via pragmatica*.

It seems that this orientation has the greatest research possibilities. How long can one split the structure of metaphor (*v. rhet.*) as a specific linguistic phenomenon? The possibilities seem quite limited. Similarly, an adequate theory of language — if it existed — should resolve the problems belonging to the sphere of *via philosophica*. Only *via pragmatica*, having as the basis the relevant solutions of the former two, could take on a large scale a detailed analysis of gains and losses, dangers and benefits, distortions and truths that we owe to the use of different varieties of metaphor. Unfortunately, it needs to be admitted that it is only a call which is yet to be answered. Obviously, any attempt at implementation somehow brings closer its fulfillment. Possibilities would greatly expand if Professor Shibles's belief about the necessity of creating a science of metaphor as a separate discipline was treated seriously.

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**Henryk Hiż**

# THE LOGICAL BASIS OF SEMIOTICS[1]

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When we want to say something, we often use words. By using words, sentences, phrases we convey information, conjecture, protest, question, command, we tell a fairy tale, we share our impressions, we reprimand, we confess. Linguistics answers the question of how it happens that meaning is contained in words. Often, however, meaning is conveyed without words. We can tell something about ourselves or the situation we are in by wearing certain attire. In some circles the lady of the house shows respect to guests by wearing an elegant dress. The New York Court of Appeal forbade a Catholic priest from wearing his cassock and clerical collar when he was acting as a lawyer in a criminal case. The Court decided that the collar was 'a permanent visible message to the jurors' and thus made fair trial impossible.[2] Barbach's[3] photographs present eminent businessmen in impeccable shirts and ties, with the standard faciale expression emanating success, comfort, self-confidence and the obviousness of deserving trust from others. Today, businessmen look differently than kings on paintings from the 18th century (just as from nearly all other centuries) in the 'king of realism' style. The monarch may sometimes look pompous and self-important, but his face never shows curiosity. This was supposed to mean that any debate with

[1]( This paper was originally a lecture held at the semioticians' meeting in Tampa, Florida in July 1975. In this version, I have omitted one paragraph which seemed questionable.

[2] *The New York Times*, 8 April 1975. There was an appellation to the Supreme Court, which has confirmed the judgement.

[3] A US photography company with workshops in several cities, specialising in portraits of well-off people.

him was impossible. Napoleon's portrait painted by Jacques-Louis Davidis, however, differed in this respect: it shows a strong and energetic man next to his work desk, with an ink stain on his white trousers.[4] Napoleon, a monarch on his own initiative, liked this painting and never allowed the stain to be painted over.

Semiotics deals with meaning conveyed by any means, not only through language. It is therefore more general than semantics.[5] For the properties that define meaning, I will use the term SEMIOTIC PROPERTIES. Semantic properties are those semiotic properties that are properties of speech. But language has not only semantic properties. A sentence can be long, can contain seventy words, of which twenty are one-syllable words. These are not semantic properties, although in some unique cases they too can influence semantic properties, i.e. the meaning of the sentence. Similarly, various objects have meaning: paintings, buildings, musical compositions, customs. But not all properties of these objects have a meaningful role. Paintings have length and height, can weigh several kilograms and can be sold. These properties of paintings are not semiotically important. Paintings can also have aesthetic value, but aesthetic values are not semiotic either. One of the main difficulties in developing semiotics as an area of systematic research is the differentiation between those properties of objects that play a role in meaning and the non-semiotic properties. In particular, semiotics does not need to concern itself with aesthetic values. Linguistics has developed quickly when it ceased to focus on how beautiful or well-styled a text is. In the long run, the fact that linguistics did not analyse sentences as artistically valuable proved beneficial even for stylistics, which now draws upon the achievements and techniques of general linguistics. Progress in science requires narrowing down the subject. The social history of art records what the different classes liked in different epochs, without judging whether they were right or whether they had good or bad taste. Iconography deals with the content of works of art, not their social role or artistic values.[6] Iconography is a part of semiotics just as semantics is another part of it. Semiotics can learn a lot from both semantics and iconography although the specific methods of semantics or iconography are too strictly related to their subjects — language and plastic arts — to be directly used in semiotics,

[4]However, there is no stain on the copy of the painting in Washington.

[5]The idea that semiotics is more general than semantics was borrowed from R. Jakobson.

[6]The basic ideas of iconography can be found e.g. in works by E. Panofsky (1955: 26—54) and M. Schapiro (1973).

which is supposed to analyse meaning, wherever it may appear. The model theory, which is the part of logic examining the relations between formal languages and their possible interpretations, is also a part of semiotics. In this case it is also clear that semiotics cannot emulate the model theory in detail, for the most essential steps in the model theory are based upon the structure of formal languages and it imposes restrictions on what can be adopted as a model. Only some very general considerations of the model theory can be useful in semiotics and will be used later in this article.

In order to accurately grasp the semantic role of a linguistic utterance or the semiotic role of any communicative behaviour, let us first observe that our utterances not only convey content but also say something about us. Our way of speaking reveals where we come from, what social class we belong to, what our occupation is, in what matters we are ready to speak confidently; it reveals whether we are organised or chaotic, arrogant or polite, sophisticated or stupid. Recipients form an opinion about us based on what and how we say, even if we are not speaking about ourselves but rather about bird-watching, Giacometti or the category theory. Recipients draw conclusions not only from what we have said but also from the fact that we have said it. But this is not at all the same. Sentences do not announce that they are being uttered. Nothing in the sentence says anything about the sentence or the person who has said it. The sentence only means what can be concluded from its content. When I say that Epicurus performed euthanasia on himself, the recipients are directly informed that Epicurus performed euthanasia on himself. They can conclude that Epicurus voluntarily took his own life. Indirectly, from the very fact that I have said this sentence and not from the sentence itself, the recipients have learnt something about me. Namely, first of all, that I know that Epicurus performed euthanasia on himself. Further, with various degrees of justification, that I had read a book about Ancient philosophers, that I am interested in Ancient philosophy or Epicurean philosophy, or that the problem of euthanasia fascinates me. The recipients may be surprised by why I have chosen to say that he *performed euthanasia on himself* instead of *committed suicide*. They may also guess that I have read about this event in Diogenes Laertius' work, where it is described in detail. But I have not said any of these. The issue here is the difference between what I have told them and what they have noticed themselves. I have told them something about the circumstances of Epicurus' death. They can rightly conclude from this that Epicurus decided to end his own life. From what my recipients have noticed, they can conclude that I know Diogenes Laertius. From Euclid's axioms follows a set of theorems

about figures, lines, sets of points, but nothing about Greek culture, while the fact that Euclid has written his axioms tells us a lot about the Greek culture of his times. We can state the presence of a refined, abstract intuition and the use of an axiomatic system.

The concept of noticing is not a semantic or even semiotic concept, although we sometimes use the term 'sign' when talking about noticing. We notice that wood becomes soft and we take it as a sign that it is eaten by termites. We notice that our friend is coughing and we conclude that he has bronchitis. But nobody had told us about this softening, about termites, coughing or bronchitis. How we notice and how we generally acquire knowledge does not belong to semiotics. The only acquisition of knowledge that semiotics is interested in is the reception of a message by the very fact that something has been said to us. A piece of wood does not tell us that there are termites inside it. Nature generally does not tell us anything, even though poets use this metaphor a lot. Various systems of communication tell us this and that. I am not trying to define systems of communication here. I only want to differentiate between the fact that something is said and the fact that we notice something. Speaking, even in a generalised sense, is always in some 'language', in a 'system', in English or Italian, in conventions regarding attire, in a tonal system of Western music (before Webern and Schönberg). It is possible that our entire noticing takes place in some 'categories of mind' or even that such categories are linked to the language in which we formulate the reports from our observations. But those are much broader questions than the ones we are discussing here. We can see that ink is black if we have good eyes. But we understand the sentence *Ink is black* if we know English. We have been told that ink is black if we have listened to the sentence *Ink is black* and we know English or if we have listened to the sentence *Inchiostro é nero* and we know Italian. Similarly, a painting tells us something if we not only see colours but also can order colour spots in proper sets, can interpret them and know the style in which the painting has been painted. Otherwise, we either see the painting asemiotically, as a play of colourful spots, or we understand it incorrectly.

An example of an asemiotic interpretation is listening to music and noticing that it has a triple metre with accent on the first note and distinguishing this rhythm from triple metre with accent on the third note but not knowing that the former is meant for dancing a waltz and the latter for dancing a mazur. Many aesthetic impressions can be asemiotic, for instance the experience of rhythm in the distribution of pilasters on the façade of a

Renaissance palace.[7] Someone may give an asemiotic interpretation to an object that has already been semiotically interpreted by him and thus overlay it with yet another structure. For example the façade of Notre Dame in Paris can be seen, and often is, as a composition of two equal squares overlapping each other by half. Art historians are not in agreement whether this structure has a semiotic equivalent, that is whether it expresses something.[8] We can see the proportions of the façade, but this does not tell us anything.

There are also borderline cases between situations in which something tells us something and noticing. A recorded tape tells us that the telephone number we have selected is not working. In this case, the person who said it is not talking to us directly. When the tape was being recorded, the reciting person was addressing anyone who could choose any non-working number. Short interrupted signals tell us that the line is busy, while long signals tell us that it is free. The speaker in all these cases is probably the telephone system that is the exchange partner in our culture. By selecting the number, we are telling the system that we want a certain connection and it either fulfils our demand or tells us that and why it cannot fulfil it. But when there is no sound in the receiver, when it is silent, the system does not tell us anything. We are outside it. We are not connected to it. We notice that we are outside the system and that our phone is not working. This example also shows that a communicative intention in the process of communication can be moved to the far background.

It is a difficult task to explain the meaning of a sentence, painting, building, or sonata. All the previous debates (and there were lots of them, starting with Plato) clearly show that it is naïve to think that a part of a painting represents something and the meaning of the entire painting is just the sum of the meanings of its parts. Moreover, it also seems pointless to assume that a painting contains symbols that replace something, represent something or mean something. This is true both for abstract, objectless art and for realist paintings. Representational denotative semiotics says that a

[7]The distinction between semiotic and asemiotic interpretations was discussed by S. Ossowski (he used the terms 'semantic and 'asemantic') in his important book *The Foundations of Aesthetics* (1978).

[8]Many medieval buildings have simple geometric proportions of squares, equilateral triangles, etc. Some historians believe that it is linked to Pythagorean and Platonian claims that ideal proportions in the universe have simple geometric proportions, and this view dominated among theologians from Chartres in the $12^{th}$ century. Others suppose that the simplicity and frequency of occurrence of these proportions stems from the fact that medieval masters did not have good measurement tools (Tatarkiewicz 1962).

part of David's *The Death of Marat*[9] represents Marat's body, another part a knife, another a towel, and yet another a drop of blood. But we will not go far by using representational semiotics. No part of the painting, no symbol, replaces death or the fact that Marat's body is lying in a bathtub. The bathtub has not even been shown. It is completely covered by towels, sheets and blankets. We can conclude that there is a source of light somewhere over Marat's head but this lamp, candle or window are not shown in the painting. We draw this conclusion from the distribution of shadows and the technique in which the wall has been painted, making the wall darker when closer to the supposed source of light and gradually lighter towards the other side. The whole scene, therefore, seems bigger than what is shown within the frames. The painting reveals a lot of facts. More strictly speaking, many English sentences can be derived from the painting, together making up the meaning of the painting. Therefore, I will not say that the painting presents Marat, towels, a knife, etc., but that it follows from the painting that Marat's body is lying in a bathtub, that the blood is drying up, that there is a lamp, a candle or a window to the left of his head, etc.

Natural language is similar. The meaning of a sentence is, colloquially speaking, the collection of its consequences. A bit less colloquially, the meaning of a sentence is composed of all sentences that can be inferred from the first sentence together with other known or assumed sentences. For we do not conclude from one isolated sentence but rather from a sentence taken together with many other, usually trivial sentences that are passed over. Even more strictly speaking, the meaning of a sentence is the difference between conclusions that can be drawn given this sentence and the conclusions that can be drawn without it.

Let A be a set of assumptions,[10] $Cn(X)$ a set of conclusions of $X$, $X \cup Y$ set $X$ expanded by set $Y$, $X - Y$ set $X$ with the exclusion of elements of $Y$, $\{\alpha\}$ a set containing $\alpha$ as the sole element; $\alpha \in$ X reads: '$\alpha$ is an element of $X$'.[11]

[9] Brussels, Musée Royal des Beaux Arts.

[10] These are not only the assumed sentences about which we do not know whether they are true or not. Among $A$ there may be both asserted sentences and hypothetical sentences.

[11] In order to accept such sentences as (1) and (2), etc., one does not necessarily need to believe in the existence of sets as some beings that are different from buildings , tables, paintings, people or sentences. To say that *Janine is an element of the set of women* is the same as to say that *Janine is a woman*. The expression '$\alpha$ is an element of set A' is a convenient turn of phrase. This expression in this sense should be carefully distinguished from speaking about sets in a different, collective sense. Hence,

(1) Meaning $(\alpha, A) = Cn\ (A \cup \{\alpha\}) - Cn(A)$,

The meaning of a sentence, thus defined, can change if set $A$ of assumed sentences changes. In some research it is assumed that set $A$ of the assumed sentences is fixed (e.g. common knowledge of a language group). In others, it is believed that $A$ changes over the course of the conversation.[12] In a borderline case, $A$ can be empty and then we are dealing with the meaning of sentence $\alpha$ in isolation. What I am referring to here is the informative meaning, not the psychological meaning, for example. Psychological meaning can be useful in checking how surprising some utterance is and what its commercial value is. In linguistic semantics, informative meaning is useful and we could try to use a similar thought in more general semiotics, where $\alpha$ is not a sentence but a behaviour, attire, picture, musical composition, building, etc. In order to examine the extrapolation of logical semantics on general semiotics, let us take a closer look at the concept of consequence, which we used to define meaning.[13] Logicians adopt the following rules for

if Janine is a lawyer, we can say metaphorically that she is an element of the set of lawyers. But we can also say, this time literally, that she is a member of a bar association. Because the bar association is indeed an organisation composed of Janine and other members. Just as a painting is a collection of dots, spots, paintbrush strokes, and a building is a whole composed of its parts, bricks, stones, tiles used for construction. In the first, distributive sense, the term 'set' is redundant. In the second, collective, it is not redundant at all. (1) can be read, even if not as robustly, but philosophically less misleadingly, in the following way:

The meaning of sentence $\alpha$ because of sentence $A$ are those common conclusions from $A$ and $\alpha$ that are not conclusions from $A$.

As a result of this approach, MEANING becomes also just a form of speech. Indeed, some sentences are meanings of a sentence and the adopted assumptions. But as I am not certain of the existence of sets or other beings, including paintings, sentences and Janine, therefore I can just as well use the phraseology of the set theory as the outlined phraseology of concretism, provided that I will not confuse the collective sense of 'set' with the distributive one. This distinction is derived from Leśniewski's ideas. My sceptical approach to the existence of anything is described in *The Aletheic Semantic Theory* (Hiż 1969) and in *On the Assertions of Existence* (Hiż, 1973).

[12]This is the starting thought for new research on presuppositions conducted by Richard Smaba.

[13]I use the terms 'consequence' and 'conclusion' interchangeably. Being a conclusion is a relation between a sentence and a set of sentences. In the language of logic, we use the concepts of sentence and of predicate. A predicate becomes a sentence after variables are replaced with fixed values. In formalised systems, apart from the relation of collusion between a sentence and a set of sentences, we often use a derivative concept of conclusion as a relation between a predicate and a set of predicates. In natural

this concept.[14]

(2) If $\alpha \in Cn(A)$, then $\alpha \in S$ and $A \subset S$.[15]

If $\alpha$ is a conclusion from $A$, then $\alpha$ is a sentence, while $A$ is a set of sentences. Naturally, sentences belong to a language, and the concept of conclusion is relativised to the language.

(3) $A \subset Cn(A)$

Each set of sentences is contained in a set of its consequences. In other words, each sentence among $A$ is a consequence of sentences $A$. In particular, each sentence is a consequence of the set, of which the sentence is the only element.

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language the concept of sentence is complicated by multiple factors. Therefore the difference between a variable and a fixed value is not clear in English (and other natural languages). In the complex sentence *If Janine comes, give her this letter*, the pronoun *her* refers to *Janine*. Therefore, it is not a variable. The conclusion from this text is *Give this letter to Janine if she comes*. Often it is impossible to find in the immediate surroundings of a sentence the expression to which a pronoun or null subject refers. *I asked him to go on vacation. All our colleagues have already had their leaves. But he did not agree* is a text from which we can conclude that *He did not agree to go on vacation*, and we treat the subject as a variable. This example shows another important difficulty encountered when we want to achieve a more precise definition of the concept of an English sentence. *But he did not agree* cannot stand on its own. It needs context, for example the one in which it was used above. Due to the relations between adjacent sentences, the conclusion from a text composed of two sentences is not necessarily the same as from each of them separately or even from an (unordered) set of sentences. And what follows from one of them does not necessarily follow from the two-sentence text. Example: *The guests are having fun. Almost everyone is drunk.* It follows from none of these sentences nor from their set that almost all guests are drunk, that there are non-drunk guests, etc., while from the two-sentence text it does not follow that almost everyone is drunk. A further difficulty in making a more precise definition of a sentence is the fact that natural language knows various types of sentences: declarative, interrogative, imperative, hortative, etc. Formal linguists try to translate all different kinds of sentences into declarative sentences. Zellig Harris (1978) translates the interrogative sentence *Who cooked dinner* to *I am curious whether Michael cooked dinner or George cooked dinner or Christine cooked dinner*. In my article *Difficult questions*, I am trying to treat the question and the answer to it as one declarative sentence (Hiż 1978).

[14]These principles have been formulated for the first time by Tarski (1956: 31, 32, 63, 64).

[15]'S' stands for 'sentence', while $\subset$ is the inclusion mark. Therefore $\subset$ can be read as 'all *A*s are sentences'.

(4) $Cn(Cn(A)) — Cn(A)$

It is the closure principle. Conclusions from a set of sentences are just conclusions from this set of sentences.

(5) If $\alpha \in Cn(A)$, then there exists a finite set $B$ such that $B \subset A$ and $\alpha \in Cn(B)$

It is the compactness principle. If a sentence is a conclusion from a set of sentences, then it is also a conclusion from a finite part of this set. Whatever follows from infinitely many sentences, follows from a finite set of these sentences.

Usually, some other principles of consequence are mentioned as well, namely those that show how the concept is linked with structures characteristic of a given language. For the purpose of the language of logic it is asserted that a contradictory set yields any sentence as a consequence.[16]

(6) If $\alpha \in Cn(A)$, then $Cn(A \cup \{\text{not-}\alpha\}) = S$.

In rules (2)—(5), the concept of consequence was used in a very general meaning. There may be many more precise concepts of consequence. One particular case of consequence is often used, namely provability: $\alpha$ is

[16]The word 'not' is an expression of the language of logic. In rules (1)—(5) we do not use expressions of the examined language and therefore they apply to any language. In Polish, for example, there is an abundance of negatives and the role of 'no' and words replacing 'no' play various roles. In natural languages, not all negatives are repeated. Moreover, most cannot be used even twice. The Polish sentence *Józef nie ma żony* (*Joseph does not have a wife*) cannot be negated in the same way as *Józef ma żonę* (*Joseph does have a wife*), that is by adding the word 'nie' ('not') before the verb and changing the object case. It can be negated using a different method, for example *Nie jest tak, by Józef nie miał żony* (*It is not the case that Joseph does not have a wife*). The changes that are required here are much different than those introduced according to the above rule. It is also not entirely clear what exactly is being negated. *Janina w poniedziałki nie jeździ tramwajem* (*Janine does not ride the tram on Mondays*) suggests (suggestion is slightly weaker than consequence) that Janine uses the tram on some other days of the week, but not on Mondays. *Janina w poniedziałki nie jeździ tramwajem na gapę* (*Janine does not ride the tram on Mondays without a ticket*) suggests both that Janine rides a tram on Mondays and that on some other days she rides it without a ticket. The range and strength of the negation therefore depend on the structure of the negated sentence.

provable from $A$ if there exists a finite sequence of applications of certain consequence rules stemming from sentences $A$ and ending with $\alpha$. Another particular case of the concept of consequence is semantic consequence, which is the preservation of truth; $\alpha$ is the semantic consequence of $A$ if $\alpha$ is true whenever all sentences in $A$ are true, which means that regardless of how we understand the sentences in $A$ and how we interpret them, if they are true in a given interpretation, then sentence $\alpha$ is also true in this interpretation.[17] The different concepts of consequence are by no means equivalent, but they all have the properties described in rules (2)—(5).

When starting with semiotics, we want to have a concept of consequence from a picture and a set of sentences rather than from sentences. We conclude from what we know or assume (even just temporarily, fictionally or for fun) and from the picture. Therefore, it seems suitable to include some other objects apart from sentences into our deliberations. These objects can be called meaningful objects (*Mo*). Sentences are meaningful objects and thus semantics of a natural or formal language is a particular case of semiotics. Just as sentences belong to a certain language, meaningful objects belong to a certain convention. There is no point in talking about a sentence in isolation from any particular language, just as there is no point in talking about the meaning or content of a picture outside a certain convention. Something may have a meaning in Christian iconography, for example an aureole, while it might not have any meaning in Muslim or Buddhist iconography. Or it might have a different meaning. The eagle on the Polish coin is not a symbol of the Gospel of St. John but of the Republic of Poland. What is seen as an image of flowers depends on the style, period and culture.[18] In all statements here, when there is a sentence $S$, it must be treated as '$S$ in language $L$', and when there is a *Mo*, it must be read as '*Mo* in convention $C$'.[19] We can generalise the concept of consequence to the concept of semiotic consequence (*Iocn*) and we can provide the rules governing this concept.

(7) If $\alpha \in Iocn(A)$, then $\alpha \in S$ and if $\beta \in A$, then $\beta \in Mo$ or $\beta \in S$.

[17] This concept was also introduced into the literature on logic by Tarski (Tarski 1956: 409—420).

[18] Many have written about this. N. Goodman reminds us about it in rather strong words (Goodman, 1968: 37—39).

[19] The word 'convention' can be misleading. I do not want to suggest that people really make contracts on meaning. Such conscious acts are exceptional. Languages are also not defined by contractual conventions. Instead of the term 'convention', some people use 'system' or 'a system of symbols'.

If $\alpha$ is the semiotic consequence of set $A$, then $\alpha$ is a sentence of a given language and every element of $A$ is either a sentence of this language or a meaningful object in a given convention. A particular example of conventions in which there are meaningful objects are languages with their sentences. Thus semiotic conclusions are sentences following from meaningful objects (ritual, drawing, etc.) and from the assumed sentences.[20] Semiotic conclusions contain conclusions from the assumed sentences:

(8) If $\alpha \in Iocn(A)$ and $B$ = the set of all sentences in $A$, then $Iocn(B) = Cn(B)$.

The closure principle is similar to (4):

(9) $Iocn(Iocn(A)) = Iocn(A)$

There is also the delicate matter of compactness in application to semiotic consequences. Using (5), if $\alpha$ is the semiotic consequence of a meaningful object and a set of assumptions, then a finite number of these assumptions should be enough to conclude $\alpha$. Moreover, if we are dealing with a set of semantic objects, then a finite subset of these objects is enough to conclude $\alpha$.

(10) If $\alpha \in Iocn(A \cup B)$, $B \subset S$ and for no $\beta$ it is true that $\beta \in A$ and $\beta \in S$, then there exist finite sets $C$ and $D$ such that $C \subset A$, $D \subset B$ and $\alpha \in Iocn(C \cup D)$.

We can question the truthfulness of rule (10), as well as (5). There are higher-order formal languages for which (5) is false. Therefore before we agree to apply (10), we have to examine the convention in which the objects concerned and the grammatical properties of the assumed sentences were created. This is a complex matter, and future semiotic research should bring results concerning the applicability and limitations of (10), which in turn will contribute to the understanding of the differences between formal structures of various conventions. It is worth adding that yet another type of

[20] It is unclear whether conclusions can be drawn from meaningful objects that are not sentences without using some assumed sentences. If it is impossible, then it would be suitable to add a supplementary condition to (7): there is an $a$ in $A$ such that $a \in S$. If apart from the assumptions a picture has certain sentences as its conclusions, it does not mean that someone really utters these sentences.

compactness can be interesting as well. Namely, instead of speaking about the compactness of assumptions, we can consider the compactness of the picture itself. There are meaningful objects in a given convention that contain as a part (in the case of paintings, a physical part) another meaningful object in the same convention. If we divide David's painting into two halves with a vertical line, the left side will remain a painting in the classical convention and with regular assumptions it still leads to the conclusion: *a man was killed with a knife*. A part of the painting can be separated, so that its parts are not adjacent to each other. Triptychs and graphic stories are scattered meaningful objects. Usually a painting can be considered a two-dimensional continuum of points. But can a finite set of points of a painting be considered a painting? And is it true that whatever is semiotically given by a continuum of points, can also be given by a finite selection of these points? A positive answer to this question may be considered a hypothesis of pointilism.

(11) If $\alpha \in Iocn(\{\beta\} \cup A)$ and $\beta$ is a meaningful object in a given convention, then there exists a finite $\gamma$ being a part of $\beta$ that $\gamma$ is a meaningful object in this convention, and $\alpha \in Iocn(\{\gamma\} \cup A)$.

The pointilist hypothesis is a sentence, which can be treated as a sentence of psychology or philosophy of perception, or epistemology. But neither a point (in the geometrical sense) nor a finite set of points is perceived in isolation. I do not claim that a geometrical point is not perceivable at all. Indeed, we perceive the intersection of two lines. But this requires a context of the two lines. The pointilist hypothesis is false if a point is understood as a circle with a zero radius. But if a point is understood as a minimal meaningful object, i.e. a meaningful object of which no intrinsic part is a meaningful object itself, then the pointilist hypothesis may prove true. When we talk about minimal meaningful objects, it is just as if we were talking about words or morphemes. They are repeatable. And it does not matter, whether a word, picture or musical composition is treated as a physical phenomenon with certain time and space coordinates or whether it is treated in a more abstract way. Between some objects, there is a relation of repetition, and this is what determines whether they are meaningful objects. What is not repeatable, has no meaning. But a deeper analysis of repetition may lead to the conclusion that in a natural language only sentences and texts are repeatable in the proper sense, while words, morphemes, and maybe even phonemes are repeatable only in derivative sense. The repetition of a sentence is a particular case of the relation of consequence.

The compactness hypothesis says that a consequence of a picture is a consequence of a finite selection of meaningful objects that are elements of the picture.[21] Before we can decide whether the hypothesis is true, we have to examine the basics of semiotics more deeply. And as regards the analysis of repetitions, it is important that not all characteristics of a picture are its semiotic properties. It is possible that Goodman is right to say that a picture is unrepeatable — with all its characteristics (Goodman 1968). But semiotically pictures are repeatable, and this means that there might exist another picture with the same consequences.[22] Aesthetic properties and technical mastery of a painting or a building are not consequences, and those are only sentences, e.g. in English.[23]

Semiotic meaning of a meaningful object depends on the set of assumed sentences and other jointly considered meaningful objects and consists in extending the field of conclusions from this set by adding the meaningful object.

(12) Semiotic meaning $(\alpha, A) = Iocn(\{\alpha\} \cup A) - Iocn(A)$.

Semiotic meaning of an object also depends on what type of meaningful object $a$ is, i.e. to what convention it is applied, and on the content of set $A$ of assumed sentences and other meaningful objects. It does not say in an inscription or utterance in what language we should read the inscription or listen to the utterance. We understand an utterance as an utterance in a given language, just as we guess in what convention or style a picture was created and we 'read' it in a relevant way. Reading a text with comprehension and understanding a painting takes place by drawing conclusions from the text or painting and from relevant assumptions. In an everyday conversation we assume some common knowledge. Assumptions in art stem from both the

[21] This is not rule (10). This is a theorem of the theory of meaningful objects that speaks about the division of meaningful objects into meaningful objects. The compactness hypothesis, which we are discussing now, concerns a collective set of meaningful objects and treats this set as a meaningful object.

[22] The preciseness of repetition is gradable. If someone copies David's painting without his mastery, we will probably not be able to draw the same conclusions from the face of the corpse about what man he was and how he behaved in the face of death. An exact copy of *The Death of Marat* may include the same semiotic information as the original, without retaining all aesthetic properties. The utterance: 'This painting is beautiful' is not a conclusion from the painting. It is a metasentence.

[23] The repeatability of a sentence is ensured in (3). It is more difficult to formulate a similar thought about meaningful objects. It would probably require introducing the concept of repetition as a new primary concept.

reality and the fantasy world. The image of Bacchus invokes Greek myths, which we use to draw conclusions from the painting. The semiotics according to which people look at a painting is changeable and depends on what they know and what other paintings they have seen and they remember. An important factor in thinking is the ability to change the arrangement of assumptions, to change the tale in which we incorporate a sentence or a painting.[24] In a conversation, we assume that all that has been said so far is true, has a connection with the sentence currently being uttered and is used in concluding from it, and therefore has the meaning of a sentence. Also the surroundings of a picture can influence its meaning. If a sentence is used twice in a conversation, the meaning of the second use is completely different than the first one. If the meaning, in accordance with (1), is only the new information that a sentence brings in, then no element of the meaning of the first use of a sentence is an element of the second use. Maybe the second use

[24] A critical commentator of a work of art draws conclusions from the work and might do this differently than the author. He might draw different conclusions than those that the author was aware of, or draw further consequences. Therefore, there are various rightful interpretations of a work of art. Sometimes a critic has doubts whether what he is describing are not his own opinions, whether he is not presenting himself instead of the author. The same problem arises in areas other than art criticism. A historian of philosophy is also aware of that. Those who say that a critic always presents himself too are right because the probability of other conclusions than those which the author was more or less aware of is huge. Conclusions, however, are drawn not only from the text of a work but also from the adopted sentences. And many of those have not been incorporated in the text by the author, for example trivial and commonly accepted sentences. A historian of ideology often tries to choose not those sentences that were written in a given epoch but those that were not written by the authors of that time because they were obvious and commonly accepted. Drawing conclusions from a work and from commonly accepted sentences beside it is the right procedure for a critic, if only — and this is quite an important reservation — we can rightly say about the commonly accepted sentences, not those provided explicitly in the work, that the author may have considered them common knowledge of his times and circles, that they are not anachronisms. A critic reading an ancient work who uses contemporary knowledge, that is one who adds sentences used today to the text of the work and concludes from this set of sentences, is more daring — maybe even insolent — than a critic who tries to retain enthymemes in the character of the epoch. The first one I would call a modernising critic, the second one — a period critic. Both these ventures probably have the right to exist but should be carefully distinguished if we want to avoid clashes resulting from the fact that we do not know what we are doing. We can debate which of the two types of criticism is more appropriate for a given subject or task. The period critic can depart far from the text and see where the set of sentences together with the sentences assumed by the author but passed over in the text would lead him.

is pointless, unless it differs from the first one, for example by intonation. If the second use is admissible at all, its meaning should probably contain sentences with the meaning of the first use: that it is important, that it is indeed so or that is what was said. Let us imagine that two identical pictures (for example two prints of the same photograph) are hanging next to each other. We can force ourselves to look at each of them separately. However, together they influence each other and they mutually annihilate each other. The viewer will comment on the fact that they look the same. But this technique can be used on purpose in picture composition. Andy Warhol placed twenty pictures of Marylyn Monroe in the same painting and the viewer concludes that her appearance was intended for mass consumption.[25]

A sentence, text or picture often allude to another meaningful object, just as a religious painting can allude to the *Gospels*, and Brahms' Violin Concerto in D major to the csárdás. Using the above terminology, we can define allusion:

(13) $\beta$ alludes to $\gamma$ because of $A$ if and only if for some $\alpha$ it is true that $\alpha \in Iocn(\{\beta\} \cup \{\gamma\} \cup A)$ and neither $\alpha \in Iocn(\{\beta\} \cup A)$ nor $\alpha \in Iocn(\{\gamma\} \cup A)$.

Two objects in different texts allude to each other if there is a conclusion from these two objects taken together that is not a conclusion from each of them separately.[26] For example, *to buy or not to buy* has the allusive consequence: *Don't think about being, think about buying.* Thus we create a text, in which the first sentence is a sentence and the second is the alluding sentence. Therefore $\alpha \in Iocn(\{\beta\} \cup \{\gamma\} \cup A)$ in (13) can be replaced by $\alpha \in Iocn(\{\beta\gamma\} \cup A)$. But such a replacement is not appropriate when $\beta$ and $\gamma$ are in different conventions, in different means of communication, such as a painting and the *Gospels*, and we cannot create a text by concatenation of these two.[27] According to (13), if $\beta$ alludes to $\gamma$, then also $\gamma$ alludes to $\beta$.

[25]This example was given to me by Sol Worth.

[26]It is quite important that $\beta$ and $\gamma$ are in different texts, different works. A reference to a fragment of the same text usually has a different nature than an allusion and influences the grammatical structure. An anaphor is not an allusion. A reference is to something within the same work, while an allusion is to something in another one. It is also not an allusion but a factor of the structure of the painting that the outline of John's robe in the Domenico Veneziano's *St John in the Desert* (The National Gallery, Washington) is almost the same as the outline of the lake.

[27]It should be added that a concatenation of sentences or longer texts, even if they are in the same convention, can cause a change in the structure of one of them, and the reasons mentioned in the previous footnote again speak against such a change.

This symmetrical understanding of allusion may be useful. The Renaissance painting *The Entombment of Christ* alludes to the *Gospels*, and the *Gospels* allude to the Renaissance *The Entombment of Christ*. The meaning of the text of the *Gospels* remains the same but the set of its allusions changes over time. Reading the *Gospels*, we recall Renaissance paintings.

The definition of allusion (13) encounters interesting difficulties. If $\beta$ and $\gamma$ are axioms in an independent axiomatic system, then there may exist conclusions from two axioms that are not conclusions from any of the axioms separately. We say in those cases that the system is indivisible. But then it would follow from (13) that each of the axioms alludes to the other one, which is counterintuitive. In order to eliminate these kinds of situations, it suffices to add a condition that $\beta$ and $\gamma$ are in different texts. A proof or an axiomatic system are typical texts. The fact that a proof is a text can be shown for example by inserting expressions such as *therefore*, *and*, *on the other hand*. Two axioms of an indivisible axiomatic system are fragments of one text. But if we require $\beta$ and $\gamma$ to be in different texts, the definition of allusion will be quite apt. But then we need a definition of a text or rules governing texts. It is extremely difficult to define the concept of text. Moreover, we do not know enough facts about texts. The grammar of texts, i.e. discourse analysis, is not a well-developed area. Let us return to David's painting. On the table next to the bathtub there is an engraving: Á MARAT, DAVID. But we do not conclude from it that right after the murder of Marat and before his body was removed from the bathtub David carved this inscription on the table. This is not a usual signature. We think of it as an important part of the painting and we conclude from it. And still this part of the painting belongs to a different order, as if being in a different language or way of speaking. The realism of the painting does not require everything in it to be painted in the same convention. Here we have two conventions. The engraving is not real in one convention, and the scene of the death of Marat is not real in the other. Let us also observe that the engraving alludes to Roman inscriptions, namely by the form of letters. This, in turn, alludes to the fact that Roman civic virtues were admired during the French Revolution. As a result, the engraving is David's personal homage to

A change of places would make the relation of allusion asymmetrical, which would probably correspond to some intuitions related to this concept. But it is better to have a symmetrical concept first, and separately add which of the elements is older (this does not occur directly in works but instead is given from the outside, it is a historical metasentence) and this way obtain an asymmetrical concept of allusion which corresponds to these intuitions.

Marat (Wallis 1973).

The history of panting has taught us to operate with more than one key within one painting and to see the harmony of conventions: in Caravaggio's *Nativity* there is Mary and the Child, and Joseph, and an ox, and in addition St Francis and St Lawrence. There is also a flying angel. The painting does not assert that St Francis indeed was present during the birth of Christ although it asserts that the ox was present. We know that we should arrive at the conclusion that St Francis was there in a different, maybe spiritual sense. A similar mixture of conventions appears in all kinds of paintings in which next to the Nativity or Crucifixion scene there is the kneeling founder of the church. Again, we know that he was not actually present there. We learn to combine conventions of two orders, although each of them separately may be in the same convention as in Caravaggio's painting. We have to distinguish this kind of combination of two conventions from a joint representation of two systems of the assumed reality. And so in Perugino's *Pietá*, as in many paintings, the body of Christ has almost no weight. The body lies on the laps of the two Marys but their dresses are not ruffled. This way the artist says that the heavenly order of things differs from the earthly one. There are numerous Crucifixion scenes in which Christ's body does not hang on the cross but instead floats in the air. These paintings do not use two conventions. They speak about two worlds within the same convention. The consequence of Perugino's *Pietá* is that there are two types of reality and that the body of Christ is not fully subject to the laws of physics.

The concept of consequence, whether logical or semiotic, required theorems that would link them to important words of a language — in particular with logical connectives. Sentence (6) links the concept of consequence with negation. What can we say then about negation in general semiotics? There can be negative sentences among the consequences of a painting or a building. The following sentence can be a conclusion from Perugino's *Pietá*: *The body of Christ is not a purely physical object.* Analysing the relations between conclusions and various parts of a painting, and the way in which these parts make up a painting seems difficult without some intermediate instrument, without an overlaying structure. But overlaying a painting with linguistic structures is a dangerous venture, just as doing this with a building or even a poem. However, what sometimes follows from a painting are negative sentences or conjunctions and thus there is an indirect link between the painting and logical operators. Similarly, a Renaissance palace tells us that the owner is not afraid of an armed raid. A Roman palace

from those times makes a negative allusion to a castle. There are no bay windows supporting a gallery to be able to throw stones and pour hot tar. Many Florentine palaces, however, have mock bay windows and tiny galleries that make a positive allusion to military architecture. If a meaningful object makes a negative allusion to another meaningful object, we can assume that they are in a relationship of a certain kind of negation. But let us be careful with negation, both in English and in general semiotics. There are paintings that are contradictory under the usual assumptions, i.e. the set of their consequences is the set of all sentences. Sometimes the conclusion from a painting is a question. In *The Calling of St Matthew* by Caravaggio Christ and St. Peter approach a gamblers' table. The gamblers are not surprised to see biblical figures. One of them asks: 'Are you summoning my partner?'. Therefore a negation, a conjunction, or a question are sometimes conclusions from paintings.

There has long been an ongoing debate on what is more difficult: art or criticism. Montaigne wrote about poetry: 'il est plus aisé de la faire que la connaître'. Later, in the $18^{th}$ century, the playwright Philippe Destouches was of an opposite mind: "La critique est aisé, l'art est difficile" (Tatarkiewicz 1962). It seems to me that the theory of art, and in particular the semiotics of art, is still at a nascent stage. I cannot say the same about art. Art is present in all cultures, while the theory of art only in some. Discussing art and customs is like discussing language: people speak in all cultures but only in some of them they write grammars. Therefore I agree with Montaigne.

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**Jerzy Kalinowski**

# ON CERVANTES' ANTINOMY

Originally published as "O antynomii Cervantesa," Studia Semiotyczne 9 (1979), 197–204. Translated by Rafał Jantarski.

In his article *Truth and Proof*, Alfred Tarski mentions two starkly opposing approaches to antinomies (Tarski 1969). Some dismiss them as a kind of intellectual pastime, with its harmful sophistry not to be taken seriously as it merely serves to show off the shrewdness of those who chose to indulge in them. Others see them as unavoidable developments of thought, as important as they are essential to our inquiries. If Tarski opts for a balanced approach he does so not because he thinks antinomies have a positive role to play, but rather they function as symptoms of abnormality.

Starting with premises that seem intuitively obvious, using forms of reasoning that seem intuitively certain, an antinomy leads us to nonsense, a contradiction. Whenever this happens, we have to submit our ways of thinking to a thorough revision, to reject some premises in which we believed or to improve some forms of argument which we used (Tarski 1969: 66).

Now, in volume two, chapter 51 of *Don Quixote* the reader is presented with an antinomy. Taking a cue from Tarski, we shall submit the reasoning described by Cervantes to a thorough examination, hoping, as we do, that what we can explain and establish in due course will help us understand why our present subject of consideration qualifies as an antinomy. To this end, it seems fitting to revisit what Aristotle has to say about truthfulness or falseness of propositions concerning future accidental events.

## 1. ARISTOTLE'S INQUIRIES INTO PROPOSITIONS CONCERNING FUTURE ACCIDENTAL EVENTS

Aristotle's own view on the matter is presented in chapter 9 of *On Interpretation*, where he differentiates between propositions concerning past or current events from propositions concerning future events:

> "In the case of that which is or which has taken place, propositions, whether positive or negative, must be true or false (. . . ) When the subject, however, is individual, and that which is predicated of it relates to the future, the case is altered."[1]

He then goes on to demonstrate his claim, ultimately concluding:

> "It is therefore plain that it is not necessary that of an affirmation and a denial one should be true and the other false [of future accidental events]. For in the case of that which exists potentially, but not actually, the rule which applies to that which exists actually does not hold well. The case is rather as we have indicated."

But what exactly would be the rule Aristotle has in mind? It is a simple one, although following on from a lengthy exposition. Only propositions predicating of necessary events are true or false. If, then, propositions about future events were true or false, they would be so by necessity. In other words, accidental events would not have a place in this world. But they do.

> " (. . . ) we see that both deliberation and action are causative with regard to the future, and that, to speak more generally, in those things which are not continuously actual there is potentiality in either direction. Such things may either be or not be; events may also therefore either take place or not take place. There are many obvious instances of this."

He further adds

> "Now that which is must needs be when it is, and that which is not must needs not be when it is not. Yet it cannot be said without qualification that all existence and non-existence is the outcome of necessity. For there is a difference between saying that which is, when it is, must needs be, and simply saying that

[1] All passages from *Of Interpretation* come from section 1, part 9 — translators note.

> all that is must needs be (. . . ). Let me illustrate. A sea-fight must either take place to-morrow or not, but it is not necessary that it should take place to-morrow, neither is it necessary that it should not take place, yet it is necessary that it either should or should not take place to-morrow."

On a side note, let us remind ourselves that chapter 9 of *On Interpretation*, presenting inquiries into propositions predicating of accidental future events which are neither true nor false, has inspired Łukasiewicz's idea of trivalent logic.

## 2. THE CASE OF A TRAVELLER FROM THE ISLAND GOVERNED BY SANCHO PANZA

So it was that by a decree of the Prince and the Princess, Sancho Panza became governor of the island. One morning he took to his judicial duties after a very modest breakfast. The first to appear before him was a stranger sent by four judges seeking the advice of the governor in a highly confusing case. The judges were sitting in a tribunal built nearby a bridge. The lord exercising jurisdiction over the river and the bridge has proclaimed the following law: "If anyone crosses by this bridge from one side to the other he shall declare on oath where he is going to and with what object; and if he swears truly, he shall be allowed to pass, but if falsely, he shall be put to death for it by hanging on the gallows erected there, without any remission."[2] To this end, his lordship ordered the erection of gallows at one end of the bridge. The law went into effect and those willing to cross the bridge had to state the destination and purpose of their journey. The judges were there to examine their declarations, letting the travellers pass upon verification of their testimonies. It happened, however, that a traveller appeared before the tribunal who, on hearing the inquiry, "swore and said that by the oath he took he was going to die upon that gallows that stood there, and nothing else." Taken aback, the judges reasoned as follows: "'If we let this man pass free he has sworn falsely, and by the law he ought to die; but if we hang him, as he swore he was going to die on that gallows, and therefore swore the truth, by the same law he ought to go free."'

As we can see, the judges derived two individual norms from the law and the statement of the traveller: "should die"and "should be let free"

[2]All passages from *Don Quixote* come from chapter 51 of the novel — translators note.

[from hanging], i.e. "should not die." These norms, it should be noted, are contrary, not contradictory (with the case of the latter being "should die" — "not: should die," that is, "may (has the right to) not die"). This, however, was enough of a puzzle, the more so because contrariety of those norms was founded on the contradiction between "told truth" — "not: told truth" ("lied").

At first, Sancho Panza confessed that he did not entirely follow and asked for the story to be repeated. Upon hearing it one more time he finally declared himself capable of settling it once and for all and without further ado: "'It seems to me that I can set the matter right in a moment, and in this way; the man swears that he is going to die upon the gallows; but if he dies upon it, he has sworn the truth, and by the law enacted deserves to go free and pass over the bridge; but if they don't hang him, then he has sworn falsely, and by the same law deserves to be hanged' (...)'Well then I say,' said Sancho, 'that of this man they should let pass the part that has sworn truly, and hang the part that has lied; and in this way the conditions of the passage will be fully complied with."' To this, however, the envoy replied: "'But then, senor governor (...) the man will have to be divided into two parts; and if he is divided of course he will die; and so none of the requirements of the law will be carried out, and it is absolutely necessary to comply with it."' This indeed made Sancho reconsider his original judgment and ultimately rule as follows: "either I'm a numskull or else there is the same reason for this passenger dying as for his living and passing over the bridge; for if the truth saves him the falsehood equally condemns him; and that being the case it is my opinion you should say to the gentlemen who sent you to me that as the arguments for condemning him and for absolving him are exactly balanced, they should let him pass freely, as it is always more praiseworthy to do good than to do evil; this I would give signed with my name if I knew how to sign."' In passing such judgment, Sancho simply followed teachings of his master Don Quixote imparted on him in anticipation of Sancho's appointment to the office of governor, and which luckily sprang to his mind in this trying moment of exercising his duties. Indeed, Don Quixote instructed his squire that "when there was any doubt about the justice of a case I should lean to mercy."

This is how Cervantes chose to tell the story. Let us now consider the matter in light of logic and semiotics.

## 3. THE SOURCE OF ANTINOMY

Together with the judges of his lordship exercising jurisdiction over the

bridge we are faced with contrariety between individual norms derived from the contradiction of two contrary qualifications of answers given by the traveler. The situation, it seems, is antinomial. But is it really? And if so, where should we look for its causes?

The proponents of thought advanced by Kelsen (Kelsen 1973, in particular 228-253),[3] and there are many, could perhaps note that whereas we are confronted here with contradicting propositions, we are not dealing with contrary norms. As it is, norms, being neither true nor false, do not count as logical propositions and only these are subject to relationships of opposition, such as contrariety or contradiction, since one can establish whether they are true or false (if only to restrict our reasoning to bivalent logic).

We will not be exploring this problem in detail as we have already written extensively on this issue elsewhere (Kalinowski 1977). For this reason, it will suffice to recapitulate briefly what follows, without going deeper into discussion whether norms can be true or false, with the answer, whatever it would be, necessarily implying certain underlying metaphysics (Kalinowski 1967). Ever since *Begriffschrift* proposed by Frege, deductive logic has been functioning as a multi-tier formalized system operating on a calculus (however one conceives it) rightly described by Tamello as "protologic" (Tammelo 1969, part II, 2;Tammelo and Schreiner 1974, (B.1), II), where symbols "+" and "-", and their synonyms "$I$" and "$O$," as well as "$V$" and "$F$," etc., constitute two separate values, where one or the other is attributed to every expression included in a set governed by particular variables of this calculus. The relationships of opposition, such as contrariety or contradiction, can be characterized by those symbols which can be further interpreted as symbols of, respectively, validity or invalidity of norms. If this point of view is legitimate, there is no point in maintaining that norms cannot be contrary or contradictory.

Therefore, I propose to turn our attention to another difficulty, originating with what Aristotle implied of propositions concerning future accidental events. The fate of those who want to cross the bridge is decided by truthfulness or falsity of their answers to two questions. Therefore, we must first inquire whether questions prescribed by the law imposed by the owner of the bridge are of such a kind that proper answers to such questions can be true or false; and second, whether answers given by the traveller are appropriate answers to those questions, and if so whether they are true or false.

For convenience, questions asked by the tribunal judges will be formulated

[3]Kelsen's view is discussed at length in Kalinowski 1977.

in a manner corresponding with interrogative functions introduced by Kazimierz Ajdukiewicz (Ajdukiewicz 1960). In the case under consideration we are confronted with complementation questions, corresponding with function "[$x$?] $fx$", read, as we know, "For which $xfx$?." Assuming, for the sake of simplicity, that questions and answers in our language are formulated in the third person, questions posed by Cervantes' judges take the following form:

(1) For which $x$ $A$ is walking to $x$?; and

(2) For which $x$ $A$ is walking to do $x$?",

where $A$ is a name of the queried person.

Proper answers to (1) and (2) look as follows:

(3) $A$ is walking to $x$; and

(4) $A$ is walking to do $x$.

Let us imagine that, on his pilgrimage to Saint James' tomb in Santiago de Compostela, Juan García was stopped before the bridge and upon questioning gave the following answers:

(5) Juan García is walking to Santiago de Compostela;

which normally means, and we are considering here regular cases,

(6) Juan García is intending to go to Santiago de Compostela; and

(7) Juan García is walking on a pilgrimage to Saint James' tomb in Santiago de Compostela;

which, again, normally means

(8) Juan García is intending to go on a pilgrimage to Saint James' tomb in Santiago de Compostela.

Glossing over issues secondary to our considerations, namely whether it is easy to establish what someone does and intends, and how judges verify this information, we nevertheless state, which is crucial, that appropriate answers to those questions can be successfully verified with regard to their truth-value.

We can now set about considering answers given by the traveler, let us call him Fernando Rosales:

(9) Fernando Rosales is walking to that gallows; and

(10) Fernando Rosales is walking to die on that gallows.

(9) is the same with (5) and is pretty straightforward: it is either true or false. (10), however, is ambiguous. It looks like descriptive sentence (7), but were it so, it would assume:

(11) Fernando Rosales is intending to die on that gallows.

This, however, complicates the matter, as one may die on the gallows by hanging oneself or by being hanged by others. And Rosales' answer does not disclose this disambiguation. The matter is still unclear in the case of

the second sentence. If the answer is descriptive, as at face value it seems to be, then (10) states that Fernando Rosales is intending to be hanged by judges provided they decided to do so, because it is not for him to judge what they should settle to do, for usually every man decides his actions for himself. But maybe (10) is not descriptive, as it at first sight may seem, but is instead a prediction. If so, it would be better phrased in the following way:

(12) Fernando Rosales will be hanged on that gallows.

If this is indeed the case, and as far as Aristotle's insights into propositions predicating of accidental future events recounted above are not false, (10) would be neither true nor false, and would thus not qualify as a proper answer to the second question prescribed by the law of his lordship. This twofold remark leads us to a conclusion that there is a loophole in the law, since it does not prescribe what to do when the person willing to cross the bridge refuses to give a proper answer, or, to the same effect, gives an answer which is neither true nor false. To decide what is the appropriate measure that one should adopt in such a case is not the task of a logician or a semiotician, but of a lawyer.

That the judges became caught up in an antinomy would suggest that, on the one hand, they decided not to treat (10) as a descriptive proposition (treating it in that way, and therefore as either true or false, one can apply the law without succumbing to contradiction). Opting to see it as a prediction instead, the judges nevertheless decided to treat both answers given by Rosales as available to truth-value examination. This, precisely, led to circular reasoning: if it is true of what he said that he will be hanged, he cannot be hanged, but if he will not be hanged, he lied, therefore he needs to be hanged, etc. Perhaps they were not familiar with *On Interpretation* or its arguments held little appeal to them. Whatever the answer, by assuming that (10) is a prediction, they should have declared a loophole that precludes application of the law, and resort to legal techniques customarily used by lawyers in such circumstances, such as requesting the lawmaker to close the loophole (by issuing a subsidiary rule, a binding interpretation, etc.); or assuming that the regulation implicitly provides that in the case of refusal to give an answer, or an answer that is neither true nor false, one is barred from entering the bridge, etc. Choosing any of the those options would save them the trouble of succumbing to contradiction in interpreting the law. This invites a conclusion that the statue, however we want to construe (10), is not in itself prone to contradiction, and one becomes mired in antinomy only when (10), although treated as a prediction, is nevertheless considered

to be a proposition that can be true or false, which goes against the nature of propositions predicating future accidental events. Antinomy arises when (10) is groundlessly considered to have certain truth-value and follows on from the mistaken conviction that hanging Rosales in a moment $t$ would make (12) true, whereas it would only validate

(13) Fernando Rosales was hanged in a moment $t$.

This is all we need to know and take under consideration to shield our reasoning from contradiction.

## CONCLUSION

The judges entrusted with the application of the statue on an island governed by Sancho Panza had no reason to believe that they were faced with antinomial contradiction. Sancho Panza was also wrong to assume, first, that one part of the traveller said the truth, while the other lied, and second, that the traveller in equal measure deserved to be allowed to cross the bridge and to be hanged. If the answer given by the traveller meant the same as (11), regardless of it being a suicidal attempt or desire to be hanged by the henchmen, he either told the truth, and should be free to cross the bridge, or lied, and should therefore be hanged. But if his answer was to be construed along the lines of (12), he was neither true nor false. Thus, there was basis neither for letting him through nor hanging him. Antinomy flourishes here on the grounds of a popular belief already proven wrong 2,300 years ago by Aristotle in his remarks on future accidental events, which, as he duly demonstrated, are neither true nor false. Upon arriving on this conclusion we can now see that the view proposed by Tarski holds well. Antinomies are pathological phenomena, but for this very reason their examination are highly instructive, as it helps us understand what we cannot do, and why, if we want to steer clear of its traps.

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**Katarzyna Rosner**

# CLAUDE BRÉMOND'S NARRATIVE GRAMMAR AND VLADIMIR PROPP'S *MORPHOLOGY OF THE FOLK TALE*

Originally published as "Gramatyka narracyjna Claude'a Bremonda a "Morfologia bajki'' Władimira Proppa," Studia Semiotyczne 10 (1980), 95–110. Translated by Klaudyna Michałowicz.

The intellectual current known as textual generativism emerged in the 1960s in France as a part of the semiotic and structural study of culture. Its main representatives are Algirdas Julien Greimas, Claude Brémond, Tzvetan Todorov, as well as Claude Lévi-Strauss, whose analysis of the Oedipus myth provided a starting point for many later analyses. Inspired by Noam Chomsky's linguistics, representatives of this current attempt to construct textual grammars, that is, grammars that would generate not sentences, but entire texts. Yet, the concept of text used by those scholars is very broad. Thus, for instance, the set of texts which would, according to the premises, be generated by a single textual grammar — called a narrative grammar — is supposed to include all texts relating events whose agents or objects are anthropomorphic entities. Such a set would include not only all kinds of literary narratives and non-literary stories about true events related in any ethnic language, not only myths and fables, but also, for instance, narratives on film and in drawing, e.g. comic books.

Attempts to construct textual grammars (which, incidentally, were often fundamentally dissimilar) were motivated by a single intuition: that texts that differed radically on the level of manifestation — i.e., expressed by means of divergent linguistic or non-linguistic semiotic systems — could nevertheless share a common deep structure. Therefore, an analysis which approaches a text as a conjunction of sentences (or a sequence or structure

of syntactic units of any other semiotic system involved in the expression of the text), stops at the most superficial level of analysis. Textual grammars should therefore be constructed in such a way that the diversity of texts on the level of manifestation is represented only at the final stage of the process of generating the given textual grammar, in its very last segment. A textual analysis concerned with the deeper levels of the structure of the text and aimed at constructing a model of the earlier phases of the process of text generation should therefore dissect a text into units that are not specific to any semiotic system. Such an analysis should discover deeper semantic and syntactic similarities between texts concealed by their diversity on the level of manifestation.

What textual generativists primarily owe to Chomsky is the general idea of generative grammar, which in their interpretation is, however, taken to be an ideal model of the human (species-specific) ability to generate texts of culture or a given sub-set of such texts. They also attempt to give their grammars a similar general structure, i.e. to describe the process of generating a text as a sequence of transformations (operations) which, in the case of texts representing the same grammar, originate from the same segment or series. However, in their attempts to solve concrete problems brought about by the process of constructing those grammars — such as distinguishing the successive levels of a textual grammar corresponding to segments of Chomsky's grammar or formulating specific transformations (grammatical rules) — textual generativists refer mainly to morphological analyses of textual macro-structures found in folkloristic analyses of myths and literature. Among such studies, *Morphology of the Folktale* by Vladimir Propp proved particularly inspiring.

Propp's work was only translated into English and published in the United States as late as 1958; Lévi-Strauss contributed to its popularity in France in subsequent years. Western scholars discovered Propp through this book. As a contemporary author — in the context of linguistics and structural semiotics — Propp turned out to be a highly inspiring scholar. Semioticians and theoreticians of literature fascinated with Chomsky's ideas interpreted Propp's analysis of the folktale as the first-ever textual grammar. It was only thanks to Propp that attempts to apply ideas of generative linguists to the study of products of culture gained impetus. Propp is also responsible for making narrative grammar the only textual grammar to become more than just a postulate or programme for future study. Perceived as the first textual grammar, morphology of the folktale became the subject of various criticisms, interpretations, and revisions. In fact, the two main

currents of contemporary generative textual semiotics can be seen as two revisions of Propp's conception, generalising his ideas and developing them in different directions.

The following short presentation of Propp's main theses deliberately disregards the fact that *Morphology of the Folktale* was written not in the 1950s in the United States, but in 1928 in the Soviet Union, and that, from the historical perspective, it belongs to a completely different current of the study of culture than the one which is the topic of this article. Thus, our focus here is not on the significance of Propp's work for his contemporaries, in the context of the ethnographic research of the period, but only on those of his theses which inspired textual grammarians, those meanings which acquired special importance in their reading of *Morphology of the Folktale*, and those motifs which found a continuation in the attempts to construct narrative grammars. In short, Propp's work is of interest for us insofar as it constitutes the first generative textual grammar.

Propp's aim was to discover a structural similarity between fairy tales. To this effect, Propp, like his generativist followers, took as his starting point the analysis of a certain provisional corpus of texts: folktales specified in Aarne's index (Aarne, 1911) under nos. 300—749; but he interpreted his research results as valid for an infinite set of possible texts. He pointed out that his pattern can be used to generate artificial (i.e. not corroborated by ethnographers) fairy tales with the same general structure. I underline this point in order to demonstrate that to call Propp's analysis a generative textual grammar is not an error of interpretation. Propp writes:

> These conclusions, moreover, may also be verified experimentally. It is possible to artificially create new plots of an *unlimited number* [my emphasis — K.R.]. All of these plots will reflect the basic scheme, while they themselves may not resemble one another. In order to create a tale artificially, one may take any $A$, then one of the possible $B$'s, then a $C$ [$A$, $B$, $C$ are symbols of functions — K.R.] [... If one then distributes functions according to the dramatis personae of the tale's supply or by following one's taste, these schemes come alive and become tales. (Propp 2003:111—2)

Although he does not use the term, Propp thus obviously interprets his structural scheme of magical tales, uncovered in the process of analysing a limited corpus, as a grammar that generates an infinite set of possible texts of the same type.

Propp identified the discovery of a structural commonality with the discovery of elementary units of the tales, that is, units which retain their identity in all tales in the reviewed corpus. He sought those units out by analysing the plots of tales or, more precisely, specific events (actions) within those plots. His point of departure was the assumption that identifying similarities between the plots is easier when comparing the actions of the characters rather than the characters themselves.

However, Propp does not find elementary units of folktale narrative in definite actions in all their concreteness within particular tales, but rather in their "function," that is, a set of features of a given event which are significant from the point of view of his analysis. What matters is the discovery of those features of concrete action which makes it homologous to particular actions found in other tales in the corpus. Propp concluded that the definition of a function should abstract from the material features of specific actions which identify who performs the action and how. In this respect, "functionally" homogeneous actions in various tales are extremely diverse. Hence Propp's concept of function focuses chiefly on the formal and purely relational features of actions. The function of a given action is defined by the purpose of this action in the entire plot. The identity of the functions of specific events in different tales is guaranteed by the identity of their relations with other functions of the tale — or, more precisely, the position they occupy in the syntactic sequence of functions.

In Propp's analysis, "event" and "function" are corresponding categories on two levels of analysis of a tale's plot. To invoke generativist terminology, one might say that an event is a surface-level unit, and a function — a deep-level unit. Thanks to the formal (relational) characteristic of a function, and especially the thesis that the function of a given event is defined by its position in the sequence of events in a given plot, it was possible to characterise the deep structure of a magical tale — i.e., the level common to all fairy tales — as the *general syntagmatic structure*. Propp's analysis resulted not only in the identification of thirty-one functions, but also in a sequential ordering, in which "the sequence of functions is always identical" (Propp 2003: 22). Thus, individual tales always follow the same pattern of syntactic succession of functions; at most, some may be omitted.

Yet Propp does not describe the deep structure solely in syntactic terms. For him, the function is the significance of an event; it is a significance common to all events that occupy the same syntactic position in different tales. This significance may be impossible to recognize if the event is analysed in isolation — the same function may be performed differently at the surface

level (the level of events); two different functions may be performed by a superficially identical event. In such cases, the function is identified by its consequence: the event that follows it. When, for instance, the hero successfully overcomes an obstacle, this event will represent the first function of the donor if it allows the hero to obtain a magical object. It may, however, represent other functions, e.g. a difficult task if it results in the hero marrying the princess. Thus the pattern of thirty-one functions is concurrently the pattern of the common meaning of all fairy tales, which manifests itself on the surface level (or, in Propp's terminology, the structure of the tale) in numerous variations. In Propp's opinion, the discovery of a common meaning in the deep-structure analysis of the tales under consideration proved that all originated from one myth. As a *general structure of meaning*, the revealed pattern of functions reconstructed the structure of signification of that myth.

Particular functions have certain genre variations identified on the basis of the identity of the actor and the manner in which a given function is performed. However, this recognition does not lead to the identification of alternative sequences of functions; according to Propp, "all fairy tales are of one type in regard to their structure" (Propp 2003: 23). In other words, a function retains its identity even as "one character in a tale is easily replaced by another" (Propp 2003: 87).

Propp distinguished seven spheres of action, that is, divided all identified functions into seven subsets. These are the spheres of the villain, the donor, the magical helper, the sought-for person, the dispatcher, the hero, and the false hero. These considerations anticipate Greimas' concept of the actant — the counterpart of the character in the deep structure. In both conceptions, the deep structure of signification is best reflected in such a distribution of functions among various characters in the fairy tale that would ascribe each sphere of action to a single character. However, in both Propp's and Greimas' "grammar," functions are not necessarily distributed at the surface level according to the established pattern: for instance, a character may operate at the intersection of several spheres (Greimas' spheres of activity), or a particular sphere may be represented by several characters — e.g., the tale may contain a number of different donors or villains. Thus, one deep structure may inform many highly dissimilar plots.

Narrative grammars developed over the course of the past decade owe more to Propp than just the general direction of research — i.e., the observation that textual invariants must be sought at the level of the plot, and that inside that level, one should focus on the similarities between corresponding events and not on the acting characters. The differentiation between the

event and its function, so fundamental to textual grammars, is not Propp's only contribution. His analyses were also a source of many specific ideas used in the construction of narrative grammars; these ideas are incidentally quite different from one another.

It has already been mentioned that Greimas' actantial model originated from the seven spheres of action distinguished by Propp. Yet, Greimas' generative textual semantics are even more deeply indebted to Propp. For instance, the fundamental object of his narrative grammar — the pursuit of a description of narrative morphology and syntax by means of the same elementary unit — references Propp's ideas. After all, in *Morphology of the Folktale* the functions are simultaneously elementary syntactic units (as units in a sequence) and elementary semantic units (as elements of particular spheres).

Propp was also the first scholar to notice that functions coalesce into larger syntactic units: pairs and sequences. His observation that a large number of functions constitutes pairs linked by a logical connection, such as interdiction — violation of interdiction, reconnaissance — delivery, found its continuation in Brémond and Todorov's concept of a sequence of functions. On the other hand, Propp's idea of a sequence — "Each new act of villainy, each new lack creates a new move" (Propp 2003: 92) — was incorporated almost unchanged into Greimas' grammar under the name of *performance*. Propp's remarks pertaining to the manner in which sequences coalesce into more complex narratives were also applied in entirety in Brémond's analyses and in other textual grammars.

Generative textual grammars can be classified according to various criteria based on diverse, but equally essential differences between specific conceptions. For instance, classification according to the number of levels of analysis (potential segments of a grammar) considered by particular theories would be a good starting point for the evaluation of both the systematic aspect of a given conception and the scope of its theoretical aspirations. Apart from the surface and deep structures identified already by Propp (events and functions in his terminology), French grammarians distinguish the level of manifestations (*discours*). Though its existence is not put to question, only some scholars include it in their analyses. On the other hand, very deep structures — that is, the level of a universal textual grammar, with narrative grammar, the main object of research today, as its subset — are postulated and analysed only by some scholars, such as Greimas.

Classifications can also be based on the structural model which the scholar puts forward for the grammar he is constructing. Two opposing cur-

rents can be distinguished in that regard. Representatives of both tendencies attempt to generalise Propp's model to have it describe the structural community of folktales as well as generate at least all narrative texts. Greimas, for instance, pursues this aim by generalising and simplifying Propp's model while maintaining its structural principle, which posits the syntactic and semantic model within the deep structure as identical for all texts generated by a given grammar, with differences perceived as a result of different manners of "filling" or articulating the pattern and of possible omissions of some of its segments. Other scholars, especially Brémond, describe deep syntax as a network of possible choices. Thus conceived, deep-level grammar does not reconstruct one syntactic pattern common to all narratives, but a network of possible sequences that bifurcate at various points. In this conception, Propp's model is interpreted not as an outline of a narrative grammar, but as a description of one of the syntactic patterns possible in that grammar. Propp's discovery of the recurrence of this particular generative pattern in the production of fairy tales is explained with historical causes: it was the established (preferred) pattern of a culture at a certain stage of its development. Since the task of the grammar itself, however, is not to explain historical phenomena but rather to model the human capacity for producing texts of a given type, it ought to define (by highlighting the moments of selection) the set of theoretically possible syntactic patterns present in, or absent from, diverse types of real narrative texts. Referring to the analogy between narrative grammars and Chomsky's generative grammar, it can be said that while Greimas is particularly inspired by the core part of this grammar — where all rules are obligatory — Brémond perceives the discovery of the rules of textual grammar which would correspond to optional transformations as theoretically problematic. After all, optional rules shape the moments of the speaker's decision within language competency, underscoring its creative character.

The preference for either of those two structural types of grammar betrays an adherence to a certain conception of culture. The tendency represented by Greimas underlines the fact that the production of texts is determined by certain very general and simple, but universal patterns. It is the culture of archetypes — persisting, deep structures existing beyond the consciousness of the participants of a culture, concealed in the diverse texts seen "on the surface." Here, all narrative texts are at bottom versions of the same text, provided the analysis reaches deep enough. The tendency represented by Brémond, on the other hand, corresponds to the vision of culture as an area of human creativity governed by certain rules which,

however, allow for an element of choice or decision.

When describing the characteristics of various types of narrative grammars, it is also worthwhile to refer to the difference in approaches to the issue that is presently the main subject of debate among the representatives of this line of research. What is at stake is the question whether a grammar should be a generator of purely syntactic structures, or whether it ought to combine semantic and syntactic analysis? This question emerged first in generative linguistics, where generative semantics began to be contrasted with Chomsky's grammar as presented in *Syntactic structures*. An analogous difference of opinion currently divides the creators of narrative grammars. On the one hand, there is the concept of Brémond, which aims to produce a grammar independent from semantics, and on the other hand — the grammar of Greimas and the analyses of Sorin Alexandrescu which it inspired. From their perspective, narrative grammar is a semantic-syntactic grammar. In other words, it contains both syntax and paradigmatics. Scholars within this tendency take inspiration from Lévi-Strauss's analysis of myths and interpret the chronological course of events in the plot (narrative syntax) as a series of transformations based on the oppositions within the semantic universe of a given text.

As did Propp, their precursor, so almost every textual grammarian creates his own terminology. For this reason, our attempt to place Brémond's grammar in the context of other textual grammars, especially that of Greimas, must end with the differentiation and naming of specific levels of analysis which serve as the focal points for the considerations of generativists. Thus, following Greimas, Hjelmslev, and Todorov, we shall call the most external level of analysis the *level of manifestation*. An analysis which focuses on that level does not disregard the "substantive" typology of signs involved in a given text. On this level of analysis, narrative texts of a high level of homology within the deep structure may be very different from one another. For instance, one may be a literary text, possible to analyse as a whole composed of either sentences or linguistic units of a higher order, such as dialogue, monologue or description, whereas another may be a sequence of film shots or a series of drawings — a set belonging to a different semiotic system. Textual grammarians devote little attention to this level; it plays a marginal role in their considerations, equivalent to the role of morphophonemics in Chomsky's grammar. Recently, however, grammarians began to recognize that even a very precise differentiation between various levels — i.e., segments of a textual grammar — does not ensure the possibility of verifying the theory if one overlooks the question of transitions from the

upper to the lower segments of the grammar, including the transition from the surface level to the level of manifestation.

The second level of analysis, referred to in many conceptions as the *surface level*, is also sometimes called the thematic or plot level. Here, a narrative text (*récit*) reveals its specificity concealed at the level of manifestation. After all, only an analysis that abstracts from the substantive characteristics of signs by means of which the given text is realised can demonstrate that every narrative is a sequence of successive events or actions carried out by a closed circle of characters. When those actions are placed in a (chronological) sequence, logical interrelations between them become apparent. A differentiation between the level of manifestation and the surface is to a certain extent analogous to Roman Ingarden's distinction between the double linguistic layer of a literary work and the layer of represented objects, with the caveat that the latter differentiation refers to a completely different, broader set of texts.

The third level of analysis is the *level of deep structures*. Here, the basic terms of analysis are no longer the categories of events or characters, but of functions and actants. If on the surface the narrative is a sequence of very concrete events which involve the characters — concrete heroes of a given *récit* — "function" and "actant" are theoretical terms. Function is a common syntactic role of a certain set of actions which perform it in specific narrative texts. Paradigmatic categories at this level, such as the actant, and later the role, are semantic meanings common to a certain set of actions in different narrative texts, and at the same time a model of the ideal (i.e., the simplest) distribution of actions between particular characters in the plot.

A deep-level analysis abstracts from all particular features of the given events or characters in order to concentrate on the shared syntactic function or semantic meaning of corresponding elements in different plots. Most generativists focus their considerations on the analysis of the deep level and of the relationship between the deep and the surface levels.

The fourth level of generative textual analysis is the *very deep level*. It may also be called the level of universal textual grammar: the deep level of narrative grammar is its surface level. In other words, generativists who operate on this level of analysis assume that narrative texts employ only one of many possible methods of semiotic realisation of a given meaning which can be presented in a more abstract manner than at the deep level of narrative grammar. Thus, for instance, the anthropomorphic categories of functions or actants are specific to the narrative manner of the presentation of those meanings, and not to the meanings themselves. By adding the

very deep level to his narrative grammar, Greimas seeks to describe its paradigmatics and syntax in the categories of logical variables and purely formal relations between those categories. If the very deep level of grammar is not a grammar of all possible coherent texts, at least it may generate a vast set of possible texts; narrative grammar would then be one of its sub-grammars.

Brémond, like Propp, focuses on the second (surface) and third (deep) levels of analysis of narrative texts and on the relations between these levels. As has already been said, this conception was an attempt to revise Propp's analysis to generalise its results onto all types of narration. Those considerations include a critique of the results arrived at in *Morphology of the Folktale*, as well as a positive reaction: an attempt to construct a grammar of syntactic structures using, according to Brémond, the same fundamental notion of function, but freed of certain weaknesses of Propp's conception. Brémond's reservations pertained chiefly to Propp's description of the interrelations between a given function and other functions of a syntactic sequence.

At first glance, the critical analysis of Propp's results seems to be a coherent and convincing argument; yet a confrontation with the positive part of Brémond's analysis reveals the fact that, while eliminating the errors in Propp's reasoning, he also removed everything that contributed to their significance.

Brémond's criticism runs as follows: if Propp's analysis is to be broadened to include all narratives, his theoretical notions, especially the notion of function, must be retained and separated from the results of morphological analysis, which refer to a relatively narrow and very homogeneous collection of tales. In particular, Propp's thesis that "the sequence of functions is always the same," and that all analysed texts represent a single structural type, is true (if it is true at all) at most with regard to a certain specific type of narrative texts, represented by the corpus analysed by Propp, but definitely does not apply to all narratives. This thesis should be interpreted (incidentally, in accordance with Propp's intention) in the following way: an analysis of a folktale discovers a shared structural type in the corpus of folktales, "a layer of autonomous signification, endowed with a structure" (Brémond 1978: 5), independent from the means by which this signification is expressed on the level of manifestation. This signification can be perceived as the archetype of a magical tale. On the other hand, the sequence of thirty-one functions in a fairy tale describes a syntactic series as a cultural stereotype. This sequence is therefore nothing but a generalised model of

a certain type of plot, a model which is more or less faithfully reproduced in all fairy tales. When translating this interpretation into the language of linguistics, Brémond argues that Propp's analysis has led to the discovery of a syntactic structure of a certain type of speech, which is stereotypical in our culture because it corresponds to a frequently expressed archetypal sense. The tales studied by Propp follow the same line of the plot because they convey a shared archetypal significance. While leading to an identical resolution, fairy tales choose between the same functions available at various moments of the process of generation of the syntactic sequence. In other words, Propp's thesis that "the succession of functions is always the same" describes the syntactic features of a certain typical variety of narrative speech, and not the language of narration. To generalise Propp's results, a narrative grammar must be constructed that would encompass Propp's sequence only as one of the possible lines of development.

Brémond believes that in order to demonstrate that a narrative grammar can also generate syntactic sequences other than the one discovered by Propp, it must be proved that there exist mutually exclusive functions which may occupy the same syntactic position. This is because only mutually exclusive functions may lead to a bifurcation of the generative course in narrative grammar. He argues that such functions manifest themselves, albeit in a vestigial form, even in such highly stereotypical narratives as folktales. From that point of view, he considers fairy tale incidents which Propp saw as rhetorical gestures delaying the action and serving only to increase tension — e.g. first meetings with the donor which fail to provide the hero with the desired information, etc. Brémond formulates the following objection to Propp's analysis: Propp does not notice alternative functions in a sequence because such a possibility is a priori excluded by the criterion that defines the identity of functions, namely the criterion of consequence. For instance, in Propp's model, a "struggle" always leads to the hero's "victory"; Propp achieves this "astounding result" because he simply does not consider clashes which do not end in the hero's victory as "struggles." According to Brémond, "Since [a function] is defined by its consequences, one does not see how any opposing consequences could come from it" (Brémond 1978: 18).

Defining a function by its consequences illustrates the finality of Propp's analysis, which, according to Brémond, is justified when analysing speech aimed towards a definite ending, but not when constructing a theory of language (i.e. a narrative grammar):

> We should construct our sequences of functions starting with the *terminus a quo*, which in the general language of plots opens a network

> of possibilities, and not with the *terminus ad quem*, in respect to which the particular speech acts of Russian tales make their selection from among possibilities. If (following Propp) we agree that a struggle implies the victory (of the hero), we refer to a cultural stereotype, not a necessary relation between units of a narrative syntax. (Brémond 1978: 25)

Another of Brémond's objections is that it is not the function, but an entire sequence that is the *de facto* deep-level unit in Propp's analysis. Hence an event cannot be considered a carrier of the appropriate function if it does not appear in the requisite position. In Propp's approach, rules governing the succession of functions in a sequence are concurrently logical and artistic. Brémond, on the other hand, argues that this relationship is logical in character only in some cases, whereas in others it is organised by an artistic stereotype. Generally speaking, the order of succession of functions with respect to their logical relations tolerates more freedom than Propp's model, although it is by no means entirely free. Thus, for instance, due to logical connections, the function of marking the hero with a stigma must occur before the function of the recognition of the hero by that stigma. However, the fact that in Propp's model the function of marking the hero with a stigma occurs much earlier than the logical connections between functions would require, that is between the struggle and the victory, is determined only by the cultural stereotype.

The reinterpretation of the results arrived at in *Morphology of the Folktale* is obviously aimed at eliminating those sequential relationships Propp established between functions which are not of a logical, but of an artistic character — that is, according to Brémond, those that are determined not by rules of a language (narrative grammar), but by a certain stereotype of speech. Brémond introduces the concept of an elementary narrative sequence: a unit larger than a function, but smaller than Propp's sequence. The representation of Propp's sequence as a syntagma composed of many elementary sequences leads to a reorganization of the sequence:

> Instead of a unilinear schema of narrative structure, we obtain an interlacing of a number of sequences which condition, bind, interweave with or parallel one another. The functions within various interlaced sequences remain generally independent, but the sequences themselves are not fully autonomous — which explains the frequency of certain types of connections. (Brémond 1978: 30)

Brémond's elementary sequence consists of three functions, with the transition from the first function to the second and from the second to the

third occurring by way of selection between two optional functions available in a given position. The general model of these sequences is as follows: the first function is the emergence of "a situation that opens the possibility of a behaviour or an event." The second function is the "actualisation of the possibility" or the "non-actualised possibility." If the second function assumes the shape of the former option — for instance, if the hero accepts a challenge, turns to the donor for help, faces a struggle, etc. — then the last function of the sequence is realised as one of two options: the first is the hero's victory, the other — the hero's failure. If in the second function of the sequence the possibility is not actualised, the sequence remains unfinished. Thus, as a syntactic unit of the language of narration, a sequence has the form of a series of choices between elements of a binary opposition. In speech (narrative text) only one of the options is realized: the teller selects one of two functions available in a given position in the sequence. Closing the sequence creates a new situation which becomes a starting point for a new sequence directly linked with the preceding one.

This, however, does not mean that narrative speech is just a simple succession of complete sequences. Brémond devoted much attention to the analysis of various syntactic combinations across sequences, i.e. combinations which enable the formation of higher syntactic units, the so-called complex sequences composed of two or more elementary sequences.[1] Thus, besides the simplest way of binding known as the chain connection, in which the event playing the role of the function closing an earlier sequence also opens the next sequence, sequences may also coalesce into systems of enclaves. In this case, an opening sequence reaches its conclusion by way of one or many other sequences. An enclave occurs when, for instance, the second function of the opening sequence (actualisation of a possibility) develops into a series of events that form a sub-sequence of the opening sequence. In an enclave structure, one process becomes the means of realising another process. Another manner of connecting sequences stems from the fact that the same event may perform two separate functions in two different but parallel sequences. According to Brémond, the multiplicity of ways of linking elementary sequences in narratives is the main reason for their variety. Structural differences between various complex sequences may also prove useful in describing the differences between variations of narrative texts specific to diverse cultures. In Brémond's opinion, his analysis "demonstrates that, by combining a limited number of easily specified elements (functions organ-

[1]Brémond analysed this issue in "Le Message narratif" (1965).

ised in triads), it is indisputably possible to construct models of situations and conduct of an infinitely increasing complexity, which may constitute a reflection of the events and protagonists (characters in a play, actants, or roles) required by the semiotic analysis of narration" (Brémond 1965).

Brémond's later articles add a new facet to his conception. The function, thus far viewed mainly as an element of an elementary sequence, is now additionally specified by being related to figures taking part in an action. In this analysis, Brémond accentuates the fact that, from the perspective of a specific character, each process (elementary sequence) brings an improvement or a deterioration of his or her situation: "Each agent is his own hero. His partners are defined from his point of view as allies, adversaries, etc. These definitions are reversed when passing from one perspective to another" (Brémond 1980: 392). Brémond considers this observation ground-breaking because he is striving to supplement his grammar with an equally general and choice-driven model of a narrative universe, that is "the patterns that are herein developed will integrate the many perspectives belonging to diverse agents into the unity of a single schema" (Brémond 1980: 392). As he himself puts it, "Amelioration, degradation, reparation: the narrative circle is now closed, opening the possibility of new degradations followed by new reparations according to a cycle which can repeat itself indefinitely"(Brémond 1980: 405).

What this quote demonstrates is that, in Brémond's approach, narration is no longer a singular structure. His grammar describes the connections between specific functions of the elementary sequence and the relationships between those sequences because it formulates the rules governing these relations. After all, the entire narration consists of an arbitrary — i.e. not determined by the rules of his grammar — number of complex sequences. A narrative is only a cycle of changes in situation (its improvements or deteriorations), a cycle which may be broken at a randomly selected moment.

Brémond was right to observe that Propp identified an entire sequence, and not a function, as a fully autonomous unit of the deep structure, but he failed to note that this was precisely the feature that gave Propp's analysis a structural as well as a semiotic character. This is because the sequence of thirty-one functions is a syntactic model of a folktale as a whole, but also a description of the syntactic commonality of many materially different tales. To Propp, fairy tales are syntactically identical, because they convey a certain common meaning. Propp reconstructs a common semantic universe of fairy tales by arranging functions into spheres. Although he does not complete the distinction between the paradigmatic (semantic) and syntagmatic aspect of

the deep structure of the tales, his analysis leaves no doubt that neither the meaning nor the syntactic role of an action can be explained in separation from the structural whole constituted by the given plot. In this conception, actions acquire the status of signs (*signifiants*) — though only in specific structural positions — i.e., carriers of a specific significance which remains the same in diverse tales, even when represented by different events occupying analogous positions in plot sequences. Therefore, the direction of Propp's analysis leads from events to their significance and from a surface variety to the discovery of an identity of meaning on the deep level. In particular tales, these meanings are tied to different events and may be analysed in separation from their *signifiants* — which is exactly what Propp is doing by arranging the functions and grouping them into seven semantic spheres.

Let us consider whether the concept of function retains the same meaning in Brémond's conception. Brémond frees the function from Propp's sequence to subordinate it to a different entity: the tripartite elementary sequence. It is, however, clear that an elementary sequence does not constitute a satisfactory model for narrative units. It is not a semiotic (signifying) unit, since the relations between its elements which Brémond considers do not concern events as carriers of specific meanings, but as real events. Brémond's sequence is, simply put, a model of any simple process of action whose subject initiates (or does not initiate) a specific action with a definite purpose, succeeding (or failing) to reach the aim — a certain change in the surrounding world. In other words, Brémond's model refers above all to the actions themselves — to the behaviour of human beings in the real world — and can apply to fictitious actions in a narrative only provided that their meaning (function) in the texts is determined once and for all as one of imitating real-life human actions, especially the cause-and-effect links between such actions.

Thus, Brémond's grammar constitutes a particular and rather banal ontology of human behaviour which can only be applied to explanations of fictitious occurrences if the aforementioned, fairly demanding condition is accepted. For Brémond, a function taken out of the sequence which determined its significance within the narration is no longer a function, but simply an event within the plot. The fact that Brémond goes on to analyse that event or action as a part of a three-stage process does not change anything, since his triad describes the cause-and-effect links between events, and not the syntactic and semantic connections between their significance within the narrative structure. Brémond's theory, therefore, at best describes the possible courses of plots, but not the meanings borne by those plots. It cannot, for instance, account for the fact that the same complex sequences

of events may carry entirely different meanings in different plots.

Propp's conception, which often identifies the function of an event only when its consequences are revealed, describes the signifying structure of narration, not the logic of the plot. Contrary to Brémond's criticism, Propp assigns to a given clash the function of a struggle not because it ends with the hero's victory: a victorious fight may also represent the entirely different function of a trial. It becomes a struggle only when the victory over an opponent cancels out a villainy or a lack; generally speaking, struggle occurs when the victory allows the hero to attain the goal that he had set out to achieve. Thus, Jonathan Culler is right in criticising Brémond's grammar: "It is true that if the hero does battle with the villain much of the interest for the reader may depend on the uncertainty of the outcome; but one can say that this is also uncertainty about the function of the struggle. The reader knows its significance and its place in the tale only when he knows the outcome" (Culler 1975: 209).

Culler cites examples of plots in which only the knowledge of the results of events reveals their significance in the structure of the plot:

> The moments of choice or bifurcation of which Brémond speaks can be thought of as points in the plot when action itself poses a problem of identification and classification. After a severe quarrel hero and heroine may either be reconciled or go their separate ways, and the suspense which the reader might feel at such moment is, structurally, a desire to know whether the quarrel is to be classified as a testing of love or as an end of love. And it is only when the enigma or problems is resolved that he moves from an understanding of action to an understating or representation of plot. (Culler 1975: 211)

The distinction between action and its significance is missing in Brémond's analysis; he stops at actions and does not reach the question of their significance for the narration.

Brémond's suggestions that his conception is structurally the closest to a grammar of language seem unjustified, as well. The generative model proposed by Brémond, which proposes that the initial event opens two possibilities and the choice of one of them restricts the number of available alternatives to follow, etc., does not correspond structurally to any grammar of language. It merely resembles the manner of modelling grammars, that is, the grammar of finite states, which was rejected by Chomsky. Propp's model turns out to be more satisfactory in that regard, too, being closer

to the linguistic structure of a generative grammar. In Propp's approach, the process of generation begins with the sequence of thirty-one functions which is a structural pattern shared by all fairy tales. As with Chomsky, the process of generation follows a series of rules of the "write A in the place of X" type, where X denotes the successive functions of the opening pattern, while A represents the events in a tale substituted in their place.

Finally, it has to be noted that Brémond's grammar — even when treated as a model for generating plots, not establishing the significance of events in the plot — is unsatisfactory for purely formal reasons, as it does not fulfil the fundamental requirement of adequacy. This interpretation suggests that the grammar is capable of generating all plots — and only plots — of narrative texts. From this point of view, Brémond's model has an excessive generative power, i.e., produces more than just the plots. As has already been pointed out, Brémond's grammar, his elementary sequence and complex sequences alike, models the connections between physical (real) actions as much as the connections between actions that are the subject of a narration.

The most recent works by textual generativists make it possible to assert that Brémond's results discouraged the representatives of this school from attempts to construct purely syntactic grammars. The failure to fulfil the requirement of adequacy, a weakness of other textual grammars apart from Brémond's, was one of the reasons why the representatives of this school currently devote more attention to the level of manifestation. It seems that only the inclusion of this level of textual structure into the analysis will make it possible to describe the difference between a real action and an action that is a subject of a statement.

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# AN OUTLINE OF FORMAL SEMIOTICS

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## 1. Introduction

The aim of this article is to present a fragment of a system of formal semiotics. It is a part of a greater whole — a uniform system which embraces, among other things, the issues of the structure of a sign, of the relation between signs and real objects, of the semantics of signs and perception of signs, of their pragmatic role.

The discussion will focus on issues of formal semantics of signs; the proposed theory will be based on concepts of fuzzy set theory.

## 2. Basic primitive concepts

The easiest way to present the formal theory will be to start with the simplest version of the system and then enrich it if necessary.

Accordingly, we will first introduce a system comprising three primitive concepts:

(1) $<S, M, \rho>$,

where $S$ and $M$ are sets of SIGNS and their MEANINGS, respectively, and $\rho \subset S \times M$ is a relation which connects signs $s \in S$ with meanings $m \in S$. The symbol $s\rho m$ will be used for: "$m$ is the meaning of $s$."

Concepts $S$, $M$, and $\rho$ have an internal structure, which will be introduced in subsequent sections. Let us denote:

(2) $\rho(s) = \{m \in M\colon s\rho m\}$,
(3) $\rho^{-1}(m) = \{s \in S\colon s\rho m\}$.

If $\rho(s) \neq \varnothing$, the sign $s$ shall be called MEANINGFUL or INTERPRETABLE; for given $s_1, s_2 \in S$, (partial) SYNONYMY will be defined by the requirement $\rho(s_1) \cap \rho(s_2) \neq \varnothing$, that is, by demanding that there should be at least one meaning shared by $s_1$ and $s_2$. Synonymy is FULL if $\rho(s_1) = \rho(s_2)$.

A special case of synonymy, where $\rho(s_1) \subset \rho(s_2)$, shall be called HYPONYMY. Finally, a general case where $\rho(s_1) \cap \rho(s_2) \neq \varnothing$, $\rho(s_1) \setminus \rho(s_2) \neq \varnothing$, and $\rho(s_2) \setminus \rho(s_1) \neq \varnothing$, shall be called EQUIPOLLENCE. Thus two signs are equipollent if they have some common meanings, yet each of them have some additional meanings, not possessed by the other.

The relations introduced above have the following properties:

*Theorem.* The relation of complete synonymy is an equivalence, while partial synonymy is reflexive and symmetrical, but not transitive. The hyponymy relation is reflexive and transitive, but not symmetrical. Finally, equipollence is symmetrical, but neither reflexive, nor transitive.

By employing sets of form (3) one can say that a meaning $m$ is EXPRESSIBLE if $\rho^{-1}(m) \neq \varnothing$. Next, if $\rho^{-1}(m_1) \cap \rho^{-1}(m_2) \neq \varnothing$, then every sign $s$ belonging to this intersection (given that $m_1 \neq m_2$) will be called EQUIVOCAL; it has at least two different meanings, $m_1$ and $m_2$.

## 3. Extension of the system

We will now enrich system (1) by introducing: (a) a division of signs into categories, (b) structural elements of the set of meanings $M$, in the form of a relation describing 'distances' between meanings, and (c) a 'fuzziness' of the relation $\rho$.

Accordingly, the system of primitive concepts will take the form of:

(4) $<S, \mathscr{F}, M, \tau, f>$,

where $S$ and $M$ symbolize the same sets as above, whereas $\mathscr{F}$ is a class of divisions of $S$, so that each element $F \in \mathscr{F}$ is a family of sets $S_1, \ldots, S_n$ such that:

(5) $S_i \cap S_j = \varnothing$, for $i \neq j$,

$$(6)\ \bigcup_i S_i = S.$$

Elements of each division from $\mathscr{F}$ shall be called taxonomic categories of signs.

For two given divisions, $F$ and $F'$, into sets $S_1$, ..., $S_n$, and $S'_1$, ..., $S'_m$, it is possible to define their intersection $F \cap F'$ in the following way:

$$(7)\ F \cap F' = \{S_i \cap S'_j,\ i = 1, ..., n,\ j = 1, ..., m\}.$$

The easiest way to define the union of two divisions, $F \cup F'$, will be to make use of equivalence relations. Namely, each division can be associated with a relation $\sim_F$, defined by a requirement that $s \sim_F s'$ if and only if $s$ and $s'$ belong to the same set from the division $F$. Conversely, each equivalence relation defines a division into its own equivalence classes.

Now let $\sim_F$ and $\sim_{F'}$ be two equivalence relations corresponding to divisions $F$ and $F'$. Then $F \cup F'$ is defined as a division corresponding to the relation which is a transitive extension of the sum of relations $\sim_F$ and $\sim_{F'}$, that is, $x \sim_{F \cup F'} y$ if:

$$(8)\ \exists s_1, ..., s_r : (x \sim_F s_1 \vee x \sim_{F'} s_1) \wedge (s_1 \sim_F s_2 \vee s_1 \sim_{F'} s_2) \wedge ... \wedge (s_r \sim_F y \vee s_r \sim_{F'} y).$$

Then we have:

*Theorem.* Operations $\cap$ and $\cup$ satisfy the following laws of idempotence:

$$(9)\ (F \cap F') \cap F = F \cap F',$$
$$(10)\ (F \cup F') \cup F = F \cup F'.$$

As for the other concepts of system (4), $\tau$ is a quaternary relation in $M$ with the following intended interpretation. If $(m_1, m_2, m_3, m_4) \in \tau$, which will be symbolized as $(m_1, m_2)\tau(m_3, m_4)$, then the 'difference' (or a subjectively assessed 'distance') between meanings $m_1$ and $m_2$ is greater than the difference between meanings $m_3$ and $m_4$.

It will be assumed that the relation $\tau$ satisfies the following conditions; for every $m_1$, $m_2$, $m_3$, $m_4$, $m_5$, $m_6$:

*Postulate* 1. If $(m_1, m_2)\tau(m_3, m_4)$, then $(m_1, m_2)\tau(m_3, m_4)$ and $(m_1, m_2)\tau(m_4, m_3)$.

*Postulate* 2. If $(m_1, m_2)\tau(m_3, m_4)$ and $(m_3, m_4)\tau(m_5, m_6)$, then $(m_1, m_2)\tau(m_5, m_6)$.

*Postulate* 3. $(m_1, m_2)\tau(m_3, m_3)$.

*Postulate* 4. If $(m_1, m_1)\tau(m_2, m_3)$, then $m_2 = m_3$.

Thus postulate 1 states that distances are symmetrical with respect to their arguments; postulate 2 says that the relation of distance comparison is transitive; postulate 3 asserts that the distance between two identical meanings equals 0; finally, postulate 4 declares that zero distance implies that the meanings must be identical.

Before formulating the last postulate for the relation $\tau$ we will discuss the last primitive concept of system (4) — the function *f*. It is the 'fuzziness' of the relation $\rho$ from system (1); formally, $f$ is a function:

$$(11)\ f : S \times M \rightarrow [0, 1],$$

where $f(s, m)$ represents the degree to which $s$ has the meaning $m$.

In the special case in which $f$ only takes 0 and 1 as values, we have:

$$(12)\ \rho = \{(s, m) : f(s, m) = 1\}$$

In general, for any $0 \leqslant \alpha \leqslant 1$, let us define a relation:

$$(13)\ \rho_\alpha = \{(s, m) : f(s, m) \geqslant \alpha\},$$

such that $\rho_\alpha$ is a (non-fuzzy) relation in $S \times M$ induced by the relation $f$ and the level $\alpha$. Note that:

*Theorem.* If $\alpha \leqslant \beta$, then $\rho_\alpha \supset \rho_\beta \supset \rho$.

We are now in a position to formulate a postulate which connects the fuzzy relation $f$ with the relation $\tau$.

*Postulate* 5. Suppose that $\alpha > \beta$, $s\rho_\alpha m_1$, $s\rho_\alpha m_2$, and it is not the case that $s\rho_\alpha m_3$. If $s\rho_\beta m_3$, then $(m_2, m_3)\tau(m_1, m_2)$ or $(m_1, m_3)\tau(m_1, m_2)$.

This postulate describes the following property. Suppose that a sign $s$ expresses two meanings, $m_1$ and $m_2$, at least to the degree $\alpha$. Let us also assume that $s$ has another meaning, $m_3$, but expressed to a lesser degree, $\beta$. In such a case the distance between $m_1$ and $m_2$ (between 'stronger' meanings) is smaller than from one of these meaning to $m_3$.

Let us fix a certain level $\alpha$ and examine the connections between relations $\rho_\alpha$ and divisions of the set $S$ into taxonomic categories.

For a fixed division $F = \{S_1, ..., S_n\}$, let us define:

$$(14)\ \rho_\alpha^{(k)} = \rho_\alpha \cap (S_k \times M)$$

For each meaning $m$, let $s_k(m)$ stand for the sign in $S_k$ which expresses $m$ to the highest possible degree, i.e., which meets the condition:

$$(15)\ f(s_k(m),\ m) = \sup_{s \in S_k} f(s, m).$$

(It is assumed, for simplicity, that the supremum is achieved.)

Let $\alpha_k(m,F)$ denote the common value of equation (15). Then we get:

*Theorem.* For every $\alpha \leqslant \alpha_k(m,F)$, $(s_k(m),\ m) \in \rho_\alpha^{(k)}$.

The vector:

$$(16)\ (\alpha_1(m,F),\ \alpha_2(m,F),\ ...,\ \alpha_n(m,F))$$

will be called SPECTRUM of the meaning $m$. It expresses the maximum degrees to which one can efficiently express $m$ by means of particular categories of the division $F$.

Clearly, $\max_k \alpha_k(m, F)$is independent from a given division $F$; however, let us denote the average level of expressing $m$ by means of signs of different categories of the division $F$:

$$(17)\ d(m, F) = \frac{1}{n} \sum_{i=1}^{n} a_i(m, F).$$

Then we obtain:

*Theorem.* For any divisions $F$, $F' \in \mathscr{F}$:

(18) $d(m, F \cap F') \leqslant \min(d(m, F), d(m, F')) \leqslant \max(d(m, F), d(m, F')) \leqslant d(m, F \cup F')$.

The theorem expresses an interesting feature that fragmentation of a division into sign categories decreases the average degree of 'expressibility' of a meaning $m$ by means of signs of different types.

For a proof, suppose that $F$ and $F'$ are divisions into $S_1$, ..., $S_n$ and $S'_1$, ..., $S'_r$, respectively. Then:

$$(19)\ d(m, F \cap F') = \frac{1}{rn} \sum_{i=1}^{n} \sum_{j=1}^{r} a_{ij}(m, F \cap F'),$$

where:

$$(20) a_{ij}(m, F \cap F') = \sup_{s \in S_i \cap S'_j} f(s, m).$$

But:

$$\sum_{j=1}^{r} a_{ij}(m, F \cap F') \leqslant r \sup_{s \in S_i} f(s, m) = r a_i(m, F),$$

and by substituting (19) we obtain the first inequality of the theorem. The remaining inequalities are proven in an analogous way.

## 4. Sign composition

We will now add yet another primitive concept to the discussed system (4), namely, the notion of sign composition.

Thus, if $s_1$, $s_2 \in S$, then $s_1 \, o \, s_2$ will represent a sign composed of $s_1$, $s_2$.

Of course, not every composition of signs is possible, and the operation $o$ is not always definitely interpretable. We will assume that the relation $o$ is a primitive concept of the system, i.e., there is a fixed set of pairs $(s_1, s_2)$ such that $s_1 o s_2 \in S$, and in what follows we will tacitly assume that the symbol $o$ will be applied only to those pairs of signs for which the relation $o$ is defined.

A typical example of the relation $o$ — for the category of signs that are notations of strings of words — is their concatenation.

Consider signs $s_1$ and $s_2$ together with their composition $s = s_1 o s_2$. For a fixed $\alpha$ we will have the following sets:

(21) $\rho_\alpha(s_1) = \{m : s_1 \rho_\alpha m\}$, $\rho_\alpha(s_2) = \{m : s_2 \rho_\alpha m\}$, $\rho_\alpha(s) = \{m : s \rho_\alpha m\}$,

We can now put forward the following definitions:

Signs $s_1$ and $s_2$ are ORTHOGONAL if:

(22) $(\forall \alpha)$: $\rho_\alpha(s) = \rho_\alpha(s_1) \cup \rho_\alpha(s_2)$

.

Each meaning $m$ such that $m \in \rho_\alpha(s_1) \cup \rho_\alpha(s_2)$ and $m \notin \rho_\alpha(s)$ shall be called $\alpha$-INHIBITED in sign composition.

Conversely, if $m \in \rho_\alpha(s)$, while $m \notin \rho_\alpha(s_1) \cup \rho_\alpha(s_2)$, then $m$ is $\alpha$-GENERATED in composition of $s_1$ and $s_2$.

These definitions are relative with respect to a given level $\alpha$ of meaning representation. If we allow for various levels of representation, we can introduce the following definitions (cf. Nowakowska 1976).

Suppose that $\alpha < \beta$ and $m \in \rho_\alpha(s_1) \cup \rho_\alpha(s_2)$, but $m \notin \rho_\beta(s_1) \cup \rho_\beta(s_2)$. If $m \in \rho_\beta(s)$, then $m$ is $(\alpha, \beta)$-SUPPORTED by the composition.

Conversely, if $m \in \rho_\alpha(s_1) \cup \rho_\alpha(s_2)$ and $m \notin \rho_\alpha(s)$, while $m \in \rho_\beta(s)$ for $\beta < \alpha$, then $m$ is $(\alpha, \beta)$-INHIBITED.

## 5. Objects and signs

In this and in the subsequent section we will put forward an outline of a theory of the connection between signs, objects represented by those signs, sign perception, and the reflection of this perception in the form of a verbal copy of an object.

The starting point will be a formal representation of an object as a relational structure of the form:

$<P,\ A,\ q,\ \mathscr{R}>$,

where $P$ is a set of elements interpreted as PARTS of objects, $A$ is a set of ATTRIBUTES, $q$ is a relation in $P \times A$ which assigns attributes to parts of an object, and $\mathscr{R} = \{R_1,\ R_2,\ ...\}$ is a family of relations in $P$.

Generally, if an object is represented in the form of a configuration of graphic signs, then — with the exception of purely conventional signs — there is a certain correlation between the structure of a sign and the structure of an object. Namely, a sign, say $s$, can also be interpreted as an object, i.e. as a relational structure of the form $s = <P_z,\ A_z,\ q_z,\ \mathscr{R}_z>$ with the same interpretation as before (i.e. a set of parts, a set of attributes of these parts, etc.).

If a sign represents an object $T$, then there is a function $\varphi$ mapping the relational configuration of the sign onto the relational configuration of the object, which preserves (at least some of) the connections. Without going into technical details, let $P_s^{\varphi} \subset P,\ A_s^{\varphi} \subset A,\ q_s^{\varphi} \subset q,\ R_s^{\varphi} \subset R$denote those parts, attributes, etc. which are reflected in the sign $s$.

Generally, the more elements of the above sets are reflected in $s$, the more iconic $s$ is, and one could be tempted to build a 'iconicity index' of $s$.

As it happens, it is possible to proceed in a slightly different way, by considering not only which fragments from the set $P$ are in the set $P_z^{\varphi}$, but also how important they are. Namely (Nowakowska 1967), one can assign to particular parts $x \in P$ numbers $w(x)$ representing the degree of IMPORTANCE of these parts in recognizing the object. These numbers, called weights henceforth, are formally defined in terms of coalition theory, and more specifically, by means of the Shapley—Shubik power index, which measures the powers of members of legislative bodies (Shapley and Shubik 1954). One can indicate an empirical procedure which leads — at least in the case of simple objects — to assigning those weights.

Understandably, a sign can apply not only to a single object, but — more generally — to a situation, that is, to a configuration of a certain number of objects. A description must distinguish a set of objects, every one of which is a relational structure presented above, and certain relations characterizing mutual connections between these objects. Such an account leads to a kind of algebra of situations and allows us to analyze correlations between the structure of a situation and the structure of its verbal copy (description); an outline of this theory can be found in the next section.

At this point, it is worth considering signs of a different kind, namely

signs concerning certain actions. In this case the adequate formalization is provided by the theory of action (Nowakowska 1973), which can be — very roughly — represented in the form of a structure:

(24) $<D, L, S, R>$,

where $D$ is a set of elementary actions (specific to a given situation), $L \subset D^*$ is a class of sequences of elements of the set $D$, i.e. a subset of the monoid over $D$. Sequences from $L$ are interpreted as acceptable strings of actions, and $L$ itself is dubbed a language of actions, due to the analogy with the natural language, which is a class of strings of words (or natural languages which are classes of strings of symbols from a certain alphabet). Next, $S$ is a set of the results of actions, and $R$ is a relation linking together the action sequences from $L$, results from $S$, and the times of their occurrence.

This formal structure has turned out to be unexpectedly rich in theoretical consequences and interpretive possibilities, allowing us to define a great number of concepts crucial for describing actions, such as attainability and its various types, moments of decision, goals, means of attaining them, effectiveness of actions, praxeological character of actions, etc.

In the case of the semantics of signs, this structure can be exploited in the following way. Let $L$ designate a language of actions specific to a given situation or class of situations, and let $\Phi$ denote a class of motivational operators (cf. Nowakowska 1973), such as "I should," "I want," "It is worth," etc. Then, for a given sign $s$, one can consider a relation:

(25) $Q(s) \subset \Phi \times L$,

where $(g, u) \in Q(s)$, $g \in \Phi$, $u \in L$ means that the sign $s$ connects the operator $g$ with a sequence of actions $u$.

It is then natural to consider the following sets:

(26) $\Phi(s) = \{g \in \Phi : (g, u) \in Q(s)\}$ for some $u \in L\}$,
(27) $L(s) = \{u \in L : (g, u) \in Q(s)\}$ for some $g \in \Phi\}$,

So $\Phi(s)$ characterizes a TYPE of sign from a pragmatic point of view; the categories would be instructions, commands, prohibitions, etc. corresponding to operators such as "It is worth," "One ought to," "It is necessary that," etc. for instructions, and similarly for other types. On the other hand, $L(s)$

can be called "a language of actions of the sign $s$;" in fact, it is the set of sequences of actions which $s$ applies to — that is, which are commanded, prohibited, etc. by the sign.

Signs $s$ and $s'$ such that $L(s) = L(s')$, while $\Phi(s)$ and $\Phi(s')$ contain opposite operators, form a natural oppositional pair (a typical example would be the stop sign and a prohibition of coming to a halt).

## 6. Algebra of situations and verbal copies

As a final point, we will sketch a theory of signs of a special form, namely, verbal copies.

As pointed out above, a situation can be equated with a configuration (relational structure) of objects. Generally, in a description one can distinguish a set of attributes expressing relevant properties and the corresponding sets of values $W_1$ (perhaps qualitative in character; these values will be generally called descriptors).

A complete description of a situation will be a system:

$$(28) <W_1, ..., W_n, E^*>,$$

where the meaning of $E^*$ will be explained below.

By an ELEMENTARY situation we will understand a vector:

$$(29)\ \bar{V} = (V_1, \ \ldots, \ V_n)$$

where $V_i \subset \ W_i$, for $i = 1, ..., n$.

Let $E$ designate the set of all elementary situations. If $\bar{V} = (V_1, \ \ldots, \ V_n)$ and $\bar{V}' = (V'_1, \ \ldots, \ V'_n)$, then the intersection and union of situations $\bar{V}$ and $\bar{V}'$ is described as:

$$(30)\bar{V} \cdot \bar{V}' = (V_1 \cap \ V'_1, \ \ldots, \ V_n \cap V'_n),$$

$$(31)\bar{V} + \bar{V}' = (V_1 \cup \ V'_1, \ \ldots, \ V_n \cup V'_n).$$

Then the following theorem is true:

*Theorem.* The class $E$ is closed under the operations of intersection and union.

Furthermore:

$$(32)\ \bar{V}\cdot\bar{V}=\bar{V},\ \bar{V}+\bar{V}=\bar{V}(idempotence)$$

$$(33)\ \bar{V}\cdot\bar{V}'=\bar{V}'\cdot\bar{V},\ \ \bar{V}+\bar{V}'=\bar{V}'+\bar{V}\ (commutative\ property)$$

$$(34)\ \bar{V}\cdot(\bar{V}'+\bar{V}'')=\bar{V}\cdot\bar{V}'+\bar{V}\cdot\bar{V}'',\ \bar{V}+(\bar{V}'\cdot\bar{V}'')=(\bar{V}+\bar{V}')\cdot(\bar{V}+\bar{V}'')(distributive\,property)$$

The relation of inclusion of situations, $\bar{V}\subset\bar{V}'$is defined by the requirement that $\bar{V}\cdot\bar{V}'=\bar{V}$ .

The last primitive concept of system (28), namely $E^*$, is a certain subset of $E$, interpreted as the situations which actually take place.

It is assumed that $E^*$ has the following features:

*Assumption.*

(35) $\bar{V},\bar{V}\in E^*\Rightarrow\bar{V}\cdot\bar{V}'\in E^*$
(36) $E^*$ is non-empty
(37) $(\forall i)(\exists\varnothing\neq U_i\subset W_i)$: $(W_1,\ ...,\ W_{i-1},\ U_i,\ W_{i+1},\ ...,\ W_n)\notin E^*$
(38) $(\forall i)(\forall V_1,\ ...,\ V_{i-1},\ V_{i+1},\ ...,\ V_n)$: $(V_1,\ ...,\ V_{i-1},\ \varnothing, V_{i+1},\ ...,\ V_n)\in E^*$

This assumption means the following. According to relation (35) an intersection of two situations which actually take place is also a situation which actually takes place. Condition (36) determines that some situation occurs. According to relation (37), for every attribute, there are descriptor values which fail to occur in reality (so this assumption eliminates trivial attributes). Finally, assumption (38) states that each attribute has a certain descriptor (that is, some descriptor describes what is actually the case).

We are now in a position to define the concept of minimal and maximal situation that occurs in reality, say $\bar{V}_{min}$ and $\bar{V}_{max}$, by means of the relations:

$$(39)\ \forall\bar{U}\in E^*:(\bar{U}\subset\bar{V}_{min}\Rightarrow\bar{U}=\bar{V}_{min}),$$

$$(40)\ \forall \bar{U} \in E^* : (\bar{U} \supset \bar{V}_{max} \Rightarrow \bar{U} = \bar{V}_{max}).$$

We will prove the following theorem.

*Theorem.* There is exactly one minimal situation.

For a proof, assume that $\bar{V}^{(1)}_{min}$ and $\bar{V}^{(2)}_{min}$ satisfy (39), and let $\bar{U} = \bar{V}^{(1)}_{min} \cdot \bar{V}^{(2)}_{min}$ . Then $\bar{U}$ is contained both in $\bar{V}^{(1)}_{min}$ and in $\bar{V}^{(2)}_{min}$. This intersection can have no empty coordinate, because otherwise it would not belong to $E^*$, contrary to (35). Hence $\bar{U} \in E^*$, and it must be the case that $\bar{U} = \bar{V}^{(1)}_{min} = \bar{V}^{(2)}_{min}$.

The situation $\bar{V}_{min}$ will be called THE TRUE STATE OF AFFAIRS. The maximal state of affairs can be equated with the effect of various bonds by virtue of which some states (values of some attributes) rule out combinations of other values.

This account of situations allows us to analyze dynamic aspects of changes of situations (cf. Nowakowska 1973). For this purpose it must be assumed that the set $E^*$ changes in time. Therefore, the true state of affairs $\bar{V}_{min}$ is also a function of a time $t$. By considering the set of all 'histories' $\bar{V}_{min}(t)$ we can define the concept of EVENT as a subset of a history. Then, by combining histories with actions which influence these histories, we obtain a systematic account of ACTION and CONTROL, where the GOAL is defined by a configuration of events (cf. also Nowakowska 1976).

Let us now return to the main topic, that is, to the issue of verbal copies. We are in a position to introduce the concept of the 'LANGUAGE OF DESCRIPTION', by considering, for each attribute, a certain class $L_i$ of subsets of the set of descriptors $W_i$. Namely, these are subsets of $W_i$ which have their own NAME. With respect to classes $L_i$ we will assume that:

*Assumption.*

$$(41)\ U \in L_i \Rightarrow W_i \setminus U \in L_i,$$

that is to say, the class $L_i$ is closed under the operation of completing (yet it is not required that it be closed under the conjunction or alternative).

For instance, if the attribute in question is colour, then the elements of $W_i$ are descriptors such as "white," "black," etc. Some subsets of $W_i$have their

own names, like "black-and-white," "bicoloured," etc. which are expressed by corresponding sets of descriptors (i.e. by subsets of $W_i$).

A VERBAL COPY is a conjunction of sentences of the form "$x$ is $V_i$," where $V_i \in L_i$. A copy is said to be FAITHFUL if all its sentences have the following property:

(42) $V_i \in L_i \cap i(E^*)$,

where

(43) $i(E^*) = \{U_i : \exists V_1, ..., V_{i-1}, V_{i+1}, ..., V_n$ such that $(V_1, ..., V_{i-1}, U_i, V_{i+1}, ..., V_n) \in E^*\}$.

Thus $i(E^*)$ is a projection of $E$ onto the $i$-th coordinate.

If $C$ is a verbal copy, let $C_i$ denote all sentences in $C$ referring to the $i$-th attribute; let them be sentences "$x$ is $V_i^{(1)}$," ..., "$x$ is $V_i^{(m_i)}$." Now we can introduce the following definition. A copy is EXACT if it satisfies the condition:

$$(44)(\bigcap_{i=1}^{m_1} V_1^{(i)}, \ldots, \bigcap_{i=1}^{m_n} V_n^{(i)}) = \bar{V}_{min}.$$

In other words, an exact copy is a copy which unambiguously specifies the value of each attribute.

Whether faithful copies exist, or not, is decided by how rich languages $L_i$ are. The following theorem holds.

*Theorem.* A faithful copy of each situation exists if and only if:

$$(45)\ (\forall i)(\forall w \in W_i)(\exists U_i, ..., U_r \in L_i) : \bigcap_{i=1}^{r} U_i = \{w\},$$

that is, if every value of an attribute (a descriptor) is expressible as a conjunction of expressions of $L_i$.

The above formal notions concerning properties of verbal copies, together with the concept of the weight of fragments, described in the preceding section, make it possible to formulate empirically testable hypotheses about mechanisms of generating verbal copies.

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# Jerzy Pelc
# THE CONCEPT OF SIGN

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## I. INTRODUCTION

In the title of the next chapter, there appears the word *semeion*, deriving from Ancient Greek, which might create the impression that I intend to present here the history of the concept of sign. These remarks, however, are not going to be of historical nature. Neither is it going to be a systematic analysis of the meaning of the word 'sign', leading to a nominal definition of the term, nor a study of different types of signs, concluding with an unequivocal characterization of a sign, or its real definition. Instead, I wish to discuss a few chosen issues, upon the settling of which such a definition may depend. Yet, I shall not put forward any definite solutions, but rather pose questions, merely pointing to the direction of possible answers. Therefore, it is going to be neither a history, nor a theory of the concept of sign, but the prolegomena to its definition.

While analyzing the concept of sign, one might wonder WHAT IT MEANS, when we say that SOMETHING IS A SIGN OF SOMETHING ELSE and especially, WHAT IS THE RELATIONSHIP BETWEEN A SIGN AND THAT TO WHAT IT REFERS. But a slightly different question may just as well be asked: WHAT DOES IT MEAN when we say that AT A MOMENT $t$ SOMEBODY USES SOMETHING AS A SIGN OF SOMETHING ELSE? I suggest to consider that latter question a basic one, with the former being secondary. It is motivated by my strong conviction that hardly anything is a sign conclusively , during its entire existence and nothing is a sign independently of how it was used in a particular case. The world does not consist of only two separate realms: signs and non-signs. Everything — every being, to use the language of philosophers, that is, an

object, a phenomenon, an event, a quality etc. — may temporarily become for somebody a sign of something else, of some other being, if this thing is used in a particular manner, a manner which requires further description. Hence, I propose treating expressions like "a sign denotes something" or "a sign expresses something" as metaphorical simplifications, replacing longer expressions such as "at a moment $t$ X uses something to denote (express) something else" or "at a moment $t$ X uses something to get to know (learn about) something else."

## II. *Semeion*

The Stoics, the Epicureans and the Skeptics devoted more attention to the concept of *semeion* — an indication — than to the concept of *semainon* — a sign, especially a linguistic sign. It needs to be noted, however, that by rendering the Greek concept 'semeion' as 'indication' and 'semainon' as the noun 'sign', I am not making any terminological or conceptual choices; I am merely reporting how these Greek words are commonly translated. Therefore, in what follows, I will be using those terms in their original Ancient Greek form in order to avoid creating the impression that there is a certain theoretical decision or an interpretation behind this translation. So, most importantly, I am by no means deciding whether the word 'indication' is the right translation of 'semeion' or whether it should rather be rendered as e.g. 'index', 'manifestation' or 'sign', or maybe sometimes this way and sometimes the other.

What was *semeion*? According to Sextus Empiricus (Sextus Empiricus 2006: II, 143-276) the term can be used in one of the two ways: general or specific. In its GENERAL sense, the word refers to that what seems to reveal something; the name 'semeion' is therefore attributed to what brings into mind the object which was once observed together with the *semeion*. SPECIFICALLY, *semeion* is what indicates an unclear object, that is, the so-called *adelon.*

But there are three kinds of unclear; concealed things: unclear pure and simple, unclear by nature or unclear for the moment. The first type defies any apprehension, including that through a *semeion*. Only the other two are disclosed through it. An INDICATIVE *semeion* — *endeiktikon* — corresponds with things that are unclear by nature, like the human soul; e.g. body movements are the indicative *semeion* of the soul. This kind of *semeion*, thanks to its own nature, performs a disclosing function and it always indicates one unclear object. Meanwhile, objects that are unclear for the moment are revealed by means of a different type of *semeion* —

the RECOLLECTIVE, *hypomnestikon*; it is precisely that kind of *semeion*, which has been observed together with something and now, as that thing is no longer visible, reminds us of it. For example, smoke is a recollective *semeion* of a fire that is unseen at a given moment, a scar is one of an old wound and heart damage — of upcoming death.

Therefore, *semeion* — both the indicative and the recollective — is something relative: it cannot be said about anything that it is simply a *semeion;* one must always mention of what that *semeion* is, by saying "a *semeion* of this and that." The "this and that" cannot be observed together with its *semeion*: a shadow is a *semeion* of a body as long as the body itself remains unseen; but if we are simultaneously observing both the body and the shadow it casts, the latter ceases to be the *semeion* of that body. The same recollective *semeion* sometimes indicates only one thing and sometimes different things, sometimes this, sometimes that. Similarly, e.g. for one doctor a given phenomenon is a *semeion* of one illness and for another one it is an indication of a different illness; a raised firebrand is a *semeion* of approaching enemies for some, while for others it indicates that friends have arrived; a ringing bell is at times a *semeion* that the fish market has opened, but it can also be a *semeion* that it is time to pour water on a road. This results from the fact that the recollective *semeion* is in some cases ASSIGNED BY THE LEGISLATOR and it depends on him to what the semeion is supposed to indicate, whether it is to indicate one thing or several things at the same time, or maybe once this, once that.

Since the same phenomenon or event can be a *semeion* of different things and since the *semeion* is something that cannot be learned, but what we apprehend through reason instead of through the senses, and finally, since it is a PROPOSITION (after all, we say that one *SEMEION* of something is true, while the other is false and it is propositions, not objects that have a truth value), then the semeion, as Sextus Empiricus notices, is not a perceptible, but an intelligible, noetic thing.

The Stoics also considered the *semeion* a proposition, a sentence, an *axioma,* in other words, a propostion, in a logical sense, rather than a judgment, in a psychological one — *krisis.* However, in their view, not every proposition was a *semeion,* only the one that fulfilled the two conditions: it is TRUE and it is the ANTECEDENT OF A TRUE CONDITIONAL, that is, a sentence in which the consequent is true as well.

But not always, as the Stoics would say, a true antecedent of a true conditional is a semeion of the consequent in that particular sentence. For example, a proposition "it is daytime," although true in that given case, is

not the *semeion* of the proposition "it is bright," even though the former is the antecedent and the latter the consequent of a true conditional: it is not a *semeion*, because we see both — that it is daytime and that it is bright — with our own eyes. While in order for an antecedent to be the *semeion* of a consequent, it has to, according to the Stoics, REVEAL that consequent, as it is the case of the sentence "If she has milk in her breasts, she must have borne a child." Hence, what the *semeion* refers to, must be hidden and the *semeion* itself must be apparent.

However, the Stoics claimed, even though the consequent is hidden away, it is still valid and present at that moment. Those who believe that a thing from the present can be a *semeion* of something from either the past or the future are wrong, like in the sentences "If he has a scar now, he had a wound in the past" or "If he has an injured heart at this moment, he will die." It is true that in the former example a wound is something from the past (once it existed, but it is gone) and in the latter death is in the future (the injured is still alive). But what is past or future here are merely the objects or events, to which the propositions refer, while the very propositions exist in the present and they are already true at this moment. According to the Stoics, it is not the present thing (a scar), that is the *semeion* of a past thing (a wound), nor is the present thing (an injured heart), that is the semeion of something in the future (death). Both the *semeion* and its referent are present and contemporary to each other. The *semeion*, namely, the proposition that he has a scar, is present, just as the proposition that he was wounded exists now and is true at this moment; the *semeion*, namely, the proposition that he has an injured heart, is present, just as the proposition that he will die exists now and is true at this moment. Thus, the *semeion*, the Stoics stated, always refers to something present.

Therefore, they held that the notion of *semeion* is conceived by INFERENCE from one proposition (or propositions) to the other. Especially, a PROOF, *apodeixis,* was considered a variant of *semeion,* because, as they claimed, it makes the conclusion obvious; strictly speaking, the conjunction of an argument's premises is a *semeion* of a conclusion, like e.g. in the following argument: "If there is movement, then there is also vacuum," or, "If there is movement (*semeion*), then there is also vacuum (a conclusion, initially hidden away, but then revealed by premises, which altogether constitute the *semeion*)."

Some Epicureans as well, like Philodemos, associated the concept of semeion with INFERENCE but mostly with INDUCTION.

Sextus Empiricus, a Skeptic, also inclined to the view that premises,

especially in a proof, reveal a hidden conclusion, so they act as its *semeion*; however, due to his skepticism, he refrained from providing his final opinion on that matter. Yet, he criticized the Stoics for declaring so definitely that the *semeion* is a proposition. He argued that, after all, a proposition is the meaning of a sentence and meaning is something different from a sign or an indication, so a proposition cannot be either a sign, nor an indication, which means that the *semeion* is not a proposition.

He also argued with the Stoics' view that the *semeion* is a true antecedent of a conditional with a true consequent. He pointed to the fact that the consequent ought to be unapparent, otherwise it would not need a *semeion* as its intermediary, because it would be perceptible *per se*. But then, if the consequent is unapparent, how can we know if it is true or false, he asked. A conditional statement composed of a true, apparent antecedent and an unapparent consequent, he concluded, is undecidable in terms of its truth value: we do not know if it is true, because we do not know whether it has a true consequent, as well we cannot tell if it is false, because we do not know whether the consequent is false. Meanwhile, Sextus reminds us, the Stoics claimed that not only the antecedent of a conditional statement must be apparent and true in order to be the *semeion* of the consequent, but also that the entire sentence must be true, so it must have a true consequent. At the same time they required that the consequent be unapparent, but, according to Sextus, means we cannot know its truth value. From that criticism, Sextus drew a conclusion that the Stoics' view about the *semeion* being a true antecedent in a sound conditional statement does not hold water.

He rejected the view for one more reason: if the Stoics were right, the uneducated people, who have no clue about propositions and dialectical principles, or about logic, should not be able to use *semeia*. And yet, he notices, we know it from practice that they do it and they do it successfully, like simple helmsmen judging winds or farmers predicting droughts. In fact, it does not concern only human beings; the Stoics themselves, he reminds us, admit that even animals are capable of grasping *semeia*; a dog tracks an animal by its footprints and a horse leaps forward at the raising of a whip, even though — he adds humorously — the former does not make the inference "it is a footprint, then animals must be nearby" and the latter does not apply the inference "if a whip has been raised, I had better gallop."

Finally, he denied the Stoics' claim that supposedly the *semeion* and its referent coexist in the present moment. If it was so, then both would be directly accessible and neither would be indicating the other.

As we can see, ancient philosophers touched upon many crucial issues

in their discussions on the notion of *semeion*, such as: what kind of being is *semeion,* is the concept relative and what are the properties of the relation between the *semeion* and its referent. They made a number of valuable remarks, which remain valid until today; e.g. that a *semeion*'s referent ought not to be perceptible at the moment when we observe and interpret the *semeion* itself; that the relation between the *semeion* and the object it indicates may be either natural or conventional; that using *semeia* involves inferring; and that not only humans use *semeia*.

Let us treat these remarks as a starting point for our considerations, which, as I have already announced — will consist in formulating certain preliminary questions and in outlining possible answers to them.

## III. What Kind of Being Is A Sign?

Peirce wrote:

> I define a sign as anything which is so determined by something else, called its object, and so determines an effect upon a person, which effect I call its interpretant, that the latter is thereby mediately determined by the former. (Peirce 1977: 80-81)

He also described the sign as "anything which conveys any definite notion of an object in any way" (Peirce 1931-1935, 1.540). Therefore, according to Peirce, BOTH CONCRETE THINGS AND ABSTRACT BEINGS COULD BE SIGNS. For example, at least some singular signs, the so-called *sinsigns*, as well as some iconic signs, or *icons*, to use Peirce's terminology, were concrete things in his view. He also treated "the performance of concerted music" as an acoustic object, so as a concrete and singular thing, and at the same time as a sign (Peirce 1931-1935, 5.475). Whereas, what Peirce calls a *qualisign* and a *legisign,* an *interpretant,* that is, the meaning of a sign, a *dicent,* or a proposition, and an *argument* — reasoning or argumentation, —- are all abstract beings, but they are different kinds of signs. Ideas, feelings, mental images, concepts, representations and thoughts have an abstract character as well; all of them, Peirce claimed, are signs or they can serve as signs. Thus, "ideas are the first logical interpretants of the phenomena that suggest them, and which, as suggesting them, are signs, of which we infer interpretants" (Peirce 1931-1935, 5.287). While discussing the other experiences, Peirce wrote that "whenever we think, we have present to the consciousness some feeling, image, conception, or other representation, which serves as a sign" (Peirce 1931-1935, 5.283) and then added that "we think

only in signs: these mental signs are of mixed nature; the symbol parts of them are called concepts" (Peirce 1931-1935, 2.300). There is no doubt then that, for Peirce, both concrete objects and abstract beings were signs.

> Yet, there are scholars who believe that ALL SIGNS ARE ABSTRACT. For example, when de Saussure describes the sign as a combination of *signifiant* and *signifié,* the signifying unit and the meaning, noticing psychic elements in both, he must treat the entire combination of the two as something psychic, in other words, as a certain abstract being. But even those researchers who reckon that signs are abstract, often attribute a physical nature to the sign vehicles, such as e.g. particular sounds, images or inscriptions (Morris 1971: 96; Eco 1976: 49).

Other authors, on the other hand, claim that signs are some form of stimuli, therefore, SOMETHING COGNIZABLE THROUGH THE SENSES, SOMETHING PHYSICAL (Guiraud, 1974: 29 and 1976: 13-14).

An approach inbetween these extreme stands is adopted by the proponents of the view that SIGNS ARE OF A MIXED, complex, dual NATURE. They say that

> the participation of an object in semiosis as a sign implies a dual nature for that object [...] The sign [...] is an object [...] empirically describable [...] but [...] it also is an 'element of my consciousness'. (Zeman, 1977: 25)

Yet another group of scholars maintain that only SIGNS IN THE NARROW SENSE, that is, symbols, ARE THINGS, while SIGNS IN A BROADER SENSE are EITHER PROCESSES AND STATES OF THINGS — and then they are called indications — OR concrete THINGS, called symbols (Dąmbska, 1973: 41).

A different example is provided by Prieto (1970: 107), for whom the sign is an abstract unit, composed of a class of signals, a class of messages and the relation between those classes, while the term 'signal' denotes a specific object.

Finally, there are authors who agree that SYMBOLS and SIGNS ought to be distinguished, since THE FORMER are EVENTS OR PHENOMENA, while THE LATTER are OBJECTS, nevertheless they do not see any possibility for formulating a general, overriding concept that would encompass both indications and signs (Kotarbińska 1957: 104).

The preceding overview attests to a divergence between the views on the ontological nature of the sign. It seems that while attempting to formulate the definition of a sign, one had better not restrict the scope of this concept in advance, for instance one should NOT PREJUDGE WHETHER SIGNS ARE EXCUSIVELY ABSTRACT OR — on the contrary — EXCLUSIVELY CONCRETE BEINGS. Such premature decisions are undesirable for a number of reasons.

Even those who maintain that the sign is a concrete object may find it useful at times to consider a certain CLASS of signs, such as synonymous or isomorphic signs (or both); such a concept often proves a valuable analytical tool. Admittedly, the constituents of that class are concrete beings but the class itself is abstract. And yet, they do not refrain from calling it a sign, a word, an expression or a sentence, depending on a case. They say, for example, that the word 'rose' denotes this and that plant, instead of saying that this particular graphic or acoustic piece 'rose' (or each and every one of that sort) denotes such a plant. Therefore, IT WOULD BE BETTER TO ALSO HAVE THE CONCEPT OF THE SIGN AS AN ABSTRACT BEING.

Yet another fact supports this. As we know from practice, we sometimes treat our feelings and states of mind as signs, e.g. as indications or signals of some other emotional experiences: the fact that it was so easy for me to forgive him accounts for my affection for him; the very fact that I am hesitating to go to the movies is a sign for me that I do not really want to go. It would be quite unnatural and awkward to consider my state of mind (subject to a semiotic interpretation) a concrete object, since at a certain point I myself would become this object. But often at that very moment the other state of mind, which my first state signals, would be me. That is precisely the awkwardness of the situation: at some point I am a sign of myself at that very point. Yet, since a sign cannot be identical with its referent, there must be some other solution. The first one would consist in assuming that it is some aspect of myself that is a signal for me of another aspect of myself. But aspects are not concrete beings, which means that we would be departing from the concept of the sign as a concrete object. The other solution would call for the assumption that some physical part of my organism is, at a given moment, a sign for me of some other part of my body at that same moment. However, this would require me to be able to pinpoint where different states of mind can be found in my body and to accept that all my feelings (like the hesitation about going to the movies, as well the fact that we do not feel like going) are indeed located in particular

parts of myself. So again, it turns out that sometimes it is inconvenient to treat the sign as a concrete object.

On the other hand, sometimes it is just as inconvenient NOT TO HAVE THE CONCEPT OF THE SIGN AS A CONCRETE THING, which is so useful e.g. while discussing iconic signs, while analyzing a particular usage of a symbol or while exploring the modifications in the so-called dictionary meaning with respect to the context and situation in which an individual expression appears.

For that reason, I prefer to leave both possibilities open and to formulate the definition of the sign in the form of an alternative. Thus, let us agree that BOTH CONCRETE THINGS AND ABSTRACT BEINGS MAY BE SIGNS.

## IV. The Concept of the Sign in a Broad Sense

IS IT POSSIBLE TO FORMULATE THE CONCEPT OF THE SIGN THAT WOULD INCLUDE what ancient Greek philosophers called a *semeion,* as well as what they called a *semainon?* One who accepts the abovementioned suggestion to assume that a sign can be either a concrete thing or an abstract being shall be also inclined to answer that question affirmatively.

However, many authors refuse to accept such an overriding, generic definition of the sign. They sometimes argue that accepting it would equal imposing a certain unity on signs, which in fact does not exist (Wells 1977: 7). Some of them mean by this that (1) THERE IS A CRUCIAL DIFFERENCE BETWEEN SIGNS AND INDICATIONS; THE FORMER ARE, in their view, CONVENTIONAL, while THE LATTER ARE NATURAL. Accommodating these opposite qualities within one generic concept of the sign would lead to, they believe, its heterogeneity and inconsistency (Guiraud 1974: 29-31). (2) Other authors, as it was already mentioned, think that INDICATIONS FALL UNDER THE CATEGORY OF FACTS OR EVENTS, while SIGNS, in the narrow sense of that word, TO THE CATEGORY OF THINGS; consequently, they claim, "it is impossible to propose one common definition without risking the accusation of a malformation, since such a formula would have to include variables which could be substituted by either names of objects or verbal equivalents of phenomena, in other words, by expressions belonging to different syntactic categories" (Kotarbińska 1957: 104).

The first accusation may be refuted by pointing out that even THE SO-CALLED NATURAL SIGN CONTAINS CONVENTIONAL ELEMENTS,

without which it could not function as a sign. Besides, it is always possible to come up with such a formulation of the definition, so that it encompasses both natural and conventional relations between the sign and the signified being. As to the opposition between the conventional and the natural, we shall return to that matter in the next chapter.

A possible response to the second accusation is that whenever something is used as a sign in the strictest sense of the term, it always occurs in a certain situation. This thing, isolated from that situation, ceases to function as a sign. The same white cane, which is the sign of a blind person when it is used to detect obstacles in the way or when it is held during a tram ride, but it stops to have meaning or to indicate anything when it is left in the corner of the hall, when it is hanging on a hanger or when it has been stuck into the ground and tied to a sapling to support it. It is not the cane that is the sign of blindness but THE FACT THAT IT IS USED in a particular way and at a particular moment. Therefore, the first possibility of formulating a common definition for indications and signs is by recognizing the latter as facts or phenomena as well; thus, the discussed distinction between indications and symbols would be no longer valid: BOTH INDICATIONS AND SIGNS WOULD BE CONSIDERED FACTS OR PHENOMENA.

Not everyone will agree with that argumentation. The difference between actual and potential signs will be surely brought up, in the light of which a white cane, no matter if it is tossed into a corner, if it is on the hanger or if it supports a tree, it is still a sign, or precisely speaking, a potential sign. The same goes for a car parked in the parking lot, which does not cease to be a means of transportation, a potential vehicle.

This is an issue worth discussing. For starters, notice that this analogy is by no means complete or that direct, since it is the car that is a means of transportation, not the fact that someone's driving it at a certain moment. So the matter remains open.

If somebody rejects the first possibility of formulating a common definition of indications and signs, because (s)he refuses to recognize the latter as facts or phenomena and (s)he insists that signs are things, while indications are facts, which, in her/his view, precludes the possibility of formulating a proper, common definition of both, there is one other possibility, inspired by Kotarbiński (1929: part I, chap. I and III). I therefore propose a reistic (or concretistic) elimination of apparent names, or onomatoids, that is, nouns denoting facts and phenomena, like the eruption of Vesuvius or impermeability, as well as concrete things, like the erupting Vesuvius or an impermeable object. A fact, or an event, is a certain "state of affairs

consisting in the fact that an individual located in a determinate place and time" has a certain property, while a phenomenon is precisely "that property whose possession by an individual in a determinate place and time" was referred to as a fact or an event (Ajdukiewicz 1978: 90). In the light of this concretistic interpretation, facts, or events, and phenomena are considered things, which are such and such at this or that time and place (or at all times). Hence, we would no longer speak of facts and phenomena, but only about concrete things, which opens up the second POSSIBILITY OF PROVIDING A COHERENT DEFINITION OF BOTH INDICATIONS AND SIGNS, namely, BY MEANS of terms denoting CONCRETE OBJECTS.

The third possibility would consist in formulating the definition of sign IN A LANGUAGE THAT CLASSIFIES THE NAMES OF CONCRETE THINGS AND THE NAMES OF FACTS OR OF PHENOMENA INTO THE SAME SYNTACTIC CATEGORY, as it happens in many natural languages. This would eliminate the risk of the appearance in the proposed definition of such variables that are substituted by expressions from different syntactic categories. Thus, it would be possible to stick to the belief that an indication is a fact or a phenomenon, while a sign is a concrete thing, and at the same time to formulate their common definition, e.g. in the form of an alternative, without risking the accusation of malformation.

Summing up all that was said, there are three possibilities: firstly, we may describe signs in the strictest sense as facts or phenomena, just like indications; secondly, we may describe indications as concrete things, which in a given time and place (or always) are such and such, just like signs; finally, we may describe indications as facts or phenomena and signs in the strictest sense as concrete things, using a language in which the names of facts or of phenomena and the names of things belong to the same syntactic category. In each of these cases a proper definition of the generic notion of sign is possible. And I strongly believe that IT IS VITAL TO HAVE such A GLOBAL DEFINITION that ENCOMPASSES ALL INSTANCES IN WHICH SOMETHING WAS USED AS A SIGN.

## V. Natural Versus Conentional Signs

Natural signs are usually contrasted with conventional ones: (1) either in terms of WHAT KIND OF OBJECTS, EVENTS OR PHENOMENA THEY ARE, (2) or in terms of WHAT KIND OF RELATIONSHIP EXISTS BETWEEN THE SIGN AND ITS REFERENT; (3) or in terms of both.

In the first instance, signs that are natural objects, events or phenomena are called NATURAL SIGNS, while everything else is simply called a SIGN.

So, even though thus understood naturalness is considered the opposite of artificiality, this is not reflected in the terminology: there is no such term as 'artificial signs'.

The word 'natural' — so does 'artificial' — carries at least two different meanings here:

(a) The adjective 'natural' is attributed only to what DEVELOPS IN NATURE, like animals, plants, minerals, the rain etc., and what comes into being WITHOUT HUMAN INTERFERENCE, as well as what was neither processed and modified by men, nor used by them in any other way; all other objects, events or phenomena are considered artificial. In that sense, artificial animals are born as a result of human-led crossbreeding, roses that grew thanks to the gardener's care, as well as a piece of amber thrown out by the sea and then encased in silver, rain brought down by physical or chemical methods or a river banked up by a dam.

(b) In the second sense, the adjective 'natural' refers to WHAT COMES DIRECTLY FROM NATURE, EVEN IF MEN WERE BEHIND its existence or if they modified or used it later on; here, the name 'artificial' would be given only to those objects, events or phenomena that do not have such a natural source of origin. From this perspective, natural is the abovementioned domesticated animals, garden roses, amber encased in silver, human-induced rain or waters banked up by a dam, as well as honey harvested from a honeycomb by the beekeeper, even if he had been feeding his bees with sugar, or a silk scarf and wool thread.

This distinction between the natural and the artificial gets even more complicated, as the word 'natural' may have a number of other meanings, especially with reference to actions and behaviors. These other meanings are connected with those mentioned before, which is why there are often confused.

1. What is considered natural are inborn behaviors or instinctive actions such as reflexes, e.g. pupil constriction in response to light; hence, the opposite of such naturalness is all that is acquired and learned — in the broad sense of that word, including the conditioned reactions of the organism.

2. Similarly, there is a distinction between behaviors and actions which are natural in the sense that they are INVOLUNTARY (such as sneezing) and those which are intentional, which result from the doer's free will, like e.g. grunting. All instinctive behaviors or actions are involuntary, but never the other way round.

3. An analogous opposition is drawn between UNCONSCIOUS behaviors and those which the doer knows he is displaying; sometimes, the former are called natural. Instinctive may, but not necessarily, be unconscious, if we give that name to those behaviors of which the subject is not aware; for example, breathing is instinctive, but not unconscious in this sense of the term.

4. The word 'natural' is sometimes attributed to IMPULSIVE AND SPONTANEOUS actions and behaviors, that is, those which occurred WITHOUT PRIOR CONSIDERATION, like bursting out with laughter, screaming out of joy or fear; these are usually opposed to behaviors and actions performed with premeditation.

5. A state or a process is sometimes called natural, when it is SELF-CONTAINED, as opposed to those which are induced. This refers to a number of things. (a) Those states and processes are self-contained which are independent from any action or behavior whatsoever on the part of the person (or that thing), who (which) experiences those states and processes or who (which) is subject to them, e.g. aging over the course of time. (b) Self-contained are also (but in a slightly different sense) somebody's states or processes which are independent from their deliberate interference, e.g. even though the aging of the organism depends on the subject's actions and behaviors, some of which are conscious and deliberate, it is not directly caused by their intentional interference aimed at making them less physically able. By analogy, there is a difference between the self-containment of a process or a behavior (c) occurring independently of external factors (such as growing old, which was mentioned above) and of that (d) occurring independently of any intentional or unintentional interference of the outside world, e.g. spontaneous damage to a properly used device, not a damage that was done deliberately or as a result of a misuse of the device.

6. Naturalness is sometimes sought in UNINTENTIONAL, NON-DELIBERATE behaviors or actions, as opposed to intentional ones. But while before (point B) the word 'intentional' meant 'out of free will', here it also means 'purpose-driven', 'displayed or performed with a certain intention.' In that sense, the word 'unintentional' — and consequently, 'natural' — would refer to experiencing or exhibiting satisfaction at the opponent's error or failure, which inevitably, even if unintentionally,

adds to the loser's misery. All behaviors or actions that can be classified as cases of nature's dominance over culture may serve as examples of thus understood naturalness.

7. What is also considered natural are VOLUNTARY actions (as opposed to actions that are forced upon us), especially UNPROMPTED ones in contrast to those which are imposed, demanded or requested. Therefore, we speak of a natural upsurge of national spirit or of the milk of human kindness. Note that in this case naturalness is ascribed to actions which in point B were considered precisely the opposite of natural.

It does not take much to notice that the abovementioned meanings of the word 'natural' are very similar and the semantic scopes of this adjective often overlap when the word appears in senses which are related. Moreover, it also happens, although not as often, that the same behavior or action which is considered natural when contrasted with one thing is treated as unnatural in comparison with something else. But only a few of a those unnatural behaviors or actions are likely to be called artificial: perhaps, what occasionally deserves that name is a behavior which lacks spontaneity (point D), as well as a state or a process that is not self-contained (point E). Also, only some of them are referred to as conventional.

The latter word is ambiguous too. First of all, CONVENTIONAL is something that is either based on a convention or that conforms to a social convention. A convention is an agreement, a norm or a custom. Hence, Dąmbska proposed the following distinction of the word's three meanings (Dąmbska 1973, 35):

1) an AGREEMENT, that is, an activity of authorized persons consisting in accommodating actual or potential stands on a given issue and reaching a common position, which, under specific conditions, binds those who entered into this agreement (or a test of such an agreement, i.e. the effect of the above described activity);

2) a „DECISION regarding the choice of determinant or a class of determinants $W$ which constitute a system (a certain order of relations) of sign-like productions that belong to the universe of cultural artifacts" (or the effect of that decision-making, namely, a "thus chosen determinant," such as "a postulate, a definition, an axiom system, a rule, a literary or artistic canon etc.").

3) a certain CUSTOMARY PRACTICE, a stereotypical WAY OF BEING, which is not instinctual, but designed to communicate a certain meaningful message set out in a directive (point 2) or in an agreement (point 1),

even if its practitioners remained unaware of the convention determining it" (or the effect of such a practice, namely, objectified displays of such a custom, like social conventions, conventional clothing, decorations etc.") (Dąmbska 1973, 35-36).

The abovementioned ambiguity of the word 'conventional' makes it even more complicated to distinguish between NATURAL AND CONVENTIONAL SIGNS, even more so, if what is considered conventional, is to follow a custom or a habit without being aware of the determining convention behind it (point 3). In such a case we would consider conventional a spontaneous or unintentional behavior and action. Yet, it is precisely those types of behaviors that were previously classified as natural (points D and F). Therefore, certain understandings of the words 'natural' and 'conventional' question this very opposition.

So far, we have been discussing the distinction between natural signs and other types of signs — precisely speaking, conventional signs — in terms of what kind of objects, behaviors, actions, states or processes they are. However, it is much more common to distinguish them in terms of WHAT KIND OF RELATION BINDS A SIGN WITH THE BEING IT DENOTES. Moreover, it is often said that if this relationship is natural, then we have to do with natural signs and if it is conventional, then the signs are called conventional as well.

The most often cited examples of a natural relationship is that of CAUSALITY and, occasionally, SIMILARITY. Some claim that every natural relationship can be eventually reduced to a causal one — "a NATURAL (in the long run traceable to causal) relation between terms" — examples of which are provided as follows:

> We are often enabled to infer a cause from an effect, an effect from a cause, or one phenomenon from the other in a pair of co-occurrent phenomena. Whenever we infer terms, we are in fact placing a phenomenon, as an index (left-hand term), into a relation $a \rightarrow b$. (Mulder, Hervey 1971: 328)

They also assert that this relationship is empirical, accessible by means of experience, and they give the following examples of natural indices to support that claim: clouds are indications of possible rain, lightning is an indication of thunder, a rash is a symptom of smallpox, limping is an indication of an injured leg, injuring a leg as an indication of limping and the whistle of a kettle as an index of boiling water. The latter example was differentiated from the others (called symptoms) and was referred to as a signaling device;

but each and every one of them falls under the category of natural indices (Mulder, Hervey 1971: 327-329).

This list of examples makes us wonder WHAT KIND OF ELEMENTS ARE LINKED BY such a NATURAL RELATION. Clouds are a concrete thing, but the possibility of rain is not. So if a natural relation can be established between two concrete objects or between a concrete object and an abstract being, it is not a cause-effect relation, as such a relationship can exist only between events. Assuming, however, that it is only a matter of formulation and that in all instances the scholars had indeed events in mind, is it really the same kind of relationship in all of the examples? The presence of clouds is a necessary but insufficient condition of rain, while injuring a leg is not a necessary condition of limping, although it may be sufficient. On the other hand, suffering from smallpox is both a necessary and a sufficient condition for breaking out in a specific rash, but lightning is by no means the cause of thunder, just as thunder does not cause lightning. The gathering of heavy clouds is an event which announces rain, but it does not announce the event of probable rain.

This leads us to suspect that when we speak of a causal relationship existing between an event treated as a natural indication of something else and an event which is precisely that "something else," we tend to confuse the cause-effect relation (which we shall call a relation of induction) with the RELATION OF SUCCESSION in the thinking process, one which occurs when one idea leads us to a different one. The latter relation will be further discussed in chapter five.

We shall accept the following popular definition of 'cause': "event A is the cause of event B" means that "whenever A occurs, always B happens next." But then, should only causal relations be called natural? What about the correlation between the cross-section of a human hair and the indicator of skull length and width or the relation between thermal conductivity and electric conductivity (Kotarbiński 1929, part IV, chap. 3), or the relationship between a free-fall time of a body and the distance covered by that body? Are these relations not natural? They are certainly not arbitrary — *thesei*. So if we were to call NATURAL THOSE RELATIONS WHICH ARE NOT ARBITRARY, but which were discovered in nature, which were proven to exist naturally, *physei*, then we would have to conclude that not only cause-effect relations between events are natural. We could perhaps formulate a stipulative definition in which a 'natural relation' equals a 'causal relation' (in the sense described before), but then the question would arise if such a terminological decision is sufficiently justifiable.

Opposing NATURAL AND CONVENTIONAL RELATIONS is sometimes founded upon a different premise than that the former are causal, while the latter are not or that the former can be found in nature, while the latter are established by men. Some of the examples provided by the authors seem to prove that, sometimes even against the authors' claims. For example, according to Mulder and Hervey, a langur's warning call at the sight of a tiger is supposed to serve as an example of a conventional, not a natural, index (Mulder, Hervey 1971: 331). What is the cause of the langur's call, we shall ask. The common answer would be: "The fact that he saw a tiger." Therefore, it would seem that we are dealing with a causal, and consequently, a natural relation. However, Mulder and Hervey maintain that it cannot be the cause, since tamed langurs in zoos do not react like this at the presence of a tiger; if we were to assume that the tiger is indeed the cause of a langur's warning call, we would have to admit that when langurs do not call at the sight an approaching tiger, the laws of nature are suspended. It seems that this argument can be refuted by another example given by the authors, which they classified as a natural indication, namely, the one with heavy clouds and rain. If heavy clouds have gathered in the sky, but there is no rain, does it mean that the laws of nature have been suspended? Not in the least. After all, the sight of a tiger and the gathering of clouds are both necessary but insufficient conditions. Why, then, some still maintain that clouds are a natural index, while the call of a langur is a conventional one? Presumably, the reasoning behind such a distinction is that in the case of a langur there is one more necessary condition, an intermediary one, that is, a specific emotional state triggered by the sight of a tiger, which culminates in an act of will, a "decision" to let out the call. By the way, notice that the freedom of this "decision" is probably highly limited: it is most likely a conditioned response. Yet, presumably, the authors apply the following reasoning: it depended on the langur whether to call out or remain silent, so it cannot be the exceptionless and necessary — the natural — relation of cause-effect.

They state that:

> [t]he call itself is not CAUSED by the presence of the tiger[...] any more than going to bed is caused by feeling tired. It is MOTIVATED by the presence of a tiger just as going to bed may be motivated by feeling tired. (Mulder, Hervey 1971: 331)

What we are dealing here with, as it seems, is a different type of the natural-conventional distinction than before. This time, for a relation between

the sign and the denoted being to be natural, something more is required than just causality: it cannot include the RELATION OF MOTIVATION, otherwise it is treated as conventional. In that sense, natural indications may only be those objects, states of affairs, events or phenomena, which do not contain awareness or its products, in other words, natural relations can only be found within blind forces of nature, within a sphere of life governed solely by determinism. Whereas, whenever an animal's or a human's free WILL is involved , no matter the degree of freedom, in other words, in the case of indeterminism, we can speak only of conventional indications.

Apparently, this last distinction into the natural and the conventional was drawn not only on the basis of what kind of relationship there is between the indication and the denoted being, but also on the basis of what kind of being the indication is.

The opposition between natural and conventional indications based on these two principles together — the TYPE OF RELATIONSHIP AND the KIND OF ITS CONSTITUENTS — is more complex than those distinctions which include either only the relation or the kind of constituents.

It sometimes happens that we consider natural those objects, states of affairs, events or phenomena which do not contain in them HUMAN awareness, neither are they the products of such an awareness. If that is how we understand naturalness, then we would regard a dam built by beavers as a natural, not a conventional, indication of the beavers' presence, since it was not a human awareness that was involved in building that dam, but an animal's. Whereas the whistle of a kettle would qualify — in that understanding of naturalness — as a conventional indication of boiling water, since a man purposefully built a signaling device into a kettle. However, it is enough to change the meaning of the word 'natural' into, e.g. one that maintains a cause-effect relationship with some event, for the whistling of a kettle (Mulder, Hervey 1971: 329), the gauge of a barometer, the mercury level of a thermometer or the position and the speed of a windmill's wings to be considered natural indices of corresponding events.

It remains an open question whether it is always so that when an indication is not classified as natural in a particular case on account of the adopted understanding of the word 'natural', it means that it is a conventional indication. It would indeed always be the case if those who drew that distinction defined the word 'conventional' as the equivalent of the adjective 'unnatural'. But while defining both terms separately, they often treat them as non-complementary antonyms, and yet, they tend to classify signs as either natural or conventional just in case. Meanwhile, there

is also the possibility of including a different kind of sign apart from the two categories, e.g. FORMAL SIGNS or FORMAL INDICATIONS, that is, a sign distinguished by the formal relation between events like the one between the divisibility of the sum of digits in a given number by three and the divisibility of that very number by three (Kotarbińska 1957: 104, 106).

In some theories, opposing the natural and the conventional leads to a distinguishing of INDICATIONS, as natural signs, and SYMBOLS as conventional ones. For example, Peirce describes an indication, which he calls an index, as a sign „determined by its object [...] by being real and in its individual existence connected with the individual object," while a symbol is a sign "determined by its object by more or less approximate certainty that it will be interpreted as denoting the object, in consequence of a habit" (Peirce 1931-1935, 4.531).

Moreover, the opposition between natural and conventional signs sometimes serves as a basis for the distinction of ICONIC or visual SIGNS and SYMBOLS. Some scholars claim that an icon performs its semiotic function thanks to a natural relation with the represented object, that is, similarity or correspondence in a particular respect. For example, Peirce defines an icon, or likeness, as he also calls it, by saying that it is a sign "whose relation to the object is a mere community in some quality" (Peirce 1931-1935, 1.558). Meanwhile, symbols are conventional signs "the ground of whose relations to the objects is an imputed character" (Peirce 1931-1935, 1.558). In other words, a symbol is " [...] the representation characteristic of which consist[s] precisely in its being a rule that will determine its interpretant" (Peirce 1931-1935, 2.292).

Thus, in those theories which do not recognize indications as signs (e.g. Bonta 1973: 28), the distinction between the notion of an indication and that of a sign, as well as certain classifications of signs, refer to the opposition between the natural and the conventional. But, as we already know, this opposition raises a lot of doubt. Therefore, before proceeding to draw the abovementioned distinctions and classifications on the basis of this opposition or formulating the definition of the sign, one ought to carry out a careful analysis of the meaning of the words 'natural' and 'conventional'.

Only after specifying the concept of naturalness may one attempt to answer such questions as: (1) is the NATURAL RELATION BETWEEN *A* AND *B* A SUFFICIENT CONDITION FOR *A* TO BECOME THE INDICATION OF *B*? (2) is the SIMILARITY BETWEEN *A* AND *B*, or more importantly, SIMILARITY IN WHAT RESPECT IS A SUFFICIENT CONDITION FOR *A* TO BECOME THE ICON OF *B*.

Those who are willing to answer affirmatively to the second question should bear in mind the remark made by Peirce that "particularly deserving of notice are icons in which the likeness is aided by conventional rules; thus an algebraic formula is an icon" (Peirce 1931-1935, 2.279). They should also take into account Morris' view that "iconicity is a matter of degree" (Morris 1971: 273).

In fact, there is no icon in which resemblance would not be aided by convention. If we do not know the convention, in other words, if we do not know what code to use in a given case, we are not able to use a symmetric relation of similarity as a basis for an asymmetric semiotic relation. For that very reason, a dog does not recognize his master while looking at his photograph (although, if we are to believe the trademark of the gramophone company *His Master's Voice,* a dog is capable of using the recording of his master's voice as the icon of the master himself). We shall accept the abovementioned proposal to treat expressions like "$A$ is an icon of $B$" as metaphorical simplifications replacing longer expressions such as, in this case, "at a moment $t$ $X$ is using $A$ to represent $B$" or "at a moment $t$ $X$ is using $A$ to imagine $B$." Accepting that proposal may lead someone to change the question if a certain similarity in between $A$ and $B$ is sufficient for $A$ to become the icon of $B$ into a different question, namely: can the fact that $X$ believes that $A$ is somewhat similar to $B$ be a motive enough for $X$-$A$ to use $A$ to represent $B$ at a moment $t$?

Similarly, one might ask IF THE FACT THAT $X$ BELIEVES THAT THERE IS A CERTAIN NATURAL RELATIONSHIP BETWEEN $A$ AND $B$ CAN BE A MOTIVE ENOUGH FOR $X$ TO USE $A$ AS INDICATING $B$ AT A MOMENT $t$ or IF THE FACT THAT $X$ BELIEVES THAT $A$ IS BOUND WITH $B$ BY A CONVENTION, A CUSTOM, A HABIT, A RULE ETC. CAN BE A MOTIVE FOR $X$ TO USE $A$ AS INDICATING $B$ AT A MOMENT $t$.

These questions refer not to a particular kind of sign, but to a particular usage of something as indicating something else. The word 'indicating' is used in those questions; a discussion about what it means that $A$ indicates $B$ will be provided in the next chapter. For now, I meant not to decide that in the case of a natural relation $A$ is an index of $B$, whereas in the case of a conventional relation $A$ is a sign of $B$; the word 'indicate' seemed neutral in the context of such a decision.

I believe that a thus formulated question can be answered affirmatively. If so, we would be characterizing e.g. the ICONIC USE OF A SIGN as partially and to some extent motivated by a conviction that the signs has

a certain natural quality, namely, it resembles the thing represents; but in order for such an iconic usage of a sign to occur, this actual or supposed similarity must be interpreted according to a convention, a custom, a habit, a rule etc. By analogy, using something as e.g. a NATURAL SYMPTOM of something else would be described partially and to some extent as motivated by the conviction that there is a certain relationship, e.g. a causal one, between this natural symptom and that something it symptomatizes; but in order for such a usage to occur, this actual or supposed relation needs to be interpreted according to an adequate law governing a natural course of events, which is certainly not free of some conventional elements such as idealization.

From that standpoint, there is NO purely natural signs, or rather, PURELY NATURAL USES OF SIGNS, just as there are NO FULLY ICONIC USES or, for that matter, NO USES of signs ARE PURE. Even e.g. the so-called symbolic use, that is, using SOMETHING AS A SYMBOL HAS A PINCH OF ICONICITY in it, which nevertheless does not make this use an iconic one, or briefly, it does not transform a symbol into an icon. What can be that pinch of iconicity, is e.g. the color of a singular graphic form of an icon. Even if the word 'milk' is printed in a black font, hardly anyone would use it as an icon of charcoal or tar based on the premise that they are the same color as the inscription. But it is not impossible, under the condition that an adequate convention is established and accepted for the purpose of that particular case, one that could serve as a foundation for such an iconic use of that inscription. Perhaps, that is what Peirce had in mind when he wrote that:

> "the representative function of a sign lies neither in its material quality, nor in its pure demonstrative application, because it is something which the sign is, not in itself or in a real reaction to its object; but which it is to a thought [...]." (Peirce 1931-1935, 5.287)

## VI. Sign Use and Inference

In the search for an overriding, generic notion of sign, one which encompasses all types and variants of signs, what draws our attention is the aforediscussed concept of *semeion*. Since ancient times this notion has been used to refer to the sign in its most general understanding. Also, it is usually related to the INFERENCE in the broad sense, that is, "shaping or

strengthening one's beliefs regarding something on the basis of some other, already held beliefs" (Kotarbińska 1957: 109).

Savan (1977: 180) notices that according to Peirce

> "all man's thoughts and actions are inferences from signs. Signs then are quasi-premises themselves inferred from other quasi-premises."

This inferential character of the semiotic process, or semiosis, is reflected in such a Peirce's phrasing as:

> "We think only in signs" (Peirce 1931-1935, 2.300), "[the first logical interpretants in human beings] take the form of conjectures," (Peirce 1931-1935, 5.480)

or

> "a word has meaning for us in so far as we are able to make use of it in communicating our knowledge to others and in getting at the knowledge that others seek to communicate to us." (Peirce 1958, 8.176)

Perhaps, it is precisely the receiver's (the interpreter's) inference that Peirce has in mind when he writes that

> "a sign is on the one hand so determined by an object and on the other hand so determines the mind of an interpreter of it that the latter is thereby determined mediately by that real object." (Peirce 1976, 3:886)

Even today many scholars consider INDICATION, a concept related to the Greek *semeion*, the most general type of sign and they refer to inference while defining it.

For example, Mulder and Hervey (1971: 326-335) consider the concept of index, or indicator, paramount and they define it as follows:

> "An entity $a$ is an index if and only if it conveys some information (that $b$) outside of itself [...] The relation $a$ conveys the information that $b$ could be rewritten as: from $a$ it is possible to infer $b$." (Mulder, Hervey 1971: 327)

A similar thinking is behind Bonta's remarks, who claims, after Buyssens and Prieto, that

> "an indicator is a directly perceptible fact, by means of which it is possible to learn something about other indirectly perceptible facts." (Bonta 1973: 27)

According to Bonta, signals are also indices, or indicators, of some kind and they are characterized by the fact that

> "they must be deliberately used [...] with the purpose of having an act of communication and recognized by the interpreter as such... Indicators tend to show [...] matters of fact [...], signals communicate states of consciousness of the emitter." (Bonta 1973: 28)

The fullest discussion of the issue of the "link between the scope of the notion of indication and the usages of the notion of inference" can be found in Kotarbińska's work (1957: 104 *et passim).* However, as it was already mentioned, she opposes the formulation of a generic concept of the sign that would encompass both indications and signs in the strictest sense: her remarks refer to indications only. Namely, based on the observations made by Husserl and Ajdukiewicz, she proposes the following NECESSARY CONDITION for something to become an indication:

> "(a) in the OBJECTIVE sense:
>
> phenomena type $A$ shall be called indications of phenomena type $B$, Kotarbińska writes, only if there is a certain constant connection between these two types of phenomena that justifies inferring that a phenomenon type $B$ will, did or does occur from the fact that a certain phenomenon type $A$ had occurred.
>
> (b) in the SUBJECTIVE sense:
>
> by analogy, Kotarbińska continues, we shall say that a phenomenon type $A$ is an indication of a phenomenon type $B$ for a person $O$ only if we want to affirm that a person $O$ will infer the occurrence of a phenomenon type $B$ from the occurrence of a phenomenon type $A$, or, in other words, if in the view of a person $O$ there is a certain constant connection between phenomena type $A$ and $B$ that allows us to make such an inference." (Kotarbińska, 1957: 106)

Kotarbińska calls this fixed connection INFERENCIAL, explaining that in order to allow inferring this relation does not have to be a logical one, in which the conclusion is true if the premises are true; it suffices that true premises make the conclusion plausible.

Apart from necessary conditions, Kotarbińska also sets out SUFFICIENT CONDITIONS. Namely, if the former are fulfilled and

> "if additionally, she continues referring to indications in the objective sense (s. 108), the relationship between two phenomena is either a natural one, grasped by the laws of science, or a conventional one, established by the power of tradition or as a result of a newly-developed social habit, then phenomena type $A$ may be considered indications of phenomena type $B$ [...] Phenomena type $A$ may also be considered indications of phenomena type $B$ if the former are such that *f(x),* while the latter are such that *g(x)* and if there exists a general relationship between them such as: $\pi x[f(x) \rightarrow g(x)]$, for certain values of $x$ it, and besides it is true, for some $x$, it is true, approximately at least, that *f(x).*"

Kotarbińska analogously formulates the sufficient conditions for indications in the subjective sense:

> "If someone, after having ascertained that a phenomenon type $A$ had occurred, infers the occurrence of a phenomenon type $B$ on the basis of this assertion, the first phenomenon is to him an indication of the second one, provided that one of the following conditions is satisfied [naturally, apart from the abovementioned necessary condition — *J.P.*]: (a) in the view of that person there is a constant, either natural or conventional, regularity between phenomena type $A$ and $B$ or (b) the premise, upon which that person found their inference, holds that there occurred a phenomenon type *f(x),* and the conclusion drawn from that premise holds that there occurred a certain event type *g(x),* phenomena type $A$ being phenomena type *f(x)* and phenomena type $B$ being phenomena type *g(x).*" (Kotarbińska 1957: 108-109)

Out of the conditions proposed by Kotarbińska — the necessary, the sufficient and separately, those which refer to indications in the objective sense and those which refer to indications in the subjective sense — I suggest to

keep, however slightly modified, those which refer to the subjective notion of an indication. The rejecting of the conditions related to objective indications is a consequence of my previous proposal to speak of the USES of signs rather than of signs themselves and to replace metaphorical simplification like "a sign expresses something" with their non-metaphorical expansions such as "at a moment $t$ X uses something to express something else."

What underlies this proposal is the belief that hardly anything is a sign conclusively, during its entire existence. The very same thing, event or phenomenon, if used in some specific way, functions as a sign but it ceases to play the role of a sign if it is used differently. Commonly, signs and indications are temporary, or rather they are USED *ad hoc*, for a particular, momentary occasion and they do not require their user to assume a PERMANENT, FIXED, CONSTANT, relation between the sign or the indication and the denoted being. That *ad hoc*, temporary and occasional sign is such as, among others, this supposed or actual relation, upon which a semiotic relation is based, not fixed at all, but it is temporary, passing, short-term, because e.g. the objects, events or phenomena between which there is a connection in the eyes of the user of a sign are temporary themselves or because this very relation was meant to be non-recurrent. Did we not establish such temporary relations during our school years when we believed that if the number of paving stones between the gate of the school courtyard and the school entrance is even, we will surely score well on the test; it is by no means a fixed relation, but at that particular moment it served to strengthen our conviction that we would not fail. Hence, I propose to eliminate from Kotarbińska's necessary condition for subjective indications the requirement of fixity of the relation which, in the view of the indication's user, connects it with the denoted being.

Next, we shall consider if the modified necessary condition and the sufficient conditions formulated by Kotarbińska in reference to subjective indications are fulfilled whenever someone USES something AS A SIGN of something else, in other words, if that person makes an inference.

It seems that the twofold usage of something as a sign needs to be taken into account: when a user of a sign is its INTERPRETER, especially its receiver, and when a user is the SENDER of the sign, especially its producer.

In the first case, the user-interpreter uses something — an object, an event, a set of objects or a phenomenon *(A)* — as a sign of something else *(B)*, his inference being inspired by two motives: the belief that *(A)* did occur and the belief that there is a certain relation between *(A)* and *(B)*, a relation already mentioned while discussing the necessary and sufficient

conditions for subjective indications.

In the case of PEOPLE interpreting signs, we may accept the following definition of inference:

> "We call INFERENCE the activity of the mind consisting in that on the basis of accepting with some degree of certitude sentences called premises, the acceptance of another sentence, called conclusion, is reached with some, but always greater than before, degree of certitude." (Ajdukiewicz 1965: 282)

The premises in the inference made by the interpreter of a sign are both the propositions regarding the assumed occurrence of such and such being $(A)$, which the interpreter intends to use as a sign of some other being $(B)$, and those regarding the relationship that, in the interpreter's view, is supposed to exist between $(A)$ and $(B)$; whereas the conclusion is the proposition about the occurrence of $(B)$.

The being $(B)$, which in the interpreter's view is indicated by the sign $(A)$, can be an object, a set of objects, a feature, an event, a phenomenon etc. But sometimes $(B)$ is the MENTAL STATE OF THE SENDER or of the producer of a sign $(A)$. This happens especially when A is, in the interpreters' view, a sign sent by someone DELIBERATELY. Such a sign sometimes appears under the name 'SIGNAL', however, this usually requires more than just the receiver's belief in the deliberation behind sending the sign; in that case, the sign really has to be sent deliberately.

It remains an open question if signs sent deliberately, or treated as such by the interpreter, (a) turn his thoughts to only one $(B)$, that is, $(a_1)$ only to the INNER EXPERIENCE of their sender or $(a_2)$ only to the signaled EXTERNAL STATE OF AFFAIRS; or (b) if they turn the interpreter's thoughts to two different $(B)$'s —- (b1) the experience of their sender, e.g. to his thought, as well as to (b2) an external object or event to which the thought refers; or perhaps, it turns (b1) DIRECTLY to the sender's experience and (b2) INDIRECTLY to an external event, or vice versa. I suppose it may go both ways.

So, for example, from somebody's deliberate gestures, facial expression or servile behavior, we are inclined to infer only, or mostly, the sender's experiences or states. Whereas, when it comes to anonymous signals, especially the mechanical and the automatic ones such as the red light showing at a junction, we make conclusions only, or mostly, about a certain external state of affairs, not about the intentions of the signal's co-senders, like those who

came up with and announced the traffic laws, those who preprogrammed the traffic lamp or those who placed it at the junction and activated it.

On the other hand, somebody's expressive, emotional statement inclines the interpreter to infer directly from it the mental state of the speaker and only then, indirectly, the state of affairs to which the statement refers. In that case, the interpreter uses the statement about the experience of the sign's sender inferred from the received signals as a premise for another inference that leads to the conclusion about a certain external event which was at the core of that person's inner experience. However, it sometimes goes the other way round: a diagnosis made by a doctor, an attended lecture or an obituary spotted in a newspaper are all signals that make us directly infer an external state of affairs; only the following statements about this state of affairs are used by the interpreter as premises for another inference about the thoughts or feelings of the signal's senders — the doctor, the lecturer or the family of the deceased, which published the obituary.

Usually, the relation between the signs and their senders' inner experiences is expressive — classified as PRAGMATIC — while the relation between the sign and the external being it denotes is considered SEMANTIC.

As we can see, linguistic utterances in normal communicative circumstances are spoken or written deliberately and they are thus treated by the receivers, which means that they belong to the SIGNALING USES OF SIGNS. Such uses consist in making the above discussed inferences. Hence, in his *Philosophical Investigations* (Wittgenstein 1953, § 20n., 486n.), Wittgenstein urged that we ought not to ask for the meaning of expressions but for the use of these particular expressions, which indirectly turned our attention e.g. to the inferences made by people participating in 'language-games'. These inferences are often RUDIMENTARY, so to speak, abbreviated, enthymematic and CONCEALED, even from those who infer, especially when they are proficient users of a given language. In brief, once we know perfectly well the relations between the sign and the denoted being, we do not make complete, developed inferences: in such a case the interpretation of a sign is merely GENETICALLY INFERENTIAL, which means that in practice it is as automatic as speaking one's native tongue. Perhaps it is precisely this awareness that inspired the associationist theories of meaning and the theory of intentional acts.

Whereas, while reflecting on whether USING something AS A SIGN always entails INFERENCE, we need to consider another instance, a much more complex and debatable one, namely, when the user of a sign is its SENDER, and particularly its producer. For now, I shall confine myself to

an analysis of the sending or the producing of signs by HUMANS, but only if it is DELIBERATE. So, the question is: does the person who consciously sends a sign at the same time make an inference similar to that which was observed in the case of interpreting signs? I believe so.

There comes into mind a twofold reconstruction of the inferences drawn by the sender of a sign.

The first variant is this: X knocks at the door, thereby sending a particular signal and becoming an originator of a certain semiotic process. But before this semiotic process began, X had participated in a different, preceding semiotic process as an interpreter: he had imagined the knocking at the door and, as the next step, he had recognized the conventional connection between this act and the state of affairs it denotes and so, he started inferring, but stopped immediately, since the conclusion was so well known to him. Only then did he knock, setting out conditions for an analogous inference made by the receiver, and at the same time the interpreter, of the signal on the other side of the door.

The second variant of a hypothetical reconstruction of the inner experiences of the sender of a sign looks as follows: before knocking at the door, X imagines the future behavior of the receiver of that signal as its interpreter, a behavior that obviously consists in making a certain inference. So, X mimics, as it were, the inference that the person behind the door is likely to start making any moment and reproduces it in his mind, thereby anticipating the likely result of his knocking at the door.

It needs not to be added that in both of these similar cases, X's inference is enthymematic, rudimentary and almost unconscious. It leaves no place or time for formulating premises and a conclusion in complete sentences. We may even doubt if this inference is composed of separate thoughts or if it is rather one, complex thought, in which the conviction about the occurrence of knocking is immediately followed by the belief that it is such and such a signal by the power of a certain convention, followed by the conviction that the door has to be opened: these thoughts appear so fast, one after another, that we could argue whether they do not actually appear at the same time.

If the above analysis is accurate, then in the case of a conscious, DELIBERATE SENDING or producing of SIGNS, we are dealing with inferences made by the sender. And since this inferential factor, as it was already mentioned, also appears in the course of INTERPRETING SIGNS, we may assume with a great degree of certainty that it is indispensable to ALL USAGES OF SIGNS BY HUMANS in a semiotic process, that is, to sending and receiving signs. Therefore, WHENEVER X USES SOMETHING AS A

SIGN OF SOMETHING ELSE AT A PARTICULAR MOMENT, HE/SHE MAKES INFERENCES OF THE KIND DESCRIBED ABOVE, AND VICE VERSA. We might call them SEMIOTIC INFERENCES, alluding to the fact that they were first observed and described in the discussions about the notion of *semeion* in ancient Greek philosophy. In every use of something as a sign there are also other factors, apart from the inferential one, characteristic of particular kinds or variants of semiotic uses, e.g. the signaling factor, the iconic factor etc. In that sense, we could say that there are NO PURE USES.

It needs to be reminded that Greek philosophy did not restrict the use of *semeia* to human kind: ANIMALS were also attributed the ability to use *semeia*. Even though we do not claim that all signs are *semeia*, we may nevertheless aim to define the notion of sign so as to be able to say that both signs and *semeia,* as understood by the ancient Greeks, may be used not only by people, but also by animal species, at least some of them.

If we wanted to extend the realm of signs into the animal world, we would have to either (a) let go of the well-established hypothesis that semiotic inference of the kind described above is a necessary and sufficient condition for using something as a sign or (b) modify the notion of semiotic inference in such a way that it would allow us to say that animals too make semiotic inferences.

SEMIOTIC INFERENCES made by human beings were classified above as mental activities consisting in gaining ACCEPTANCE, with a greater than before degree of certainty, of a particular PROPOSITION, namely a conclusion, based on having accepted some other proposition or propositions, that is, premises. Obviously, animals do not formulate, accept or reject propositions. But whether they do not hold, foster, strengthen or weaken some unstated desires, thoughts and BELIEFS — that I do not know. For an animal lover ignorant about biology like myself it is difficult to refrain from a personal, non-scientific conviction that a dog which leads his master by the coat and sits by the door or whimpers and jumps at the door handle is sending a signal, consciously or not, whereas a dog which displays joy at the sight of their masters' putting on their coats and reaching for the leash is interpreting signs and strengthening its belief about going for a walk very soon on the basis of convictions about activities that announce dog walking.

It is a question for animal psychology and the physiology of the animal brain to determine whether animals THINK and if so, then in what sense of the term. A psychologist attributes to many of them i.e. the ability of the so-called SENSORY-BASED THINKING, whose main component is the ability

of spatial and temporal orientation: "thinking, understood as learning the connections between things (e.g. spatial or causal relationships, relationships of subordination etc.), is possible without speech and it unquestionably exists among many animals" (Pieter 1963: 165). A neurophysiologist observes:

> The totality of associations formed by people in their every-day life may be divided into two categories: associations involving speech in its every aspect (verbal associations) and associations formed without resorting to speech (non-verbal associations). While the former is restricted only to homo sapiens, the latter exists also among many other animal species [...] (Konorski 1969: 259)

The same expert asserts explicitly:

> We believe [. . . ] that if among human beings a mental experience of the perception of a stimulus pattern manifests itself through a particular behavioral act or through particular bioelectric potentials of the brain and if this pattern produces exactly the same reactions in a given animal (e.g. a monkey or a cat), then we are entitled to think that this animal experiences its perception of a given object in a more or less the same way as we do. Similarly, if a dog returns to its feeding spot, from which it was pulled away, just like we continue our unfinished meal, from which a phone call drove us away, we may assume that an animal has an idea of an unfinished meal just like the one we have. Contradicting such a claim would equal drawing a thick boundary line between the activity of a human brain and that of higher vertebrates, which would be unacceptable from a biological perspective. (Konorski 1969: 9)

Another psychologist writes: "Among facts of sensory perception we can distinguish representations and convictions" (Witwicki 1925: I, 71); the latter, according to the author, equals propositions.

Acknowledging the above information, we may conclude that since sensory perceptions in animals are similar in certain respects to those in humans and since these perceptions consist of e.g. convictions, or propositions, then animals are capable of experiencing some sort of conviction. So it seems that the door is not closed on the formulation of an adequately broad and liberal notion of inference, understood as proceeding from less to more strong

NON-VERBAL CONVICTIONS in a sensation-based manner, yet analogous to the process of inferential thinking in humans.

If we were able to formulate the notion of inference broadly enough as to allow us to say that both humans and animals infer, then we would also be able to claim that not only humans, but also animals use signs and that in both cases it consists in making semiotic inferences in the broad sense of the term.

For now, it seems premature to determine this question, due to e.g. the lack of sufficient knowledge about the mental experiences of animals. Yet, we may already opt for one of the following free solutions.

(1) Firstly, endorsing the view that THE USE OF SIGNS ENTAILS INFERENCE, we could adopt the anthropocentric viewpoint and maintain that ONLY HUMANS ARE CAPABLE OF USING SIGNS; but then we would be making a distinct division between the human and the animal mind, which is unacceptable for a specialist in that matter and which equals not being able to explain properly numerous well-known facts about animal behavior: such behaviors would be difficult to explain, if we would be forced to interpret something other than the sending or following signals.

(2) Secondly, we could agree that BOTH HUMANS AND ANIMALS USE SIGNS, yet IT DOES NOT ENTAIL INFERENCE IN EITHER CASE; but then we would be forced to reject the entire characterization of semiotic processes as provided above, since it is based precisely on the concept of inference.

(3) Finally, we could suppose that BOTH HUMANS AND ANIMALS USE SIGNS, yet IT INVOLVES INFERENCE ONLY IN THE CASE OF HUMANS, something completely different in the case of animals; but then we would have to forget about the possibility of formulating a common, overriding, generic notion of sign.

None of the above perspectives seem appealing to me. I am leaning toward a BROADER NOTION OF INFERENCE, one that TIES ALL USES OF SIGNS WITH MAKING INFERENCES, and to the view that BOTH HUMANS AND ANIMALS USE SIGNS. This is because I believe that it would be useful to have a NOTION OF SIGN which is AS GENERAL AS POSSIBLE. I also believe the hypothesis that the use of a sign is necessarily and sufficiently conditioned by a certain type of inference, called here a SEMIOTIC INFERENCE, and receives more and more confirmation; this makes way for a definition of an overriding, generic concept of sign, or rather, of the use of something as a sign.

## VII. Prolegomena to the Definition of the Concept of Sign

A review of the above observations may constitute the prolegomena to the definition of the concept of sign or serve as preliminary remarks for the theory of sign:

1) When aiming to formulate such a theory, one ought to bear in mind how the Ancients commented on the concept of *semeion* and how the prominent philosophers of later times developed and improved former observations in their discussions about signs.

2) According to the common practice of understanding signs, they can be either concrete objects or abstract beings, individuals as well as sets, both events and phenomena, in other words, different sorts of beings. If one does not wish to reject this practice, they ought not to restrict the realm of signs to a single type of being or determine that signs of a particular kind are beings of a particular kind and that signs of a different kind are a different kind of entity.

3) The assumption that not only concrete, singular objects may be signs poses a risk of hypostasis. If we wish to avoid that risk, as well as others — like personifying or anthropomorphizing signs — it is useful to regard formulations referring to signs as metaphorical and simplified, and to replace them with formulations referring to the use of a sign in particular circumstances, that is, in a particular time and place, as well as by a particular user, or a sender or a receiver. Such a relativization has its benefits. It draws our attention to the fact that the same thing, or generally, the same being, becomes a sign or ceases to be a sign depending on how it was used; that something which is used as a sign does not really have to exist and it does not have to be in a particular relationship with the being it denotes: it is enough that the user of the sign believes so. It also highlights the fact that a given being may become a sign of one kind and sometimes of a different kind, depending on the particular use; finally, it also emphasizes that there are no pure uses: in each use there are elements proper to a different kind of sign.

4) The possible relations which, actually or at least in someone's view, connect the sign with the being it denotes, are said to be either natural or, on the contrary, conventional. This distinction sometimes serves as the basis for differentiating indications from signs or icons from symbols. But if one wants to use the opposition between the natural and the conventional, one ought to start by defining precisely both of these ambiguous terms, and then see if the scope of these concepts, thus defined, are complementary.

5) An analysis of different cases in which something was used as a sign allows us to put forward a hypothesis that this use is subject to a certain

kind of inference, called a semiotic inference. Such an inference is made by both the senders and the receivers of different types of signs: symptoms, syndromes, indications, symbols, icons, signals etc. The motives for using something ($A$) at a particular moment as a sign of something else ($B$), thus, for making a semiotic inference, are: the belief of the sign's user that $A$ exists, in the broad sense of the term, and that there is a certain connection between $A$ and $B$, such as a causal nexus, contractual or habitual relationship, or perhaps that of similarity. These motives incline the one who infers to accept the relevant premises. The conclusion of a semiotic inference refers either to mental states of an actual or a supposed sender (senders) of the sign interpreted by a receiver or to an external state of affairs to which the sign refers. Or it refers to both. The semiotic inference itself is often rudimentary and the users of the sign are not always aware that they are making one.

6) Recognizing that the semiotic inference is at the same time a necessary and sufficient condition for using something as a particular kind of sign paves the way for formulating the definition of an overriding, general and generic notion of sign which encompasses all types of signs; but it would have to be restricted to humans. It is because only humans are capable of making inferences, in the strictest sense of the term. If we wanted to attribute the ability of using signs to animals as well, but still be tying the use of signs with semiotic inference, we would have to modify the notion of the latter. Namely, we would have to reject the definition according to which all inferences consist in accepting one proposition, with a greater than before degree of certainty, on the basis of other accepted propositions. Instead, we would have to agree to a more liberal, and at the same time broader, notion of inference, according to which making inferences consists in, among others, proceeding from weaker to stronger sensation-based and nonverbal beliefs. Since, on one hand, we lack information about animal mental processes and, on the other, this extended definition is still a work in progress, we are not able to determine now if animals are capable of semiotic inferences. Hence, the question if animals use signs in this sense remains open.

7) Is it desirable to have such a general notion of inference, especially of semiotic inference, and consequently, such a general concept of sign, which encompasses all uses of different signs by both humans and animals? If we see major analogies between how humans use signs and how animals do it, if we believe that the attempts to integrate branches of science are useful, if, therefore, we approve of the state of affairs in semiotics, which operates this very broad concept of sign and which acts as an interdisciplinary method applicable to phenomena in both natural and human sciences, then we would

answer: yes.

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# THE PRINCIPLE OF *REDUCTIO AD ABSURDUM* AGAINST A COMPARATIVE BACKGROUND

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The subject of this discussion is the peculiar applications of the logical principle that states that if any sentence implies its own negation, the sentence is false and thus its negation is true. Symbolically, the law is expressed by the formula '$(p \rightarrow \sim p) \rightarrow \sim p$' which can be read "if (if $p$ is not-$p$), then not-$p$." In PM this very law *2.01 is called the principle of the *reductio ad absurdum* and is paraphrased as follows "if p implies its own falsehood, then p is false" (Whitehead and B. Russell1910: 104). For the record, there is a reverse law called the law of Clavius devised by the logician Jan Łukaszewicz: '$(\sim p \rightarrow p) \rightarrow p$' which is not substantially different from the previous one, but which we will not deal with here.

The limitation to the law of reduction '$(p \rightarrow \sim p) \rightarrow \sim p$' is not accidental because it is this law rather than its reverse equivalent that can provide a starting point to extensive comparative and historical inquiry. Of the issues that merit particular attention in comparative terms, three groups ought to be mentioned that could be summed up in the following initial propositions:

1. firstly, the principle of the *reductio ad absurdum* was first devised independently (in the sense of being applied in peculiar reasonings) in all three ancient cultural circles that had created their own philosophical speculation: European (Greek), Chinese and Indian (Buddhist Indian);

2. secondly, relevant reasonings, testified to in these otherwise different philosophies using different languages ,are not only similar in form but

concern similar if not identical issues and serve similar goals, with the Buddhist Indian circle differing uniquely from the others,

3. thirdly, the reductive reasonings, which were revelatory in their day, in the light of modern semantics, prove to be covert paralogisms, which in practice do not so much constitute examples of the application of the principle of the *reductio ad absurdum* but, rather, illustrations of unconscious overuse of the principle.

The first two propositions will be illustrated in chapters I-III, where I will present and discuss the respective examples, testified to in Greek, Chinese and Indian sources. The third proposition, much more elusive for philologists but rather obvious for the historians of logic, will be discussed at length in chapter IV, which is also an attempt at summing up the whole subject matter.

## I

The Old Greek exemplification of our issue is fairly easy as the basic sources are well-known to the historians of logic. And the very sources are easily available, also with Polish translations. However, since the topic of the material part of this study is an introduction into the complicated and practically unknown subject of oriental exemplification, which must take considerable space, I limit the Greek documentation to the very minimum out of necessity. In particular, to avoid misunderstandings, I need to explain that the Aristotelian approach to the subject, deliberately restricted to one point that is most important to us, is not so unambiguously simple as the only quotation from *Metaphysics* presented here would suggest, though. This issue, meriting separate discussion, will be skipped here with a hope of being resumed on another occasion.

The earliest of the extant Greek examples of using *reductio ad absurdm* is found in Plato.[1] It is a passage in *Theaeteus* (XXII, 169 D — 171 C), where, using this particular principle, the Platonic Socrates proves Protagoras false in the latter's statement that things are the way they appear to one. The

[1]The example in question was only detected by G. Vailati 1904; see H. Scholz 1936: 1-8. Scholz attaches great importance to the discovery in Pato's writings of the rule of arguing that corresponds to the law of reduction '$(p \rightarrow \sim p) \rightarrow \sim p$' and proposes the name "Platonic criterion of falsity" for the law. See also Bocheński 1962: 38-39. The extra references to Platos' *Euthydemus* XV, 280 B-C seems less relevant for our problem.

reasoning is, however, rather confusing, clouded by contextual complications (implication in dialogue and colloquial style), which undoubtedly contributed to this vital historical and logical aspect of this text by Plato still turning heads as late as the beginning of our century. For the same reasons, this text of historical significance renders itself rather unsuitable to be quoted *in extenso*, and therefore I limit myself here to mentioning it and making the necessary references.

Another crucial illustration to the issue is provided by another, later message in Aristotle's Metaphysics I' 8 (Aristotle 1989, 1020 b, 15-18). The text is as follows:

> for he who says that everything is true makes the opposite theory true too, and therefore his own untrue (for the opposite theory says that his is not true); and he who says that everything is false makes himself a liar.

In the passage just quoted, the word "everything" renders the original Greek $\pi\acute{\alpha}\nu\tau\alpha$. However, it seems obvious that Aristotle meant "all utterances" or, more precisely, "all statements" (i.e. also those statements that state something and thus are subject to judgment as true/false).[2] With this clarification, the text cited seems particularly valuable as, despite its brevity (or reductive nature), it makes a dual appeal to *reductio ad absurdum*. At one go, Aristotle refutes two opposing propositions: "All [=all sentences] is [are] true" (to which proposition the position held by Protagoras essentially comes down) and "All sentences are false," where it can be taken for granted that in both cases an implication rule based on the law of reduction '$(p \rightarrow \sim p) \rightarrow \sim p$' is used. Note that if "All sentences are true" (p), then also true is — as belonging to the range of ALL sentences — the sentence "It is untrue that all sentences are true" ($\sim p$) and thus: $(p \rightarrow \sim p)$, ergo $\sim p$. So is the case with the proposition (which Aristotle treats with a big simplification) about the falsity of all sentences,[3] which leads to itself being false, too (ergo: "It is untrue that all sentences are false").

The brevity of the passage quoted from *Metaphysics* seems to testify to Aristotle considering this kind of reasoning very obvious and requiring no

[2]It was as early as Bolzano who made a note that that in contexts like these a Greek author should have been more precise and said ... meaning 'all statements'. This remark is about the passage from Sextus, quoted later (see below note 7), but it has indirect relevance to the passage from Metaphysics, too.

[3]According to a relatively late source (Sextus Empiricus), *Adversus logices* I 53, the proposition about the falsity of everything was embraced by Xeniades of Corinth ($5^{th}$ century BC).

additional explanation. From our point of view, though, a brief analysis of the text quoted was necessary so as to emphasize the similarity of the argumentation structure in our examples (also other than European). We will also see later (chapter IV) that the structure of this kind or reasonings will have to be presented in much more detail than is now needed.

The following example is marked by a particular clarity of reasoning taken from a late stage of Greek philosophy *Against Logicians* (Π*ρὸς λογικούς* usually cited under the Latin counterpart of the title *Adversus Logicos*) by Sextus Empiricus. Below is the passage in question from *Adv. Log.* II 55:

> For if everything is false, "everything is false" will be also false, since it belongs to "everything." And if "everything is false" will be also false, its opposite, "not everything is false," will be true. Therefore if everything is false, not everything is false. (Sextus Empiricus 2005: 99)

Despite the clarity of this text, it will be useful to supplement it with several remarks. Let the last sentence be emphasized; it reads "If all is false ($p$), then not all is false ($\sim p$)" directly corresponds to the implication that forms the antecedent of the *reductio ad absurdum* ($p \rightarrow \sim p$).[4] An expression thus
be found either in the previously quoted text by Plato or the Aristotelian *Metaphysics* just discussed. At the same time the words by Sextus contain an unambiguous indication that in case implication ($p \rightarrow \sim p$) obtains, its negated consequent is in fact a conclusion. In the text by Sextus, what we are dealing with is not only an example of a completely deliberate use of the reduction principle, but also with a nearly explicit formulation of this principle.[5]

Some worthwhile facts in this context include other texts whose documentation lies outside the passage quoted. First, Sextus refers a number of times to such reasonings. Of the other cases (on account of the parallel with the above quotation) is the passage from *Adv. Log.* I 390,[6] but his *Outlines*

[4]It is worth quoting the Greek original of this expression: *εἰ ἄρα πάντ'ἐστὶ ψευδῆ, οὐ πάντ'ἐστὶ ψευδῆ.*

[5]To be precise, what matters is the implication scheme ($p \rightarrow \sim p$), *ergo* $\sim p$ as corresponding to the logical law '($p \rightarrow \sim p$) $\rightarrow \sim p$' rather than the law itself.

[6]A passage from it reads: "For if every appearance is true, than even not every appearance's being true, since it takes the form of an appearance, will be true, and thus every appearance being true will become false" (Sextus Empiricus 2005: 77). As in Theaetetus, it is about being polemical with the views held by Protagoras. See also *Adv. Log.* I 395 II 466-467.

*of Pyrrhonism* (Πυῤῥώνειοι ὑποτυπώσεις) II 76 ought to be mentioned at this point, as well. Second, it is only Sextus who introduced a special technical term for such reasonings — περιτροπή — lit. "reversal," usually translated as "self-refutation" (*Adv. Log.* I 389-390). Third, Sextus mentions Democritus and Plato as those who had used such argumentation before him but fails to mention Aristotle (*Adv. Log.* I 389). It would follow that the discoverer proper of the principle of *reductio ad absurdum* was Democritus, for which there is no direct evidence in the extant Democritean passages, though.

This is where we end the brief review of the subject at the Greek stage. The subject matter, inherited from the ancients, does have a continuation in modern times and examples can be provided that go as late as the $20^{th}$ century. Rather than take up such a large task, I will just mention that in the scholastic philosophy of the Late Middle Ages, it appears in a peculiar context that binds it with the closing discussion in chapter IV. This is where we will return to the issue. The modern period can be illustrated with one example coming from the $19^{th}$ century, which merits the reader's attention or the mere reason of the personage of the author.

Bernard Bolzano (1781-1848) devoted much space to his discussion setting out to prove that true sentences exist. This is a quotation that is most closely linked with the Ancient Greek example given before, which (on top of *Theaeteus*) was known to him, incidentally.

> Satz Wahrheit habe, widerlegt sich selbst, weil es doch auch ein Satz ist und weil wir es also, indem wir es für wahr erklären wollten, zugleich für falsch erklären müssten. Wenn nämlich jeder Satz falsch wäre, so wäre auch dieser Satz selbst, dass jeder Satz falsch sei, falsch. Und also ist nicht jeder Satz falsch, sondern es gibt auch wahre Sätze; [...] (Bolzano 1837: 148).[7]

The only reference to the quotation that I know of in Polish is to be found in Śleszyński (1923: 180-181).[8] Of source the text quoted is a mere echo of Bolzano's ancient precursors (which he himself stresses) and requires no additional explanations. To be precise, it is worth mentioning that Bolzano's logic saw a monograph, where the issue in question is addressed (Berg 1962:

[7] *Ibidem* a reference to predecessors including Sextus Empiricus, with the remark mentioned before (see above note 2).

[8] The author attempts to present Bolzano's reasoning as barbara syllogism, adding that the absolute skeptic against whom the argumentation is directed could answer that they do not recognize barbara mode.

chap. 7, 61-63).[9]

## II

The Old Chinese example of our subject is extremely scarce and is derived from one source only. It might seem a fairly simple business, but in fact it is associated with serious difficulty, which I can only touch upon here. For a reader for whom the Chinese material is completely foreign, two initial explanations are necessary.

The only source is Mo Tsy (Master Mo), attributed to the philosopher Mo Ti, living in $5^{th}$ and $4^{th}$ century BC (most probably deceased around 380 BC), which is a posthumous record (done over a longer time) of the master's school (Chinese: Mo Kia, the master's school). More specifically, the part of the work of interest to us is the one on Mohist dialectics (chapters 40-45), and the four canonical chapters 40-43 in particular. The dialectical part of Mo Tsy is a unique extant document of Old Chinese scientific reflection done in a later period of the Mohist School by one of its factions, very commonly dubbed "dialecticians," which is in fact imprecise as initially their interests included exact sciences such as geometry, mechanic, optics, etc. Also, most importantly, they were into the very beginnings of methodology, argumentation technique and logic. According to a common belief, the respective chapters come from approx. 300 BC.

The historical significance of the Mohist dialecticians' investigations as the forerunners of the Chinese scientific thought is unquestionable, and in the opinion of some of today's researchers, the results they had achieved could have formed the basis for the further development of empirical disciplines. The whole current of thought, however, remained a short-term and solitary phenomenon without any further continuation and the passages from Mo Tsy that document this current are among the most distorted Chinese documents that have survived to date, which also makes their interpretation particularly difficult. The usual contributors that added up to distort Chinese documents in the course of many centuries' of transmission[10] were expanded by some other peculiar factors.

[9]It discusses Bolzano's proof of true sentences. However, it is unclear why Berg limits himself to emphasizing that Bolzano was entirely aware of the law '$(\sim p \rightarrow p) \rightarrow p$' (If (if $\sim S$, then $S$) then $S$, p. 63) not to mention that he was at least equally aware of the law '$(p \rightarrow \sim p) \rightarrow p$'.

[10]We touch upon one of the biggest problems of Sinology, whose presentation, even if brief, is impossible here. Suffice to say that the most obvious (and abundant) factors that fostered the distortion of texts were the very structure of the Chinese script and the peculiar system of writing. It is a notorious fact that almost all Old Chinese texts

First and foremost, one needs to count the hermetic nature of the texts themselves as the drivers of the distortion, meant for the disciples of the school for mnemonic purposes, which made these texts barely understood by those from outside the group. The tangled, non-linear and "entry-based" nature of the chapters were the other key issues. The canonical part, of most interest to us, is a loose collection of several hundred entries, with chapters 40-41containing sequences of the so-called canons, often very brief, several lines' or characters' long formulas of definitions or propositions and chapters 42-43 filled with equally loose sequences of somewhat longer (several sentences) explanations to these canons. In all, each canonical item (about 180 in all) is made up of a canon proper and a corresponding explication, with both corresponding parts to be found in different chapters.[11]

The other unique factor is of a very different character. As previously mentioned, Mohist dialecticians' investigations remained episodic and discontinued, but the issue is broader and concerns the school of Mohists as a whole. The once influential and probably best organized philosophical school disappeared at a time preceding the emergence of the Han empire towards the end of the $3^{rd}$ century BC and its written output soon fell into oblivion for centuries.[12] Suffice to say that official Chinese science only "discovered" the Mo Tsy text and took interpretative interest in it at the beginning of the modern era, in the $18^{th}$ century when the work was already incomplete (a dozen or so chapters had perished) and the extent work contained a number or errors and distortions.[13] This pertains to the whole of the *textus recepti*, but the dialectical parts proved particularly vulnerable to the centuries' long,

(as well as Middle Chinese and some later ones, too) have reached our time in a repair that calls for emendation Hence the vast significance of the philological text criticism, which in the Chinese humanities and in Sinology in general constitutes a basic subdiscipline. Sure enough, the whole issue has wide-ranging semiotic aspects, too, which probably no one has tried to tackle in any systematic manner so far. Incidentally, those readers who are interested in the subject matter raised here in very general terms can find an exemplification of the applications of the technique of critical philology as an indispensable condition of the interpretation of an Old Chinese text (here: *Tchung-tsy*) in my review article (Chmielewski 1977).

[11] On account of the mere lack of punctuation in traditional Chinese texts and a lack of unambiguous criteria of syntactic division (incl. inter-sentential boundaries) it is easy to imagine the problem posed by the division into separate entries and the attribution of explanations to the canons.

[12] A contributing factor was that Mohism was a heterodox orientation in relation to Confucianism, which had become a state doctrine in the Chinese polity.

[13] We owe the salvaging of the incomplete text to copyists, who included Mo Tsy to the Taoist canon in the $15^{th}$ century (which was purely artificial).

random and uncritical transmission as those were among the least (if at all) comprehensible for the copyists.

In all, the dialectical parts have been the most difficult problem for the Mo Tsy textual criticism and interpretation. It was only at the beginning of the $20^{th}$ century that the great erudite and philologist Sun I Zhang (1848-1908) who came out with a critical edition of the Mo Tsy text, which truly merits the term "groundbreaking" as it ordered the whole of the vast text even if a number of textual problems remained unresolved. In this sense the Sun I Zhang edition proved a breakthrough for the dialectical parts as well, particularly for the canonical chapters. The text of the dialectical parts edited by Sun I Zhang, supplied with abundant commentary, conjectures and emendations became the basis for the 20h century Chinese studies on Mohist dialectics. However much these most modern and specialist studies may have contributed to making the analysis of these chapters ever more in-depth and broadening the extra-philological aspects of the subject matter, one must say that in the interpretation of those oft-elaborated on materials, we more commonly deal with serious differences in interpretation than with findings that all (or most) would agree on as settled.

As a quintessence of the above description of the state of affairs, two fundamental remarks come to mind. Firstly, it is sure or at least very likely that in some (but rather few) cases, for all the apparatus at our disposal, neither an adequate reconstruction of the original text nor a compelling interpretation are or will ever be possible. Secondly, there are cases that go to the contrary, where the matter was unnecessarily made too complicated or obscured where it otherwise seemed simple. In particular, I mean cases where new scholars endeavor to replace Sun I Zhang's emendations and conjectures that were sufficiently justified and led to coherent and convincing interpretations with their own, much less fortunate, expositions of the texts.[14] In my opinion, the two Mohist canons — the Chinese exemplification of our subject matter — belong to the latter category, particularly as regards the shape of the Chinese text, which is the basis of interpretation.

This lengthy introduction, even if significantly simplified, seemed necessary not only as the justification of the fact that the Chinese exemplification of the subject is rather hard but also for emphasizing that in the Sinological part of the study I must provide the examples only at my own responsibility. It means that neither the exposition of the Chinese text I adopt (including

[14]Note that particularly for the interpretation of those canonical readings that are interesting in terms of logic, Sun I Zhang's text proves sufficient overall or at least constitutes the best starting point (Chmielewski 1966, particularly p. 40).

the punctuation, dismemberment of the text) nor the interpretations which the expositions entail as expressed in the Polish translation, correspond to any of the interpretation attempts of the canonical texts that I know of; conversely, they differ from any such attempts. This is not to say that my interpretations are completely independent from the literature available so far. On the contrary, behind them (or some of their elements) is a vast corpus of bibliographic documentation, Chinese and Western, whose detailed discussion is impossible here and is not really necessary. The most indispensable references, given in the footnotes, are supposed to make it possible for those interested to identify the Chinese text in the form I adopt,[15] and make a note of some interpretations that are closest (but not identical) to mine.

Here is the canonical Mohist text that is key for this discussion:[16]

Can. It is false to believe that all statements are false. The explanation lies in the speaker's (i.e. the one who states) own utterance.

Expl. Falsity is illegitimate. If the person's statement is acceptable, it means that it is not false; thus there are acceptable statements. The person's statement is illegitimate: if (it) were to be considered true (*i lang*), then of necessity it proves false (*pi pu lang*).

Undoubtedly, the purpose here is to refute the proposition, that says "all statements are false," as a rebuttal by way of an appeal to the fact that the proposition, and thus a statement belonging to the set of all statements, entails its own falsity. Particularly interesting is the ending of the explanation "if (it) were to be considered true ($p$), then of necessity it proves false ($\sim p$),"[17]

[15]It is all the more important that on the basis of the mere translation even an expert Sinologist would have a problem with an exact reconstruction of the logic of the text being the basis of interpretation. A direct quotation of the text I consider correct is impossible for typographical considerations.

[16]The text exposition adopted is in line with Sun I Zhang's emendatory suggestions, which are also embraced by Chen Kien Feng (1957: 117). See: the most important text in the Western literature, A. C. Graham 1959, I-II: 95n. Graham points to the self-contradiction of the proposition about the falsity of all statements, but given the unfortunate exposition of the so-called explanation that skips Sun I Zhang's emendation, it provides an interpretation that blurs the logically relevant sense of the whole.

[17]In *textus receptus*, the ending of the explanation had been distorted, but as early as Sun I Zhang a philologically justified and logically relevant emendation was suggested that held that the *shan* sign was w wrong substitution of the original *tang* (these are graphically similar and we know that such a similarity often led to erroneous substitutions). My translation renders this particular exposition, *I lang pi pu lang*, which is also acceptable to Chan Kien-Feng. For the record, it needs to be mentioned that this exposition is ignored by most interpreters.

which corresponds to the antecedent of the principle of reduction ($p \rightarrow \sim p$). Considering that the Chinese author realized the fact of such an implication obtaining, it ought to be implied that "$p$ is false, that is, $\sim p$ is true." It can be said that Mohists had by themselves discovered the *reductio ad absurdum* and formulated it almost explicitly. Strictly speaking, what is meant here is the scheme of implication that corresponds to *reductio ad absurdum*, not about this very principle, which at an early stage of thought seems to be a distinction of little significance.

The reader will easily notice that the canon quoted constitutes a striking parallel to *Adversus Logicos*, referred to previously. In terms of content there is no difference, and in terms of logical formulation the Mohis example is at least as clear as hat o Sextus. And perhaps even more logically explicit. What is meant here is the mutually parallel endings of both texts that refer to the implication ($p \rightarrow \sim p$) of which the Mohist *pi lang pi pu lang* seems a more abstract ad general expression than the parallel by Sextus (see the Greek text in note 4). At any rate, the Chinese example quoted is more precisely formulated than the earliest Greek testimonies (Plato, Aristotle) and it ought to be borne in mind that it is half a millennium older than the text by Sextus Empiricus. All that explains why in the scarce Chinese exemplification, this particular example must be ascribed a key role.

The canon in question has an equivalent in another canonical text, which concerns an opposite proposition, that is, one about an alleged truthfulness of all sentences. However, the matter here is much more complicated on various counts, *inter alia* and above all on account of its circularity in the formulation of the starting proposition and the respective counter-argumentation. It would doubtless be easiest to formulate a proposition such as "All sentences are true ($p$)" and refuting it as before, that is, by making another proposition that, hence, the proposition that "It is untrue that all sentences are true" is true too; thus ($p \rightarrow \sim p$), with a conclusion that $\sim p$. Instead of this, Mohists resolved to use a double negation ($\sim \sim p$ rather than equivalent $p$), which in itself seriously complicated the whole argument by making it necessary to constantly repeat negations (in the explanation there are a dozen or so of these). Such an aggregation of negations in an abstract and brief text of the canon was another obstacle in its comprehension for outsiders and could have contributed to the distortion of the text at an early stage of transmission.

The peculiarities of the Chinese text will be returned to after the respective canonical text has been quoted. I interpret it in this way:[18]

[18]The starting point of the example is on this occasion, too, Sun I Zhang's text (but

Can. It is a falsity to negate (all) negations. The explanation lies in non-negation.
Expl. A negation of all negation is (=entails) a negation of its own negation [all negation] and is thus a non-negation of [all] negation. [By contrast] what is illegitimate is a negation that (some) negations can be negated, but this is not a negation of (all) negation.

As can be seen from the example, together with the bracketed supplants we are dealing with a text of a high degree of complication and at the same time formulated in a nutshell (which is, of course, an added complication), and thus a text must have been incomprehensible to anyone except Mohist dialectical initiates from the very beginning. It is only the observation that the canon is a commentary on one discussed before (in the *textus receptus* the king and *shuo* parts of the canon do not follow each other but are separated by several other canons) makes its interpretation possible. To be more precise, this is about several different though interconnected points which must be listed in sequence.

First, as I have already said, the canon basically goes against the proposition of an alleged veracity of all sentences, that is, one opposed to the proposition which the Mohist author refuted in the canon discussed previously. In this sense both propositions are mutually complementary. Second, the starting proposition being rebutted was formulated using a double negation. Third — an obvious consequence of remark two — the argumentation against such a proposition, contained in the explanation, is by necessity formulated using a double negation. Noticing the three above points has undoubtedly been owed too A. C. Graham (see n. 16) and in this sense we also owe him for the decoding of the entangled and partially incomprehensible canon. This, however, is more about the short comment Graham gives than his own interpretation of the very text of the canon, which I consider wrong (*cf.* Graham 1959: 95).[19] Leaving the purely philological aspects of the issue aside, suffice it to say that the inadequacies of Graham's translation

not his interpretation). See Chan Kien-Feng 1957: 118 (with punctuation that differs from mine). However, admittedly, there is another exposition of the beginning of the so-called explanation, which leads to an alternative translation of the first sentence. If one does not negate one's own negation [all negation], one does not negate (all) negation (the rest of the explanation being kept as before). Suffice to note with no additional comments that even such a version does not change the logical sense of the whole canonical text.

[19]The point is not that Graham accepts the exposition of the beginning of the explanation discussed in the previous note but the totality of his (quantifier-free) interpretation.

can be explained above all in his overlooking of another point — point 4 — implicit in his own right assumptions. The thing is that the points made previously assume the need for supplementing the logical (sic!) interpretation of the superficially quantifier-free accumulation of negations that occur in the Chinese text by introducing certain "implied" quantifying expressions. In this sense the novelty of the interpretation boils down to drawing final implications from Graham's correct and revealing observations, which he himself did not use properly. In stressing this interdependence I must also state that in this case, more than in the previous one, my translation of the canon differs from all the previous attempts. Unable to provide a detailed rationale for my own interpretation here, and its philosophical aspects in particular, I must discuss two issues, though, which are the most shocking for a European reader.

Firstly, I will discuss the issue of double negation, which in our view unnecessarily complicates the Chinese formulations as early as the level of the basic proposition. In this specific case the Mohist rendition of the proposition that is then refuted corresponds to a statement as follows: "All negations are negated" instead of the simpler equivalent "[It is considered that] any statement is true."[20] Such an artificial formulation of the basic proposition is, in our opinion, quite understandable on account of the tendency to construct affirmative statements by *duplex negatio affirmat* — '$\sim \sim p = p$', universally applied in Chinese. Stylistically, such structures are usually emphatic (and, most probably, so is the case here, too), which does not affect the truth-value of the sentences, of course. What is striking is the exceptionally high frequency of the occurrence of double negation in Chinese texts (starting from the early *Chou* period at the turn of the first millennium BC) as well as the great diversity of the types of structures that use the law of double negation, from the simplest to the most complicated.[21] The concentration of negations in arguing against the starting proposition is, unusual to us and anyone who is not a Mohist initiate, just a consequence of the formulation

[20]Please note that the proposition "All negation is negated" can be represented with the formula $(p) \sim \sim p$ (For any sentence $p$, it is untrue that $\sim p$), which along the lines with the principle of double negation is equivalent to $(p)\ p$ (For any sentence $p$ (it is true that) $p$).

[21]One can't help making a remark that the complicated matter of double negation in Chinese, which any Sinologist encounters in the day-to-day practice, has not given rise to a monograph yet, and it even tends to be disregarded in grammar books of Chinese. To the best of my knowledge, the only attempt at showing the role of double negation in Old Chinese syntactic structures (with an analysis of selected examples), which is systematic even if a little sketchy, is my paper Chmielewski 1965: 117, 29n.

of the proposition itself.

The second thing that begs for comment is the issue of quantification, and to be more precise, the need to complete the interpretation of the canon with the introduction of the suitable quantifiers, which the Mohist author skipped in their text completely. This needs to be emphasized all the more so that the issue has largely gone unnoticed (I have mentioned Graham already, but this is equally true of other interpreters, too).

One should begin by being reminded of a little-known fact that the Old Chinese language not only has an array of logical quantifying expressions but, what is more, the grammatical rules of using these natural quantifiers in Chinese exactly reflect the tautologies of the modern two-value quantifier calculus. This is not only true of the De Morgan laws, fundamental for this calculus and particularly clearly reflected in the Chinese syntax, but also some more complex derivative tautologies where quantification co-occurs with double negation and binary functors of propositional calculus. The earliest examples of such complicated syntactic structures are to be found in inscriptions coming from the early *Chou* period, with later text freely using such constructions and always doing so in agreement with the propositional calculus. In other words, Chinese grammar simply precludes any superficial quantification anomalies, which occur (especially at the junction of quantification and negation) in natural languages, particularly Indo-European (Jespersen 1956: 331f[22]). Notably, there is a clear tendency in Chinese to use more complicated structures (those at the surface-structure correspond to formulas containing more logical operations, usually negations) rather than comparable simpler structures (corresponding to the operations that contain fewer operations). This tendency is undoubtedly related to the propensity in Chinese to use double negation, which it probably is derived from.[23]

[22]Of course the work is obsolete (first edition in 1924) but apparently despite half a century since its first publication linguistics has not proposed much more.

[23]It is about such facts as these that Chinese grammar and style prefer syntactic structures that correspond to the formula $\sim(\exists x)\ (\varphi x,\ \sim\psi x)$ instead of a simpler formula $(x)\ (\varphi x \rightarrow\ \psi x)$, which is logically equivalent to the former. Here again we must say that the issue of quantification in Chinese, which is a unique and important issue in the language, is not only without a systematic monograph but has largely gone unnoticed by most Sinologists, still satisfied with *ad hoc*, intuitive and not always right interpretation of cases encountered in the texts. The heart of the matter is that the grammar of quantification in Chinese is (even superficially) so close to the natural counterparts of the logical quantifier calculus that the mere noticing and isolation of the suitable subject matter (let alone a systematic study of it) seems outright impossible without the assistance of logic, and its analytical techniques. See the examples and

The comments, seen as an introduction to the supplementation of the translation of a non-quantifier Chinese text with suitable quantification expressions may seem spiteful and even paradoxical since they set the reader's mind in expectation of a precise quantification in the text rather than a complete omission of quantifiers by the Chinese author. The paradox will prove spurious, though. The intention was to use the occasion to present in a little more detail — and to the Polish reader for the first time ever — an issue that is little known even among Sinologists but which might be of interests to scholars from other fields, too. What is most important, though, is that the state of affairs presented above, as opposed to what appears to the contrary, is a relevant backdrop of the issue in question: a backdrop that is vital in the sense that it highlights the legitimacy of the insertion of quantifiers in a translation which is supposed to unambiguously render the semantic intentions of semantically shortened formulations of the Chinese original.

All that has been said before about the grammar of quantifiers in Old Chinese concerns explicit quantification, that is, of such very numerous cases where the Chinese author was willing to use an appropriate procedure. This is not to say, however, that that they should do so at any opportunity. As in any other natural language, in Chinese too non-quantifier expressions are widely used; these are ambiguous at the surface-structure but do have implicit quantification, left to the guesswork of the reader. Sure enough, an unambiguous interpretation of such constructs can be impossible at times, but apparently such cases are rather rare and they also tend to be intended by the author as vague or deprived of quantification intention at all.[24] As in other languages, in Chinese, too, the surface-structure sense of the sentence against its context may be enough to reconstruct implicit quantification, but especially in Chinese, there is an overarching factor which I have just exposed. Since there was a precise mechanism of logical quantification built

comments in the previous paper as well as my own communication Chmielewski 1979.

[24]The issue would merit a study that could made the last remark more clear. Perhaps sentences deprived of a quantification intention (quantification-neutral) should be isolated as simply quantifier-free form ones with implied quantification, that is, ones where quantifiers may not exist at the surface-structure but can be reconstructed in line with an obvious (or at least highly probable) intention of the author of the utterance. Apparently, it is possible to precisely determine the criteria allowing such a division. The canon obviously belongs to the latter category since, first, it cannot be quantification-neutral without a loss of sense (this is the core of the hapless interpretation by Graham) and, second, it yields a logically appropriate sense with an arrangement of quantifiers that is relatively easy to reconstruct.

into the Chinese grammar, and thus the Chinese language sense, too, and operating by default, it can be presumed that such a mechanism is also active in the discursive thinking of individuals using the Chinese language. This must in turn have facilitated the addressee's right interpretation of quantificative intention in shortened utterances, quantifier-free at the surface-structure and, on the other hand, may have encouraged the sender (author) to a shortened non-quantifier sentences, whose quantification intention was sufficiently clear and rendered itself to an unambiguous interpretation. It seems that all the factors mentioned ought to be reckoned with in the case under consideration.

A presumption that the author of the canon in question might not have been aware of the quantification aspects of the issue they were dealing with or regarded their expression as quantifier-neutral (under which assumptions the whole canon loses its logical sense) is out of the question on other counts as well. It was Mohist dialecticians (and actually only them in the history of the native Chinese thought) who pursued logical-linguistic reflection and must have been particularly sensitive to quantification for the mere reason of their probably being the world's first to try and define quantifiers.[25] Overall, most probably we have to make do with a deliberately shortened expression but at the same time with an obvious quantification intention, on the interpretation of which the author of the formulation could count, at least within their school. Bear in mind that a canon was a two-part mnemonic (hence the desirable brevity), on one of a range of issues being considered by the Mohists, one that signaled a broader interpretation or discussion, and one on which initiates were probably given to comment. If so, the exercise was not too difficult let alone for the fact that the interpretation of the canon's quantification intention was nearly always merely about general quantification with one important exception, though.[26]

Giving these explanations as sufficient (at least in my understanding) justification of the translation, it needs to be stressed that it is in this particular translation, where the canon is a coherent and interesting whole. The basic idea of the canon is of course the fact that anyone's proposition

[25]One of the canons in chapter 40 of Mo Tsy is a logically correct definition of a great quantifier as an equivalent of the zero quantifier (Oz) ....which, in logic, is equivalently replaced by the negation of an existential quantifier with a negation directly following (Graham 1971: 84). Note that this Mohist definition reflects a common procedure in the grammar of Chinese of expressing general quantification in the latter manner, that is, (Oz) $\sim$ ... rather than the later (z) ...

[26]The multiple general quantifications characteristic for the canon could also have contributed to its *quantifier-free* formulation.

that "I negate ALL negation ($p$)" is a negation and in itself belongs to the range of ALL negations referred to in itself. It thus entails its own negation: "I negate that I negate all negation," which, in other words means "It is not true that I negate all negation ($\sim p$)." In the end, a negation ($p \rightarrow \sim p$) is ascertained to obtain here. In agreement with the *reductio ad absurdum*, this leads to the conclusion $\sim p$. However, let us notice that the canon is not limited to refuting in this circular manner an equally circular proposition that allegedly all propositions (sentences) are true.[27] Its author also states that some negations are subjected to negation (which is an obvious truth which Mohists must have realized),[28] but a difference is also emphasized between this statement and the starting proposition that has been refuted. In other words, the canon not only refutes the inconsistent starting proposition, but it also corrects it, with the correction being about a quantification that is not directly expressed in the text but which is implicit in it.[29] This logical coherence, which can be seen in the translation of the canon, also testifies *ex post* to the relevance of the interpretative principles adopted.

The two examples may indeed constitute the whole of the subject matter as per Chinese philosophy, but this provides us with sufficient proof that Mohists were able to discover the principle of the *reductio ad absurdum* on their own and were capable of using it to at least the same degree as the little earlier Ancient Greek thinkers. This is corroborated in the third example which is so close logically to the issue discussed here that it could constitute the third (and last) component to the extended Chinese exemplification. What we have to do with it here, however, is not a direct application of the *reductio ad absurdum* itself but, rather, a reverse law of reduction, expressed by the '$(\sim p \rightarrow p) \rightarrow p$'. Clearly, the example means above all that Mohists also discovered this reverse variant of the reduction principle even if they

[27]As noted above (note 20) a proposition such as "I negate all negation" is in fact a circular way of formulating a proposition "I recognize all sentences to be true." The conclusion of the Mohist reasoning "It is not true that I negate all negation" is to say that "It is not true that I recognize all sentences as true."

[28]The point is that some (and only some) negative sentences are false and thus are in need of another negation, which along the lines of the law of double negation abrogates the previous (falsifying) negation and turns the whole into a true statement. At the same time, Mohists ascertain here the existence of true statements along with the respective equivalent formula '$(\exists p) \sim \sim p = (\exists p)\ p$'

[29]Using symbols, we can put it this way that Mohists not only refute the false proposition $(p) \sim \sim p$, which as we know is equivalent to $(p)\ p$, that is, "All sentences are true;" what is more, they turn it into a true proposition by way of changing a general quantification into an existential one $(\exists p) \sim \sim p$ (equivalent to $(\exists p)\ p$, that is, "Some sentences are true").

did not realize the difference between the two (which is of little significance, anyway), but it provides an indirect confirmation of Mohists freely using reductionist reasonings. In this sense, the example is important for our subject, too, but as stated at the beginning, as a reverse reduction, this will be excluded from the discussion. I will thus limit myself to the general comment above and append a note on the canon.[30]

The scarcity of the Chinese documentation is notable. It comprises of up to three examples coming from the same Mohist source. Compared to the Greek examples (not to mention its Western continuation), this scarcity of Chinese exemplification may seem so unlikely that a skeptical reader could even suspect a misunderstanding or the author's sheer ignorance. It thus needs to be stated in no unclear terms that indeed the Chinese examples provided before constitute the complete exemplification of the Chinese philosophical literature on the subject.

For a Sinologist, this state of affairs is no surprise. More than that; one could rather be surprised that there exists a sufficient documentation at all of the phenomenon in question rather than it being so scarce and limited to one Mohist source. As said before, the Mohist School, and its branch known as dialecticians in particular, was an important, if isolated, Chinese phenomenon that was discontinued and it was rather fortunate that a coincidence of factors helped it survive at all despite having been forgotten for centuries. This needs to be supplemented by stressing that the Mohist theoretical reflection — particularly logical, semiotic and epistemological — was so different from the type (or, rather, a stereotype) that dominated Chinese philosophy that it simply had no chance of rebirth after the fall of the heterodox school and with its output having been lost. It is highly probable that it was the heterodox nature that contributed to the extinction of the school (even though the main reasons were political), but surely the lack of interest in the work of Mohist dialecticians was a major factor why

[30]The canon in question being a Mohist proof of the usefulness of acquiring knowledge. Here too the text is formulated quantifier-free, with the reasoning implicated in a rather complicated context. However we have to make do here with an unquestionable fact of using a reverse (sic!) reduction principle '$(\sim p \rightarrow p) \rightarrow p$'. An orderly reasoning can be presented as follows: somebody's negated proposition "It is not true that (all) acquisition of knowledge is useful ($\sim p$)" contains in itself a knowledge (even if just the knowledge that the acquisition of knowledge is useless), which this somebody presents as useful to those who do not possess this knowledge and ought to acquire it. So, the proposition that negates the usefulness of acquiring knowledge is supposed to imply *per se* that still "(some) acquisition of knowledge is useful ($p$)," with the consequent being a conclusion at the same time.

their legacy was lost.[31] We have to stop at this brief sketching of the subject matter.

The description of the intellectual climate that did not foster this kind of reflection — something opposite, in fact, to what dominated Old Greek and Indian Buddhist thinking — may explain why documentation in Chinese is scarce, but makes no proof that the whole of the Chinese exemplification boils down to the illustrations provided before. It thus ought to be added that this conviction also has empirical grounds in that so far nothing has been found to the contrary. We mean a peculiar argument *ex silencio* from Chinese scholars, whose knowledge of the sources usually exceeds the capabilities of Western Sinologists and who have not recorded examples of such a kind. This requires some more explanation.

In extra-sinologist circles it is little known that philology has been the basic field for all disciplines of Chinese humanities, with all textual research having an extensive philological context in China. In practice it means that making constant references to other texts is an integral part of any critique and interpretation of each text studied if the scholar has found the other texts analogous or relevant in some important terms to the text being investigated and has thus recognized those as capable of contributing to making the interpretation of the text investigated broader or deeper. This is a procedure used by Chinese scholars to this day, and given the encyclopedic erudition of each competent scholar, which needs to be multiplied by the number of researchers who (as in the case of the Mohist chapters) dealt with the editions of the text, the probability of all of them overlooking some references or parallels that are important for the text they investigate is extremely low. Thus a conviction of the completeness of the exemplification provided as one that appeals to the fact that those numerous editors and interpreters employing the procedure of the dialectical chapters of Mo Tsy have not noticed anything that could supplant this exemplification seems fairly justified.

To be precise, it needs to be added that there is one peculiar exception

[31]The impervious nature of the traditional Chinese thought to inspiration pushing towards theoretical logical reflection, epitomized by dialectical Mohist inquiry, confirms very modest results of external Indian Buddhist inspiration in the Middle Ages. As we will soon see, some Sanskrit texts in Buddhist logic were indeed translated at the time, and Chinese monks even wrote their comments to the texts, but the interest in the subject was rather low and, like in the case of the domestic Mohist inspiration, made no lasting contribution to the development of Chinese philosophy. The limited reception makes the significance of the respective Chinese-language materials no less important, though, for the study of Indian Buddhist logic, to which they in fact belong.

in the existing Chinese literature, which does not undermine the rationale, though, but on the contrary, reinforces it indirectly as testifying to having indeed been a search for substantial equivalents to the texts of our interest in the source material. A counterpart of sorts has been found of the first of the canons discussed in a lengthy comment by the monk K'uei-Ki (AD $7^{th}$ c.) to a Chinese version of a textbook of Buddhist logic written in India.[32] The thing is that the relevant passage of K'uei Ki's comment, noticed and quoted by contemporary Chinese researchers of Mohist dialectics does belong to Chinese-language literature, but does not constitute part of the native Chinese thought. In line with what the mention on the nature of text the passage comes from suggests, it belongs (like the whole text where it is found) to Indian Buddhist logic and that why it will only be presented in the chapter devoted to the Indian Buddhist documentation of the subject.

These remarks close the rationale for my conviction that the Chinese exemplification of the subject of this study is thus complete. At the same time it was found that the documentation does not overlap the whole Chinese-language documentation. Moreover, the explanation might imply to the reader that the role of Sinological materials (in the linguistic sense) is not restricted to the native Chinese milieu but that it also pertains to the Indian Buddhist circles.

This right conclusion, indicating a fact that is new to us and at the same time important in the context of the further discussion needs more explanation as it fails to give one an idea about the significance of the issue, which has only been signaled here. In brief, Chinese-language Buddhist literature is indispensable (and in some cases irreplaceable) source material for the many branches of Buddhist studies including Indian Buddhist logic which is of utmost interest to us here, and for which the significance of Chinese sources is much greater than would otherwise appear upon the mention in passing of the K'uei-Ki comment. As regards the subject matter studied here, this will be corroborated in the next chapter.

## III

The issue of the Indian Buddhist exemplification is much more complex than the Chinese examples, with the difficulties it poses being of a completely different nature. This calls for some more general explanations all the more

[32]The most recent edition of a detailed analysis of Mohist dialectics: T'an Kie-Fu 1977: 335. A reference to be found in an earlier work of the same author, T'an Kie-Fu 1935. See also Chan Ki-Feng 1957: 118.

so that the matter is not restricted to our narrow specialization and is much more extensive, concerning the whole of Buddhist studies as a strictly interdisciplinary field. Also, the issues involved are less known or virtually unknown to the potential readership and this is another reason why these should not be overlooked. Regardless of the point of supplying a broader and relevant backdrop of a broader discussion, what will be done is broken down in proportion to my own competency here, which is very modest.

What we should start with is a fact that is well-known to both Sinologists and Buddhist scholars alike that the art of dialectics has a rich tradition in Indian Buddhism. The first attempt at the codification of the rules of this art anticipates the subsequent Indian logic (*nyāya*), both orthodox (in the sense of being pursued within Brahminism) and Indian Buddhist. Scholars pursuing Indian studies note that these doctrinal disputes and discussions were usually about refuting the opponents proposition in which reductionist reasoning played a vital part. To be precise it ought to be added that the examples cited in the literature of the subject indicate that the authors do not really mean the applications of the *reductio ad absurdum* in a formulation that attracts our interest here, but a broadly understood reduction to a contradiction and the *modus tollendo tollens* '$[(p \rightarrow q). \sim q] \rightarrow \sim p$' in particular (Jaystilleke 1963: 105f, 409f ).[33] At any rate, the tendency to use reductionist reasonings (however strictly we determine their structure) is beyond doubt and is one of the aspects of characteristic Indian Buddhist love for dialectical-logic subtleties. One can thus expect to find an exemplification of our issue in Indian Buddhism but that this illustration will be richer than in China and Old Greek, too, perhaps, and as such perhaps richer in terms of the variety of applications. It seems all the more likely as in this case both the quantity and diversity of potential sources of documentation are exceptionally large, even when compared to European antiquity.[34] The latter point also leads to the main cause of the difficulties mentioned before, with some added serious complications.

[33]Not all logicians will recognize such reasonings as examples of the applications of *reductio ad absurdum*. This is an extension of the concept of reduction, probably justified by that the antecedent of the *modus tollendo tollens* formula $(p \rightarrow q). \sim$ implies the antecedent of the $(p \rightarrow \sim p)$ reduction. It is a marginal issue as we are here interested in the principle or reduction *sensu stricto*.

[34]I gave my own heuristic assumptions by which I was directed on a quest for examples in the sources and literature available. The findings presented further justify the relevance of the assumptions and making a note of these. However, the exemplification given subsequently is in a way random and may be expanded on by competent scholars.

The mere quantitative abundance of Buddhist literature poses no small problem even for the most competent scholars of Buddhism and is in itself enough of a challenge for those who seek documentation of numerous issues in the abundance of source texts. The matter is not that easy even if not that complicated, but it is compounded by a linguistic complication. The original Indian Buddhist literature is bilingual: Pali and Sanskrit, similar and yet different languages and thus requiring a separate study. Also, the Buddhist Sanskrit is sufficiently different from its classical variety to make it difficult for a fluent reader of the latter to read texts in the former without proper preparation. Also, the Pali-Sanskrit language differentiation within the native Indian Buddhist literature is reflected in the nature of the sets of texts that correspond to the language difference. First, Pali is the language of the basic sources on early Indian Buddhism, referred to as Hinayana, especially the so-called Pali Canon, but there are also some Pali texts that do not belong to this canon. Sanskrit is the language of an impressive body of Indian Buddhist literature called *mahāyāna*, particularly the corpus of texts by the so-called Madhianics (*mādhyamika*: followers of the middle path) and the yogins (*yogācāra*: followers of yoga), being those who created a very rich philosophical literature, including treatises and manuals on logic or otherwise related to logic.

However, at around the beginning of the second millennium, that is, around the time of the disappearance of Buddhism in its cradle — India — a vast majority of the Sanskrit Buddhist text had been lost.[35] Some original manuscripts may have been preserved to date — almost all outside India, incidentally — and the recent decades revealed some new finds, but it only slightly diminishes the scale of the catastrophe that was inflicted on the Sanskrit Buddhist literature. The extant manuscripts are indeed extremely valuable, but they are but a fraction of what had been lost, but if the effects of the losses can be considerably averted, then we owe that to some other circumstances.

There has already been an opportunity to mention the unique significance of Chinese-language materials for the study of Indian Buddhist logic, but this is just a part of a much more important phenomenon. As a result of work on the domestication of the Indian Buddhist thought for the sake of the Chinese Buddhists, which was begun in the early Middle Ages and lasted for ages, we now have very rich Chinese Buddhist literature. It may be above

[35]This was not the fate of the Pali literature, which was preserved and indeed created in Ceylon, where the Hinayana Buddhism took root and has remained to this date.

all the source material for the reception and development of Buddhism in China, but it is also a precious, even if secondary collection of sources for the Sanskrit Buddhist literature as the commentaries and treatises written by the Chinese Buddhists for their own use, the Chinese Buddhist canon also contains a number of translations from Sanskrit, including the Chinese-language copies of a number of works that have been lost. Notably, reading the Chinese Buddhist texts requires some specialist preparation that goes way beyond the conventional Sinological curriculum.

What is more, almost exactly the same can be said about the other vast collection of Buddhist literature — the Tibetan Canon. The origins of Buddhism in Tibet came several centuries later than in China,[36] but a vast effort was made in the Tibetan monasteries to translate Sanskrit Buddhist literature, with the Tibetan versions having a particular value being more faithful renditions of the original thus allowing whole parts of the lost Sanskrit original copies to be reconstructed. This also testifies to a much higher flexibility of the Tibetan language as compared to Chinese (the two being related, albeit remotely, thus making the similarity insignificant) but what was also very important was the fact that the Tibetan translators were unrestricted by their own literary tradition (they did not have one) and worked out their own style adapted to the translation from Sanskrit that was as faithful as possible. Also, they reconstructed in their own language the very rich technical terminology of Indian Buddhism.[37]

Both canons — each constituting a large collection — are a major proxy source for Buddhist studies, largely compensating for the loss of original Sanskrit Buddhist copies. Importantly, too, both canons are mutually complementary. Of course, there are texts that are doubled and we thus have

[36]The Tibetan language began to be written down as late as the $7^{th}$ century AD and this occurred precisely for the purpose of domesticating Indian Buddhist literature. The Tibetan script is modeled on Indian but uses extra means of a precise transcription of Sanskrit, which are unnecessary for Tibetan.

[37]Here two important remarks come to mind. First, it is a semiotically interesting language of an isolated and rather primitive Tibetan community, which had just learned to write and had not had any literary tradition of its own, should have so quickly become a tool for a very precise reconstruction of a highly speculative and abstract Indian tradition. Second, given that translation is a par excellence semiotic issue, a systematic action of translating Sanskrit Buddhist texts into Chinese and Tibetan is a universal semiotic experiment that is unique in kind and size. Also, it is a vast field for semiotic (empirical-semiotic) research that is the more promising as the language systems involved are very (or even diametrically) different structurally and representing various cultural traditions with a literary tradition (and in the case of Tibetan — a lack of one). It seems proper to at least signal the issue in a semiotic periodical.

parallel Chinese and Tibetan versions of the same lost original. Such cases are very useful let alone because they allow a mutual verification of translation. Even more useful is a situation where lack of a Chinese version is compensated by the existence of a Tibetan one or the other way round so that we have at least one translation of the lost copy. The most fortunate, but at the same time rarest, cases when we have both the Sanskrit original as well as the Chinese and/or Tibetan translation are particularly valuable as these very texts provide us with an empirical basis for the investigation of the translation technique, fidelity of the translations and the like.

It follows that the plentiful research within this very Indian Buddhism (while disregarding the reception of Buddhism outside of India, in itself a different set of issues) cannot be limited to the mere Indian source base but must largely (and in many cases, solely) appeal to the linguistically secondary Chinese or Tibetan material. We will soon be convinced of the truth of that observation as illustrated in the subsequent sections of the paper. Now, though, we need to realize the scientific difficulty posed by the state of affairs. In brief, a scholar in Buddhist studies ought to possess Sinological and Tibetan philological skills on top of their philological Sanskrit-Pali competences and the knowledge of the Indian culture. All these combined in one individual in their single lifetime seems an unattainable ideal, with a merely approximate competency that allows sufficient research skills being found only in a very few. Also, considering that the ideal competency assumes being extremely well-versed in a vast corpus of various texts in multiple languages, we have discovered from within the main and complex reason why Buddhist studies are so difficult.

Now onto how this overall situation affects the study of Buddhist logic, under which the subject matter being discussed falls. It might seem that at least in this specialist field the situation is less complicated, for the mere reason that we should be dealing with rather scant sources as compared to the totality of Buddhist literature. This is so in a way, but not as much so as would seem.

In the first place, the limited source base expected does not require any lesser qualifications in philology and language. The significance of the Indian languages for Buddhist logic is related to something more than the fact that this logic hailed from India and was worked on there, but it also constitutes a part of Indian logic and cannot be separated from its natural context. Suffice to say that these ties are documented by native Indian materials not only Buddhist. On the other hand, most (including those most vital) source material for Buddhist logic is to be found in Chinese or Tibetan versions as

the Indian originals had perished. Second, the selection criteria that limit the source base cannot be precisely constrained. The basic texts including logical treatises (in the Indian understanding of logic, of course, which is different from the modern understanding of formal logic and closer to a peculiar perception of "philosophical logic") are not very numerous, but they are not all the texts involved. Information on logic can be provided by various texts other than logical treatises of a philosophical and philosophical-polemical nature, though. This is especially true of concrete examples of reasonings, including ones that are not reflected in a logical theory.[38] In the end, the collection of the potential multilingual source material cannot be identified with precision. It is much broader than the mere set of logical treatises, anyway.

To conclude this part of explanations, we need to note a peculiar complication of a different, extra-philological nature, which poses a serious problem in research into Buddhist logic (excluding other fields of Buddhist study) and may well be the most difficult obstacle to overcome by those who must, above all, have a comprehensive philological formation. Of course, the knowledge of formal logic, necessary in Buddhist studies, without which any sensible research in history and logic, is impossible nowadays either in Indian Buddhism or anything else.

All I have said before is just to emphasize the merits of the accomplishments of Indian Buddhism researchers, particularly those few who combined philological competency with the contemporary knowledge in formal logic and analytical techniques.[39] This is also explained by the fact that most achievements in Buddhist logic today are confined to the philological level at best, which is to say still in its early stages, and require more specialist research (or even verification); another reason is that there are still serious gaps in studies on important texts. The scant and fragmented plight of the knowledge of Indian Buddhist (and Indian in general) logic results from this state of affairs, for a radical improvement in which we will need to wait a long time.[40]

[38]This is very important just for being related to the exemplification of the subject matter of the study. The implications are not properly appreciated. In the Indian theory of logic there is no counterpart of the basic segment — propositional calculus — even though there are reasonings that correspond to it in the Indian practice. See the note 33 on *modus tollendo tollens* as well as note 24 on reasoning practice).

[39]Interestingly, it was a Polish scholar in Buddhist and Indian studies, Stanisław Schayer (1899—1941), who played a pioneering role there.

[40]The only one attempt so far at an existential presentation of the present state of the art in Indian logic, made by a skilled historian of logic is the part *Die indis-*

All the above comments ought to be treated as a background emphasizing my own limitations in the discussion of the complicated and little researched field, where I have never done my own research. This is to say that the exemplification presented further is as it must be — rather random. If, despite that, it proves to be a sufficient and logically interesting illustration of our issue, it will mean that my quest on the little known path was accompanied by good luck.

We know from the previous chapter that there is a Buddhist example, discovered by Chinese scholars as a *sui generis* counterpart of a Mohist canon. It is, however, a rather late example. Also, on another count it is suitable for quoting only at the end of the review. Of course, what would be most desirable is chronological documentation, and this is what I am going to do. However, in the case of Old Indian texts chronology is difficult and has long-ranging reverberations. Old Indian texts (not only Buddhist and not only those on logic) do not render themselves to dating (rough estimates can vary by centuries) and even the establishment of their relative chronology can pose a challenge. In the case of Buddhist texts translated into Chinese,[41] the only sure chronological information tends to be *terminus ante quem* that the Chinese version provides (this one can be dated, sometimes quite precisely). Of course, in these conditions the intended chronological arrangement of the documentation can only be chronological in an arbitrary sense.

Bearing this qualification in mind, we should start from an example that may not render itself to dating, but which is among the oldest of those that will be supplied. This example is also an illustration of the part Chinese-language materials play in the Indian Buddhist exemplification of the subject matter, as coming from a Chinese version of an unidentifiable

*che Gestelt der Logik* in Bocheński 1962: 481-517. The very modest size of this part, as contrasted with the size of the whole work, speaks for itself and nothing points to it possibly being capable of expansion despite the passage of a quarter of a century. There is another comment to be made concerning the position held by Schayer, questioned by Bocheński (1962: 488-489) on the anticipation of the propositional logic in the *Pali Kathilvalthu*. See also the counter-critique by Jaystilleke (1963: 412-415), who proves Schayer right on the basis of Pali original. The issue is interesting not only because it is related to propositional logic (Jaystilleke 1963: 44n) but because it apparently exemplifies in its subject area a broad issue in Oriental philology: the adequacy of logical analysis can be (and sometimes is) dependent on the linguistic-philological aspects of the original, which translated into a modern European language can easily be blurred or distorted.

[41]The Tibetan translations, being much older that Chinese, are irrelevant here, particularly that the Indian Buddhist texts represent an early stratum of literature.

Sanskrit original, the latter being the only extant source. It is a text that no doubt belongs to the early stratum of Buddhist logical treatises, whose translation (rather obscurely) titled *Zhu Shi Lan* is to be found in the Chinese Canon.[42] What is known about this text beyond doubt is that the translation into Chinese was done in AD 550 by the well-known non-Chinese missionary monk Paramartha (Ch. Chen-Ti) and that the extant text of the Chinese version is incomplete.[43]

Te first chapter of *Zhu Shi Lan* is about "illogical charges" (Ch. *wu tao-li nan*, Sanskr. *anyāya-khaṇḍana*). In the last paragraph of the original, the author refutes the charge by an opponent that he "rejects [*pu hu*, lit. 'does not recognize/allow'] all statements." Below is a rather literal translation of the passage from the Chinese version:

When you say that you reject everything, is this [your statement] included in the number of EVERYTHING or is it not included in the number of EVERYTHING? If it is included in EVERYTHING, then you yourself refute what you are saying [...] If, however, [this statement of yours] is not included in the number of EVERYTHING, then there is no EVERYTHING [in your EVERYTHING].[44]

[42]In the newest Japanese edition of the Canon, *Taishō Shinshu Daizokyo* (abbr. *Taishō*), vol. XXXII, item no. 1633, pp. 28-36. An edition of the text which is clear in its layout is one published in Hu Ti-Shan 1931.

[43]We do not even know the original title of the treatise. The commonly used restitution of the title as *Tarka Iostra* (Treatise on the [art of] polemics) is just a handy convention for which it is hard to find justification in the Chinese original, which roughly means "Treatise on How Things Really Are" [*Zhu Shi* ≠ *Tarka*]. Ch. *Zhu-shi* seems to be a loan translation of the yathā-bhūta expression well-known in the Pali Canon. Also, it looks like the text preserved is an artificial compilation of a number of different Sanskrit treatises that can hardly be identified. Chinese scholars tend to attribute the authorship of *Zhu Shi Lan* to the great philosopher Vasubandhu, which is questionable. The text has not been translated into any European language, but the great Italian scholar of Buddhism Giuseppe Tucci, perhaps the only scholar who had actually studied the text, published his own "retranslation" of *Ahu-Shi Lan* into Sanskrit in his "Pre-Dinnāga Buddhist texts on Logic from Chinese Sources" (Tucci 1929, part I *Tarkaiostram*, pp. 1-40 of the Sanskrit pagination).

[44]The Chinese *Taishō* text, vol. XXXII, no. 1633, p. 30 (2), verses 18-22 (Hu Ti Shan 1931: 1850-1851). My translation where I have tried to render the Chinese version literally is not significantly different from the Sanskrit retranslation offered by Tucci: *servaṁ nānujñāyata iti yad uktaṁ bhavatā, etad vacanaṁ sarvasminn antarbhavati na vā? yadi tāvat sarvasminn antarbhavati tadā bhavān svayaṁ svoktaṁ nānujānāti. [...] atha sarvasmin nāntarbhavati tadā tasya sarvatvam eva na syāt* (Tucci 1929: *Tarkaiostram*, p. 11). The translator's note referring to this passage (part II, *Notes on TŚ*, p. 3) means that Tucci did not notice the logical aspects of the treatise of interest to us (which was practically impossible in work published half a century ago).

A direct application of the principle of reduction is to be found in the first part of the quoted text. If a statement "I reject everything" itself counts within the range of EVERYTHING, then the one who states that should refute this, too. An analogy with the formula '$(p \rightarrow \sim p) \rightarrow \sim p$' will obtain clearly if we assume that in this case "I reject" (I do not allow) means the same as "I negate:" If I "negate EVERYTHING ($\sim p$)," then "I negate (also that) that I negate EVERYTHING ($\sim p$)" and thus, finally, "it is not true that I negate EVERYTHING ($\sim p$)." Regardless of the difference in verbal formulations, it is in fact the same reasoning as in the Mohist canon discussed before. We may even wonder why the contemporary researchers of Mohist dialectics, who, as we see, also reached for Chinese Buddhist literature, did not find this parallel or, which seems more plausible, deliberately omitted it for one reason or other.

What is much more important is that in the text there is something novel, which we have not only encountered in the analysis of the Chinese examples but also in the Greek texts; not even in the $19^{th}$ century example (Bolzano): posing the very question of whether a statement such as "I reject everything" counts as EVERYTHING itself or not; in the latter part of the passage the author apparently allows for the possibility of excluding this statement from the range of EVERYTHING it itself discusses; it is also emphasized that the EVERYTHING the statement refers to, then, is not EVERYTHING in the end. Note that such a position at least puts to question the legitimacy of the basic implication assumed by all the reasonings discussed so far and is rather obvious. In other words, in the short passage quoted from an unknown Old Buddhist passage of an unknown origin, we deal with one of the oldest explicit formulations of a reservation about the semantically unlimited applicability of the *reductio ad absurdum* that have surfaced in the history of human thought. As we will see further in chapter IV, we have the right to take such a formulation as pioneering with regard to the modern views on the issue.

The issue is all the more important as this very position of an unknown author of the Indian original of the text being quoted is not a rare case in Old Indian literature. A similar tendency can be traced in the Pali Canon, where it is to an extent sanctioned by the authority of the very canonical Buddha. This would require some more thorough study of sources, which is beyond my capacity and this is why I am unable to present this point as a separate example and neither do I know if it would suit such presentation. In the context of present and further discussion, it is necessary to shed more light

on this, but I can do it solely on the basis of second-hand information.[45]

In a text from the Pali Canon — *Dīkhanakha-sutta* — found in a collection of medium-length texts, *Majjhima Nikoya*, three positions are identified in relation to "views" (Pali diṭṭhi; Sanskrit dṛṣṭi: I "I recognize everything (i.e. all views)," "I do not recognize anything (i.e. any views)," and finally "I recognize some (views) and do not recognize others." Let me remark that the first position is comparable to the one held by Protagoras, with the second corresponding to that of Xeniades and add that from our point of view, we would deem the third position right. The canonical Buddha is in disagreement with that, though, and he only endorses the second position — "I do not recognize any view" (Pali sabbaṁ me na khamati; more literally: "I do not recognize everything") — as the only one of the three that would foster freeing man from numerous forms of complicity. Buddha recommends a non-dogmatic attitude, here, too, though. This is to say that this position should not be something to cling to; conversely, an abandonment of this (best of all) "view" is recommended, albeit without granting a possibility of exchanging it for either of the other two. All that is congruent with an otherwise well-known fact that Buddhism was skeptic-friendly.

Buddha's interlocutor is a Dighanakha, a wandering skeptic who embraces the position of "not recognizing any view," except he treats his stance dogmatically. Asked by Buddha whether he recognizes his own view, he says that even if he does recognize this view of his, it is all the same. It is supposed to mean that he — Dighanakha — does not recognize any view other than this very one he holds. Buddha stops at this and does not try to prove to the interlocutor that the latter errs logically and does not point to him that in the proposition he makes *sabbaṁ me na khamati* "I do not recognize everything" he uses the word "everything" wrongly.

The convergences between the canonical text just quoted and the ones in *Zhu Shi Lan* are clear and it is hard to imagine these to be accidental. Given the relative early chronology represented by the Pali text, and the part where *Dighanakha Sutla* belongs in particular, it is almost certain that it is in this text that we have to make do with the earliest traceable documentation of the subject matter in question — a starting point to the further evolution in the Buddhist context. As we will be making further references to this role of the text in this study, it is worth outlining the main points of this earliest position.

[45]I owe all the data on the discussion contained in *Dīkhanakha-sutta*, which constitute (secondarily) a source base of my study, to the book by Jaystilleke (1963: 213-217).

First, the canonical Buddha only addresses the position expressed in the statement *sabbaṁ me na khamati* ["I do not recognize everything"] in a friendly manner, with the preference being pragmatic rather than epistemological (the elimination of complicities). Second, the qualification that this position cannot be treated dogmatically also has a pragmatic nature, but apparently, inherent in it is an intuitive awareness of the logical difficulties associated with the proposition. This appears to be reflected in the tricky question that Buddha asks: the possibility of self-refutation of the proposition. Third, in responding to Buddha's question, Dighanakha confirms "dogmatically" his position and invalidates the charge of self-refutation generated in the question by implying that he excludes the proposition from the range of EVERYTHING which the proposition talks about. Fourthly, Buddha, who with his question meant to get his interlocutor to declare that he will not cling to his position and is ready to give it up (which would testify to a non-dogmatic treatment of the position and thus, as it were, circumvent the logical difficulty inherent in the proposition that expresses this position), acknowledges the answer without any further comments. Fifth, he does not question the exclusion made by the interlocutor of the proposition from the range of the *sabbam* inherent in it. Buddha seems to sanction or at least allow such an exclusion.

A more detailed investigation might make the above more precise or correct it. However, it remains a fact that a tendency, marked in the Hinayana Pali Canon to undermine the type of reasonings of interest to us, is not limited to *Zhu Shi Lan* but can be ascertained on a number of occasions in the Mahayana writings. This is particularly true of the literature of the Madhianics, from which another example comes. This requires a prior analysis of the treaty *Vigraha-vyāvartanī*, from which I took the passage analyzed further.

The title *Vigraha-vyāvartanī* roughly means "polemic reversal," which can bring up associations with the term *peritropé* which we encountered in Sextus Empiricus. The treatise is authored by the great philosopher Nāgārjuna, the main founder of the school of Madhianics. As in many other similar cases, his life can hardly render itself to dating and what we can say is that he may have lived in $2^{nd}$ to $3^{rd}$ century. Still half a century ago, when Giuseppe Tucci and Yamaguci Susuniu were publishing the first translations of *Vigraha-vyāvartanī* into European languages (simultaneously but independently), the text was only available in the Chinese and Tibetan version.[46] The Sanskrit original was only found later (in Tibet) and the

[46]G. Tucci 1929, part I, pp. 1-77 of Arabic pagination and the notes there, part II,

critical edition of the Sanskrit text came out relatively late, with a translation based on that original being very recent.[47]

The skillful and additionally complicated composition of the text is remarkable. Like a number of Sanskrit-Buddhist treatises, the text is made up of two intertwined strata: of verse and prose. It means that every point of deliberation is first presented in a metric two-verse (kārikā), after which there is a prose self-comment (vṛtti) that discusses in detail the sense of the preceding stanza. Foreign translations keep this layout, too. The text is so composed that when leaving out the prose comment one can carve out the verses as a whole that briefly presents the contents of the treatise. Also, the treatise is thus divided into two separate parts in a unique correspondence. In the first part, Nāgārjuna adopts an attitude of a spurious opponent of Madhianics and formulates a series of potential charges against his own doctrine. In the other, he refutes the charges one after another.

The very beginning of the first part of the treatise is the model for our subject matter; they both add up to create the first criticism from Nāgārjuna as a fictitious opponent. Of course, in such an exceptional case as this, where on top of the Chinese and Tibetan version of the treatise there is also its Sanskrit original, an idea comes to mind of making a detailed comparison of all the versions of the text. This would be interesting in semiotic terms. I do not intend to do that, though; I believe it will be better to give a Polish translation, prepared from the Tibetan version rather than the Sanskrit original. When years ago I was translating verses of *Vigraha-vyāvartanī* into Polish, I only had the Chinese and Tibetan versions at my disposal, of which I chose the latter as the basis. Now that I also have the Sanskrit original, I can also say that the Tibetan version of the stanzas is in absolute agreement with the original. The differences are virtually in word order only, which is conditioned by the differences in syntax and metrics.[48] Therefore,

23-42. To his English translation, done directly from the Chinese version of the treatise *Hui-cheng lun* made at the end of the first half of the $6^{th}$ century, Tucci appended a transcribed text of the Tibetan version. The French translation is better. It was made from the more precise Tibetan version by the Japanese Buddhist scholar Yamaguci (1920). Both these translations were made a little obsolete when the Sanskrit original was discovered later (see next note), but the translation of the Chinese and Tibetran versions, which was at the time a considerable accomplishment, with the translations having to this date retained a comparative value.

[47]The critical edition of the Sanskrit text Johnston and Kunst (1951). The English translation from this edition Bhattacharya (1971).

[48]Of course, the Tibetan translation of the versed parts is also versed albeit along the lines of different metric principles. Conditioned by the difference between the language. In particular, the single verses of the Sanskrit correspond to two short verses,

eventually the Polish translation from Tibetan can pass for one made from the original language, making this example of the subject at the same time an illustration of the precision of the Tibetan translations I have mentioned before.

For the sake of the Orientalist reader, allow me to quote a passage from the Tibetan text that forms the basis of the Polish translation. In our conditions, reaching the Tibetan version on the mere basis of references might prove impossible, and the Tibetan text (like in Sanskrit and unlike in Chinese) can be unambiguously presented by transcription. Quoting the version that the Polish translation is based on alongside the corresponding passage from the Sanskrit original[49] will facilitate the formulation of the required explanation of terms and content, without which the translation would be rather unintelligible. Below are both stanzas in the Tibetan version:

*gal-te dṅos-po thame-čad-kyi /*
*raṅ-bźin kun-la yod-min na //*
*khyod-kyi chig kyaṅ raṅ-bźin med /*
*raṅ-bźin bzlog-par mi nus-so //*
*'on-te chig de raṅ-bźin bčas /*
*khyod-kyi dam-bčas sṅa-ma ñams //*
*mi-'dra-ñid de-de yin na /*
*gtan-chigs khyad-par brǰod-par byos //*[50]

The translation below faithfully renders verse after verse and it even tries to keep the word order where it does not violate the Polish syntax:[51]

If all things'

so in the end the two-verse stanza of the original is rendered by a four-verse Tibetan *kārikā*. We will see that some more difficulties for the translator, resulting from the need to use verse metrics did not affect the translation.

[49]For the sake of comparison, this is the Sanskrit text of both stanzas: *sarveṣāṁ bhāvānāṁ sarvatra na vidyate svabhāvaś cet / tvadvacanam asvabhāvaṁ na nivartayituṁ svabhāvam alam // atha sasvabhāvam etad vākyaṁ pūrvā hatā pratiñā te / vaiṣamikatvaṁ tasmin viśeṣahetuś ca vaktavyaḥ* (Johnston, Kunst 1951: 108-109, *cf.*. the English translation (Bhattacharya 1971: 220-221).

[50]The Tibetan version of the stanzas is here presented after Tucci (1929: 3, 5 — his translation of the stanzas ibid., p. 2 and 4). I use a transcription that is more modern than Tucci's, though, where aspiration is consistently transcribed "h." For the translation of both stanzas from Tibetan, *cf.* Yamaguci (1920: 5, 7). The Chinese text of both stanzas as used by Tucci, *Hui-cheng lun, Taishō* (no. 1631, p. 13 (2)).

[51]Below a retranslation into English, as literal as possible — trans. note.

Self-being does not at all exist,
Your words are also devoid of self-being,
And refute self-being they cannot.
If, however, the words have self-being,
Your previous proposition becomes violated.
If such disagreement occurs,
You ought to state a special rationale.

Note that above all we have to make do with a more sophisticated application of the principle of the *reductio ad absurdum* than previously, which is caused both by the peculiarities of the Madhianics' philosophy and the dialectic method becoming more sublime in the treatise.[52] We need to start with explaining the basic terminological issue related both to the essential point of the doctrine. The rather artificial word "self-being" used in the translation seems a right equivalent of the Tib. *raṅ-bźin* which here renders the Sanskrit *svebhāva* because even in terms of word formation it resembles the Indian original and with its artificiality stresses the fact that a special philosophical term is meant here.[53] The self-being, *svebhāva*, is for Madhianics being in itself and of itself, conditioned by nothing, non-transient and unchangeable. However, since Madhianics embrace the belief in "conditioned emergence" of everything (prat*ī*tya-sumutp*ā*da), they consistently deny all things of the world of phenomena, this kind of self-being. Also, for Madhianics "devoid of self-being," asvabh*ā*va (= *raṅ-bźin med* in our text) is practically tantamount to "empty," *śūnya* (that is empty for the sake of self-being, *svabhāvena śūnya*); hence the unique role of the concept of "emptiness," *śūnyatā* in this philosophy, which also calls itself the "doctrine of emptiness," *śūnyatā-vāda*. This has caused a number of misunderstandings. In reality, the thing is more complex and discussing it would go beyond this study and is unnecessary.

[52]The ascertainment of that fact, just as the ascertainment of the peculiar nature of *Vigraha-vyāvartanī* in the history of Buddhist philosophy by no means justifies the exaggerated opinions by some Buddhism scholars as one that we have to do here with "unerbittliche *Logik*" and that the treatise presents the author, N*ā*g*ā*rjuna "von allem in einer unbeirrbaren Folgerrichtigkeit" (Frauwallner 1956: 190). Undoubtedly, the "dialectical" mastery of N*ā*g*ā*rjuna otherwise leaves much to be desired in the logical sense, the statements like these contribute to the matter becoming blurred. It also seems that despite the already abundant literature on this treatise available, precise analysis of all the reasonings it contains is yet to be carried out.

[53]At any rate it seems that the "self-being" is better than "essence"(Tucci), "nature essentielle" (Yamaguci) or "intrinsic nature" (Bhattacharya).

It now becomes clear why Nagrayana as a fictitious opponent of his own doctrine begins the treatise with a criticism concerning the on-existence of the "self-being of all things" — an essential thing for the doctrine. This point must have been particularly exposed to attacks from thinkers embracing more realist outlooks, who quite rightly saw in it a denial of the world of phenomena, with N*ā*g*ā*rjuna's words echoing criticisms he must have encountered.

The first stanza contains a peculiar application of the principle of reduction, with the point being to prove the invalidity of the proposition rather than negating it. It is ascertained that a statement such as "All is devoid of self-being" (a paraphrase of the first two verses) as counting among EVERYTHING implies that it is devoid of self-being itself. In symbolizing the function "(it is) devoid of self-being" with the abbreviation *asv* (= *asvabhāva*), we can present it in the following formulation:
$\{(x)\ asv(x)\} \rightarrow\ asv\ \{(x)\ asv(x)\}$.

In line with the principle of reduction, the consequent of the formula, *asv* $\{(x)\ asv(x)\}$ (*khyod-kyi chig kyaṅ raṅ-bźin med* = *tvadvacanam asvabhāvam*) is adopted, which is supposed to prove that assuming the truthfulness of the starting proposition $\{(x)\ asv(x)\}$, it is itself devoid of self-being; it is also stated that the starting proposition — as devoid of self-being — is unable to (*mi nus* = *na... alam*) refute self-being; it is simply invalid. There is a silent assumption that only something that has self-being could "rebuff" self-being, which is revealed as the basis of the next stanza.

The second stanza is based upon a conviction that the starting proposition "All is devoid of self-being" $\{(x)\ asv(x)\}$ itself has self-being (*raṅ-bźin bčas* = *sasvabhāva*), that is it fulfills the necessary condition of its validity in the sense of being at all able to refute self-being. This leads to another application of the reduction, which is supposed to prove the violation of the basic proposition with this assumption. If this proposition (*dam-bčas* = *pratijñā*) fulfills the condition of being sasvabhāva, which is necessary for it to possibly be valid, then as one excluded from the range of ALL things about which it speaks, it entails its own falsity (if all is devoid of self-being then it is not true that all is devoid of self-being). Symbolically:
$\{(x)\ asv(x)\} \rightarrow\ \sim\{(x)\ asv(x)\}$.

Both stanzas together introduce the whole criticism to the alternative: (1) the starting proposition, in line with what is claims by itself, is devoid of self-being *asv* $\{(x)\ asv(x)\}$, and thus simply devoid of validity; in particular, it is unable to rebuff self-being or (2) the proposition itself is sasvabhāva and it thus fulfills the necessary (but only necessary) condition that qualifies

it for validity, but it then becomes violated itself (*ñams* = *hatā*) by that it entails its own negation $\sim\{(x)\ asv(x)\}$.

Against the backdrop of these formulations appears what we encountered in *Zhu Shi Lan* — the issue of excluding the proposition from the range of "all [the] things" that proposition talks about. This proposition is suggested by the last verses of the second stanza, where the opponent calls upon the presentation of some overarching "special rationale" (*gtan-chigs khyad-par* = *viśeṣahetu*),[54] which could dispense with the demonstrated "inconsistency" (*mi-'dra-ñid* = *vaiṣamikatva*). The whole context, including the self-comment, we have omitted here indicates that the fictitious' opponent can see no possibility of granting an "empty proposition" (*asvabhāva* means as much as *śūnya*) the capacity of negating the "self-being of all things," but it seems to not preclude the possibility of excluding the very proposition as one that has self-being of the range of "all things" which it talks about. This would indeed call for some ultimate rationale, to the presentation of which the opponent trickily summons and given that Nāgārjuna himself is the author, we can even assume that he does not treat the call seriously. None the less it remains a fact that Nāgārjuna — even if only as a spurious opponent of Madhianics — allows for the potential possibility of excluding the proposition that talks about EVERYTHING from the range of EVERYTHING, and this is very important from the standpoint of our discussion. It must be stressed that the totality of the above interpretation and the analysis of the two stanzas finds an exact confirmation in the self-comment, which we need not delve into really.

We might stop at that in the discussion of the example, but to complete the picture and satisfy the readers' justifiable curiosity, it must be explained how the author becomes polemical with these criticisms in the further part of the treatise as a spokesman for his own doctrine.[55] This polemic is disappointing and chaotic and much less interesting in logical terms than the formulation of the criticisms. As could be expected, as a consistent follower of the idea of the "emptiness of the phenomenal world," adopts a position that is reverse as compared to that which he presented as the opponent, which was shown as one that promised a hope of defense. It is

[54] A foreign version (particularly the Chinese one) suggests a *viśiṣṭahetu* variant in the Sanskrit original (lit. ultimate, superior rationale) as restituted by Yamaguchi, who had no access to the Sanskrit original.

[55] Nāgārjuna disputes the arguments at great length in stanzas 21-24 and the related self-comment (Yamaguchi 1920: 23-27; Bhattacharya 1971: 251-256). It is obvious that the Indian author formulated criticisms more precisely than he could answer them.

categorically stated that his proposition that denies everything self-being is in itself deprived of self-being. In terms of our analysis, it means that N*ā*g*ā*rjuna adopts the first formula of reduction and its outcome *asv* $\{(x)$ $asv(x)\}$ and thus what corresponds to the first stanza without its last line. It has two obvious consequences. First, the author omits the irrelevant issue of possibly excluding the proposition from the range of the great quantifier inherent in it and this refutes the criticism, which is expressed in the second reduction procedure.[56] Second, his counter-argumentation boils down to debating the last line of the first stanza which postulates the incongruity of proposition that has no self-being to negate the "self-being of all things." Going over N*ā*g*ā*rjuna's constant appeal to "conditioned emergence" as an equivalent of "emptiness" which is equivalent to the "non-existence of self-being," it seems that the most sober argument that can be extracted from the polemics is as follows. That all things are devoid of self-being which does not mean that they are unable to perform the functions. So, a pot devoid of self-being performs the function of containing honey, water or milk, just as clothing protects one from cold, wind, etc. and in the same way words that have no self-being and claim that all is devoid of self-being perform the function of ascertaining the non-existence of self-being.

The example seems particularly interesting in the context of our discussion particularly because of its non-conventional nature. Regarding the description of N*ā*g*ā*rjuna's counter-argumentation against the charges included in the text, it must be noted that the position he himself embraces ought not to be treated as evidence of his opposition to the operation of exclusion. In confirming the operation of the first reduction, N*ā*g*ā*rjuna simply omits the issue as irrelevant (as he recognizes the proposition as *asvabhāva*), which is not tantamount to an essential rejection of the possibility of exclusion in any other case. It can be presumed from the whole context that the acceptance of the first reduction is caused not by the rejection of the possibility of the operation as such but by practical and doctrinal issues. This is supported by the fact that the author elsewhere himself uses the procedure of exclusion, as we will soon see.

In line with the N*ā*g*ā*rjuna's treatise that is fundamental to Madhianics,

[56] See *kārikā* 24, in which the author states that there is no incongruity (*vaiṣamikatva*) in his position and there is no need to present a "special rationale." Of course, the adoption of the first reduction (where the proposition on the non-existence of self-being is itself devoid of self-being) proves that N*ā*g*ā*rjuna recognizes the possibility of leaving the proposition within the range of the great quantifier but this does not mean that he flatly rejects the possibility of the exclusion operation.

*Mūla-madhyamaka-kārikā*, his theory of "emptiness" (*śūnyatā*) was to constitute "a rejection of all views" (*sarva-dṛṣṭīnāṁ niḥsaraṇan*), which exposed it to the criticism of self-refutation in line with the principle of *reductio ad absurdum*. Considering that the "rejection of all views" is in itself a view (*dṛṣṭi*), entails the rejection of oneself, too. Nāgārjuna was conscious of this criticism and in his *śūnyatā* also wrote a stanza (XIII S) warning against regarding as a view the doctrine of "emptiness," understood as one that "rejects all views," which naturally excludes the basic proposition from its range. Those for whom *śūnyatā* constitutes a view are, to Nāgārjuna, "incurable" (*asādhya*). This definitely does not give proof of the understanding of a logical-semantic essence of the matter, which was at that time impossible anyway, but the procedure of excluding a proposition (view) from the range of the great quantifier inherent in itself is an undoubted fact here.

Add that it was Nāgārjuna who initiated a custom among Madhianics of applying the operation of interest to us when it did not collide with the principles of the doctrine (as in the non-existence of self-being), but, conversely, served that doctrine. Thus the procedure of exclusion is used by Aryadeva, a direct disciple of Nāgārjuna, in his treatise *Śata-śāstra*,[57] with Candrakīrti being the most notable commenter.

He is the author of the lengthy text *Prasannapadā* a comment to the basic treatise by the founder of the school, *Mūla-madhyamaka-kārikā*. The meaning of this "clearly formulated" comment (to paraphrase the title) is all the more important as it was the only one to have been preserved in the Sanskrit original (and in the Tibetan version) with the other comments to the basic text only being known from foreign translations.

In *Prasannapadā* chapter XIII §5, Candrakīrti devotes more space to the subject than his forerunners. His comment to the corresponding stanza of Nāgārjuna's text is a harsh polemic against the "incurable," which sets out to prove that *dunya-vada* is not a "view" and cannot be refuted. It makes no sense, though, to present the argumentation in detail as it would entail going too deep into the subtleties of Madhianics' philosophy (which I am not very competent to discuss) and, being an opponent, Candrakīrti must operate extra-logical arguments, such as analogies and authoritative quotes, which go beyond our interest. A competent presentation of the passage in question can be found in an otherwise easily available work by Stanisław Schayer, all credit to him for noticing half a century ago the logical-semantic

[57]The treatise was only preserved in the partial Chinese version which Tucci translated into English (Tucci 1929, part I: 85 (I did not have access to the Chinese version).

aspect of the polemic.[58]

What deserves a note is that which Schayer did not touch upon in his discussion. First, against the background of a broader context, even so limited as in this study, there is a self-imposing impression that Candrakīrti's presentation of Madhianics' position (the founder included) is derived straight from the tradition testified to in *Dīghanakha-sutta. Mutatis mutandis*, Nāgārjuna's *śūnyatā*, described by the master himself as *sarva-dṛṣṭīnāṁ niḥsaraṇam*, seems just a more sophisticated variety of the position which in *Dighanakha Sutla* is worded *sabbaṁ me na khamati*, and which the canonical Buddha sanctioned with his own authority. In both cases we have to make do with positions rejecting all "views," there being a convergence of terms (Pali *diṭṭhi*; Sanskrit dṛṣṭi). Apparently, there should be more research on this.[59]

Second, it can be ascertained in this broader context that the attitude by Madhianics to reductionist reasonings and the use of the exclusion procedure was instrumental and pragmatic. It means that in cases where the reductionist reasoning of interest to us (no exclusion) was useful to justify a corresponding point in doctrine, it was accepted without qualifications (such as Nāgārjuna accepting a reductionist reasoning concerning the non-existence of self-being in *Vigraha-vyāvartanī*. However, in cases where this kind of reasonings undermined a part of the doctrine, the procedure of exclusion was consistently and obstinately used, and it was justified with extra-logical arguments (such as Nāgārjuna and Candrakīrti in reference to *śūnya-vāda* as a "non-view" that negates all views; also, Āryadeva in *Śataśāstra*). Finally, as expected and pointed out by Schayer, in the material that has been presented, noting indicates that Indian authors who accepted reasonings by the *reductio ad absurdum* in some cases, and in other cases

[58]Schayer 1931: 36-39, part. 30n on page 36-37, which in Buddhism scholarship is the first rendition of the subject matter from the standpoint of modern logic. In particular, Schayer noticed that the charge of self-refutation, which Candrakīrti opposes, corresponds to European logic's traditional application of the *reductio ad absurdum* for the sake of refuting a proposition of the kind "All propositions are false." After his discussion of why such applications of the principle of reduction are illegitimate (on the basis of Kotarbiński 1929: 146-147), the author adds from himself, "Den Mādhyamikas konnten diese Subtilitäten der modernen Logistik selbstverständlich nicht bekannt sein. Sachlich hatten sie aber durchaus Recht, wenn sie das Argument der *tārkikas*, die Aufhebung aller *dṛṣṭis* sei auch eine *dṛṣṭi*, nicht anerkennen wollten." We will return to the matter in terms of its content in chapter IV; this is just to notice Schayer's primacy in noticing the subject matter of logic, which in Buddhism goes well beyond the text of *Prasannapadā* and which was not taken up by anyone later.

[59]I realize the risk in putting forward such a hint by a non-specialist. My only justification is that I know nothing of this matter but to me it seems worthy of interest.

rejected such reasonings by the application of exclusions, realized the real logical and semantic reasons why these apparently obvious reasonings are illegitimate.[60]

The examples provided so far, emphasizing a kind of mistrust in reductionist reasonings of the kind we are discussing, should not hint at the non-exceptional nature of such an attitude among Indian Buddhist thinkers. Of particular interest is the clearly opposite stance adopted to the matter by Dignāga (approx. 480-540), probably the greatest (not only) Indian logician and one of the most prominent philosophical minds from outside Europe. An example coming from him will now be presented in the context of an interpretation handed over by the Chinese Buddhist logician K'uei ki (632-682). What I mean is a message from the Chinese researchers of Mohist canons (chap. II, n. 38) and whose presentation requires some more introduction.

The only period in China when there was some vivid interest in Buddhist logic is related to the activity of the famous monk Huan Tsang and his school in the first half of the *T'ang* period Huan Tsang (596-664) brought two Buddhist logical works from his trip to India and translated them: *Nyāya-mukha* (The Face of Logic; the Chinese title *In-ming cheng-li men lun* suggests "The Gate of Logic"), doubtless authored by Dignāga himself, as well as *Nyāya-praveśa*, that is: *The Introduction to Logic* (Chinese title *In-ming zhu cheng-li lun*), probably authored by Śaṁkarasvāmin. Both these brief manuals of Buddhist logic enjoyed a degree of popularity in China, with the Chinese version of the latter having appended a series of comments. One of those, by Huan Tsang's most prominent disciple K'uei Ki, is thought to be the greatest achievement of Chinese Buddhist logic and the greatest work in logic that has ever been written in China. It is the so-called *Great Commentary* (to *Nyāya-praveśa*), *To Shu*,[61] and it is in it that we see the example of interest to us.

The lengthy comment by K'uei Ki has not yet been subjected to a systematic Sinological-Buddhist study[62] and neither has it been translated into any European language. The translation of the corresponding passage is given here through my own volition. Due to a peculiar layout, caused by

[60]This will be discussed in more detail in chapter IV.

[61]In Chinese works, K'uei Ki's commentary is usually referred to as *To Shu* (with no explanations), which even for Sinologists can be unintelligible.

[62]This gap has recently only slightly been filled by the publication of R.S.Y. Chi (1960, see pp. 126-143 in particular). A systematic study of Kuei Ki's commentary, including the daunting task of translating this difficult text into a European language seems to be an indispensable condition of establishing the real Chinese contribution to Buddhist logic.

it being a comment, I have also quoted a passage that directly precedes it, that is, what in K'uei Ki's comment is the beginning of the paragraph where the example is to be found. For clarity's sake I am introducing a division into paragraphs, three of which introduce the fourth main part. Please note that due to the names and technical terms that require Sanskrit identification, the reading of the translation must be difficult, only slightly overcome by *ad hoc* additions, explanations and glossaries. It is only the detailed discussion, which will follow after the quotation of the basic text, which should remove all ambiguity. Below is the translation of the passage from Kuei Ki's commentary to *Nyāya-praveśa*.[63]

[As for] THE INCONSISTENCY IN OWN WORDS [Chinese *tsy-jü siang-wei*; Sanskrit *svavacana-viruddha*], such as my "mother is a woman of stone [infertile]."
Here is the commentary:
A sentence [*tsung* = *pratijñā*] is about what is called quality [*fa* = *dharma*] and the carrier of quality [*ju-fa* = *dharmin*]. The carrier of quality is called a subject [*t'i*, lit. "body"] and the quality is sense [predicated; Ch. *i* = Sanskrit *artha*). [Predicated] sense rests on this subject in a way in which [the two cannot] mutually preclude each other [*pu siang kuai-küe*], but ought to state something in accord [*k'o siang shun-li*]. The words "my mother" imply that we mean a woman who has a child, but the words "woman of stone" clearly attribute to her not having children. {In the case of ] the subject "my mother" and the [predicated] sense "woman of stone," the carrier of quality and quality are not in accord. If [the speaker's] own words are in such contradiction, whatever is the space [*ho suo*] to adopt a position [*shen-li*] by an opponent [*tui-ti* = *prativādin*]? Therefore, we have to do with an error [in the very posing a sentence; Ch. *kuo* = *doṣa*, in this case probably corresponds to the Sans. *vākya-doṣa*].

The expression "woman of stone" ought to be translated as "infertile woman" but in line with an earlier translation the name "woman of stone has been retained."

*Nyāya-mukha* [in the text *Li-men lun*, which is an abbreviation of the title In-ming cheng-ki men lun = *Nyāya-mukha*] says: "as, for example, the proposition 'All statements at all are false."' A certain heretic [*wai-tao* = *tīrthika*] claimed, "all statements at all are false" against which Dignāga [Ch'en-na] puts forward the [following] charges [*nan* = *dūnsana*]. If you say "all statements in all are false," than you ascribe correspondence with reality [shy-shy, lit. 'actuality') to what you are saying. If (in this way) you are rejecting the falsity of it [your utterance], then it is on account of the [assumed] truthfulness of this one member [that is your utterance] that there is contradiction [*wei*, lit. 'opposition']

[63]The basis of the translation is the text by K'uei ki *In-ming zhu cheng-li lun shu*, edn. *Taishō*, vol. XLIV, no. 1840. The passage translated is in the $2^{nd}$ chapter (*küan chung* on page 110) and comprises verses (2) 21 to (3) 4.

with the word "all" in the subject [*dharmin*]. If, however, this utterance of yours is false and [thus some] other utterances are not false, then there is a contradiction with the words "in all are false." You have yourself uttered a falsity [because] you considered false what is not false. If, therefore, your utterance is false and [thus some] other utterances are not false, then there is contradiction with the words "in all are false" in the predicate [*tsung-fa* = *pakṣa-dharma*]. It is therefore called, INCONSISTENCY IN OWN WORDS.

The paragraphs preceding the paragraph proper call for some explanation. As in other paragraphs, here too K'uei Ki begins from citing the text being commented on, to which refers his own commentary further. In this case, practically all of the first paragraph (as far as the example about an infertile mother is included)is a quotation from the Chinese version of *Nyāya-praveśa*. K'uei Ki's own comment begins with the second paragraph, which is not deprived of meaning in the context of his and our further discussion. The singling out of the *dharma* and *dharmin* elements, which are part of the world denoted by linguistic expressions but are not words and as practically independent from linguistic constructions, they do not correspond to our grammatical predicate and subject,[64] which is not the commenter's idea, of course. The two terms are among those fundamental in (not only Buddhist) Indian logical analysis, their technical meaning rendered with sufficient proximity in this translation. The following analysis of the self-contradictory sentence "My mother is an infertile woman" is clear enough in the translation but two things need to be focused on here. First, as emphasized by K'uei Ki's analysis, the sentence in the example would in traditional Western logic be called *contradictio in terminis*. It is interesting that *Nyāya-praveśa* gives this example as a typical illustration of "contradiction in own words." We will come back to the issue later. Second, an European reader may wonder why K'uei Ki makes a reference to an "opponent." It is explained in the Indian and Buddhist approaches, every statement is treated as a proposition for discussion between the one who makes it (*vādin*) and the opponent (*prativādin*). The sentence-proposition ought to be duly formulated and refer to the actual subject of discussion (*pakṣa*). In the example sentence, due to its self-contradiction, we are dealing with an error that belongs to a broader category of mistakes, with a generic name *pakṣa-ābhāsa*, lit. "an appearance (*ābhāsa*) of the subject (discussion)." Here the opponent could not adopt a position towards such a flawed sentence and could not understand what the

[64]Note the little known fact that Indian grammar knows no grammatical subject in the sense bequeathed on it by traditional European grammars. It was noted before by Andrzej Gawroński (1932: 130).

one uttering a sentence like this meant to say. The third paragraph contains a philological gloss that is of no interest to us. I have included it only to keep the translation as a whole.

Now onto the fourth section, which irrespective of some *ad hoc* explanations included into the translation, requires some complicated and lengthy explanation. The section starts with a quotation from the treatise *Nyāya-mukha*, authored as we know by Dignāga. Because at the beginning of the analysis of the sentence that immediately follows the quote, K'uei Ki makes a reference to this very Indian logician, the impression one gets is that the part that follows is also a quote from *Nyāya-mukha* or at least a quote (paraphrase) from some other text by the same author whose title is not given. There is all indication that K'uei Ki is making a mystification, possibly not even *mala fide,* but perhaps only resulting from the great respect had for the great Buddhist logician or a desire to add seriousness to his own words.[65]

First, it needs to be explained that the quotation from *Nyāya-mukha* is the only sentence quoted at the beginning of the paragraph, which Dignāga himself gives in his manual without any discussion, probably believing that the sentence is an obvious example of *svavacana-viruddha* that does not call for a rationale.[66] This initial explanation does not preclude K'uei Ki possibly having paraphrased some other statement by Dignāga on the subject matter. Still, not only do we know nothing about the interpretation of the example sentence, K'uei Ki provides us with other excerpts from another text coming from Dignāga,[67] but, what is more, in this particular case the Indian thinker

[65]Attributing your own idea to a famous philosopher need not be a mystification in a pejorative sense. Perhaps the mystification was spurious here, caused by the concise style and unique Chinese ambiguity. In K'uei Ki's text the phrase *Ch'en-na nan jen* seems unambiguous. "Dignāga makes criticisms," but with a hypothatical interpretation (perhaps too far-fetched but still possible) "[...] he would level charges," the only suggestion left would be that he consistently tries to guess how Dignāga himself would have proved the self-contradiction of his own example, if he had done that at all. Another thing is that in that case K'uei Ki reconstructs rather unsuccessfully. This will be discussed later.

[66]See the translation from the Chinese version of the treatise (Tucci 1930: 1-72; *cf.* #1 on p. 7 — the treatise does not come back to this issue anywhere else). The treatise was preserved in two Chinese versions, practically identical, the later one being left out. Tucci made his translation on the basis of Huang Tseng's version (Tucci 1930, vol. XXXII, no. 1628), that is the same text that K'uei Ki had at his disposal.

[67]Of more than a score of Dignāga's works we know of, including a dozen or so that treat about logic, none has been preserved in the original (apart from some isolated quotations scattered across later Indian literature). The main source for K'uei Ki's

is out of the question for more important reasons than as the source of inspiration of the Chinese commenter. Second, the very analysis that is supposed to prove the self-contradiction of the example sentence that is given by K'uei Ki proves that the author of the analysis — whoever it was — was not using the Sanskrit form of sentence that it had in the original text by Dignāga but, rather, chose the Chinese translation of this sentence as the basis. In practice it eliminates the Indian philosopher as the author of the analysis the commenter attributes to him. This demonstrates that we deal with a Chinese idea, perhaps one by K'uei Ki.[68]

This is a more precise explanation, one that involves a reference to the translation of the example sentence into English. The reader must have considered the peculiar artificiality of the translation caused by the introduction of the quantifying determiner "in all" into its predicate part, which due to there being a general quantifier in the subject (all utterances) is, of course, redundant. This procedure, adopted by the translator, does not present him as pedantic but was determined by the need to precisely render the Chinese sentential form here, with its double quantification. The Chinese structure of the example sentence *i-ts'ie jen kie shy wang* is syntactically broken down into *i-ts'ie jen* "all utterances" and *kie shy wang* "in all" (to be more precise "in all cases") are false. The peculiar analysis by K'uei Ki, which is to prove the sentence false irrespective of the cover of technical Buddhist terminology, appeals to this very division and in particular to the quantification expressions included in both members.[69] In this situation,

interpretation could have been the main epistemological-logical work of Dignāga's *Pramāṇa-samuccaya*, the collection [of deliberations] on cognition, preserved in just two rather late Tibetan versions. The logical parts of this vital text, being the most mature illustration of Dignāga's doctrine, have not been translated. There are, however, known to be numerous correspondences between *Pramāṇa-samuccaya* and his earlier treatise *Nyāya-mukha*. In the translation of the earlier treatise, Tucci recounts transcribed parallel passages of the Tibetan version of *Pramāṇa-samuccaya*, but in the material he gives us (the only one I have) there is nothing to do with the matter under discussion (Tucci 1930: 7, 9n) (but in the passages quoted from *Pramāṇa-samuccaya* other sources of *pakṣa-ābhāsa* are discussed, illustrated by the same examples known from the Chinese version of Nyāya-mukha. It is also unlikely that K'uei Ki could have known the text of *Pramāṇa-samuccaya*.

[68]It is hard to preclude the possibility of the commenter having used an interpretation of the example elaborated on in the course of debates conducted in Huang Tsang's school. The issue of precise authorship of the whole interpretation is indeed secondary. What matters is the emphasis on the Chinese rather than Indian origin of the analysis.

[69]The word "predicate" used in the translation is a very inaccurate rendition of the term *pakṣa-dharma* (ch. *tsung-fa*), which in Indian logic means "the occurrence of quality (dharma) in the subject matter of the discussion (pakṣa)" I believe, though,

removing predicative quantification from the translation would make it impossible to translate the second part of K'uei Ki analysis, or make it illegible at least. In other words, the interpretation of the (alleged) self-contradiction of the sentence adopted by the Chinese commenter has some unique sense only with such double quantification, without which the very idea of this interpretation could not have emerged. Consider, too, that K'uei Ki undoubtedly understood the procedure of proving the self-contradiction of a sentence as analogous to that which he had previously applied to the sentence about the barren mother.

The redundant double quantification may not be mandatory in Chinese, but it is far from uncommon, and the Chinese version of the example sentence by Dign$\bar{a}$ga does not violate the Chinese syntax. However, the syntactic peculiarities of quantification in Chinese that are involved here need to be explained, not just because they are interesting in themselves, but above all because this is essential for the discussion. The ordinary single quantification, unlike in our languages, syntactically refers not to the grammatical subject in Chinese (*cf.* "All utterances are false," with the quantitative expression being subject-group modifier), but to the predicate and thus plays the part of a quasi-adverbial predicative determiner, which can only be rendered by a barbarism such as "utterances are ALL'LY false." For sentences that are explicitly quantified, this is a basic and binding construction, which can — but only can — be appended by an additional, linguistically and logically redundant modifier quantification of the subject. In other words, a well-formed quantified Chinese sentence must include the predicative quantifier (with the added possibility of subject quantification, so in all this would be the like of "ALL utterances are ALL'LY [in my translation 'in all'] false") but cannot only have a subject-group quantification (corresponding to our "All utterances are false"). In this respect the requirements of Chinese syntax are opposite to what holds in Polish and Indo-European (incl. Sanskrit) syntax.

It is only the above explanations that properly present the issue of the authorship of the analysis K'uei Ki gives of the important example sentence. AT least they determine one important point in it. Considering that the Sanskrit form of the example sentence must only have included a subject-group quantification,[70] it is clear that the whole analysis allegedly coming

that in this case such a translation is justified and cannot cause misunderstandings, with the translation becoming smoother.

[70]It is not difficult to reconstruct the Sanskrit original of the sentence as *sarvaṁ vacanaṁ mithyā*, where the word *sarvam* 'all' is a subject-group modifier and the

from Dignāga has as its basis the Chinese translation of the sentence rather than its Sanskrit original. The original Sanskrit form of the sentence would render K'uei Ki's interpretation of self-contradiction (particularly the second, "predicative" part) outright impossible, and this means that Dignāga (like anyone using Sanskrit only) could not have invented everything that the Chinese commenter ascribes to him.[71] Eventually, it was only a Chinese Buddhist that could have authored the interpretation as we have it in the text being quoted. It was most probably K'uei Ki himself.

That we are dealing with the author's own idea appears to be indicated also by the context that precedes the example and this was another reason why I included the initial paragraphs, too. In an attempt to supplement the mention of the (intended) parallel treatment by K'uei Ki of both the example sentences quoted in the text, we can now say with near certainty that both the analytical examples (not only the fourth one but the second, too) constitute the commenter's own contribution into the issue of self-contradiction, which he could rightly have deemed to have been vaguely positioned in Buddhist logic. This is all broader in scope as concerning also the concept of contradiction in a strictly logical sense as an inter-sentential relation.

K'uei Ki's contribution is otherwise not very fortunate, which needs to be highlighted in the broader sense of the authorship of both analyses and their relationship. Against the backdrop of the whole text and the explanations given before, the following can be said.

Note that the work the quoted passage comes from is a sizable comment to the short treatise *Nyāya-praveśa* in its Chinese version. In this treaty, the

whole exactly corresponds to "All utterance (is) false." What becomes clear, too, is the reason for the double quantification in the Chinese translation of the sentence. For literality's sake, the translator introduced a subject-group quantification (*sarvam* = *i-ts'ie*), but on account of the requirements of Chinese syntax he also had to introduce predicative quantification (*kie*), which did not exist in the Sanskrit original.

[71] Dignāga could surely have been the author of the first "subject-group" part of the analysis, related to the word *sarvam*, which in itself is completely sufficient to carry out the reduction along the formula ($p \rightarrow \sim p$). Moreover, it is rather clear that the Indian logician who used this sentence as a typical example of self-contradiction must have understood it in ways we know from such writings as *Zhu Shi Lan* (but allowing no exclusion of the sentence from the range of "all utterances") and thus in a way that is similar to the way given by K'uei Ki in the first part of his analysis. It can therefore be suspected that the author borrowed the first part of the analysis from Dignāga and supplemented it by himself with the predicative part" on the sole basis of the Chinese version of the sentence. However, this could only be proved by some sources other than K'uei Ki, but no such sources have been found.

"inconsistency in own words" (*svavacana-viruddha* as a kind of *pakṣa-ābhāsa*) is illustrated with the example sentence "My mother is a barren woman," just this one without any explanation.[72] The commenter added his own analysis of the sentence which indicates its self-contradiction and made a successful appeal to the terms *dharma* and *dharmin*, known to him from Buddhist logic. Because we have to make do with a *contradictio in terminis* here, and specifically with the inconsistency between a trait assumed in the subject (the carrier of quality, *dharmin*) and a trait being imposed on the subject by the predicate (the predicated trait, *dharma*), the analysis conducted in this convention is obviously relevant. There is every indication that even the first analysis in this particular case has no correspondence to the Indian original that K'uei Ki could have known, which would make it his own contribution.[73]

The commenter also knew that in another treatise (by another author) in the Chinese version of Dignāga's *Nyāya-mukha*, the utterance "All utterances are in all false" features as an example of *svavacana-viruddha*, which he had included in his commentary due to the scant exemplification of self-contradiction in the text being commented. Most apparently, K'uei Kidid not realize that he fell victim to the inaccuracy committed by the famous Buddhist logician, who probably could not distinguish between the self-contradiction of a sentence understood as the a *contradictio in terminis* (as in the example found in *Nyāya-praveśa*) from the self-refutability of a sentence, which is different from self-contradiction. Leaving aside the difference between the logical-semantic essence of the flaw found in the example sentence coming from *Nyāya-mukha*, this is just to note that the sentence is neither self-contradictory in the sense of there occurring a mutual preclusion of the subject and predicate (as in the example given in *Nyāya-praveśa*) nor in the sense of it including a conjunction of two contradictory

[72]In the Sanskrit original we only have *svavacanaviruddho yathā mātā me vandhyeti* [= *vandhyā iti*] (*Nyāya-praveśa* 1931: 16), as well as the most recent edition of the text in the work by Tachikawa Musashi (1971: 141). It is exactly what we find in the Chinese version of Huang Tsang and what K'uei ki quotes from this version at the very beginning of the text quoted above in our translation.

[73]In the materials available I have found nothing that would indicate any Indian model of even the first analysis by K'uei Ki. Buddhist logicians must have regarded the self-contradiction of that sentence as obvious and requiring no explication. The example in question is a sentential equivalent of the nominal expression *vandhyā-putra* (= Tib. *mo-gśam-gyi bu*), "barren woman's son," which in Buddhist Indian literature was used as an obvious and typical example of a self-contradictory name, referring to a non-existent object (and one that could not exist).

sentences ($p$, $\sim p$). Under the discussion conducted so far, the sentence would not be labeled self-contradictory, but self-refuting, as it renders itself to contradiction by directly implying (to be precise, seemingly implying) its own negation. Of course, the implication ($p \rightarrow \sim p$) is not the same as the conjunction ($p \wedge \sim p$).[74]

In this light, K'uei Ki's otherwise unfortunate interpretation, attempting to treat the allegedly parallel but in fact very different self-contradictory sentences in parallel, does contain some originality which could have contributed to its appeal among Chinese Buddhists. This is indirectly evidenced by the fact that the interpretation us not questioned even by the contemporary Chinese explorers of K'uei Ki's text's fourth paragraph. They seem happy to classify the text as a Buddhist counterpart of the key Mohist Canon (known to us from chapter II; in fact only the example sentence rather than the interpretation is such a counterpart).

The peculiar two-part analysis of Dignāga's example sentence which is passed on to us by K'uei Ki comes down to the following points. First, if the sentence is true, then it contradicts its own subject (ALL utterances); second, if the sentence is false, then even though there is no contradiction with the subject, there are thus utterances that are not false,[75] and this contradicts

[74]Note that similar misunderstandings are found in the only modern attempt I know at an analysis of the example sentence by Dignāga given by Suoki Takehiro (1970: 84-85). Suoki, a Tokyo University professor and author of a manual of symbolic logic is among the few scholars who use the techniques of modern formal logic to analyze issues in Buddhist logic. In this case, however, probably induced by the fact that according to Dignāga, the sentence is to be an example of "inconsistency in own words," in an unnecessarily complicated argumentation (and also one fraught with imprecision) reduces the example sentence to a conjunction of two contradictory sentences. Suoki cites as source of the example the Chinese version of Nyāya-mukha, but he takes the Japanese translation of the sentence as basis, with the latter similar to Indo-European structure (without the confusing double quantification). The Japanese author seems not to know either the analysis made by K'uei Ki or the Indian Buddhist tradition in reducing such sentences to absurdity. In any event, his attempt seems to be completely independent from suggestions that might come from such sources. Neither does he appear aware of the position taken by logical semantics connected to the theory of types. Therefore, his analysis needs to be assessed from pre-Rusellian positions, so it is difficult to understand why Suoki did not apply the simplest procedure that is, the *reductio ad absurdum*, as was done as early as in antiquity and which by the beginnings of our century had remained unquestionable.

[75]I leave aside another thing, where the Chinese commenter is at fault, of the quantifier-free formulation of this point, which I remarked on and complemented in this translation of the passage. See above in the quantifier-free formulations of the Mohist Canons.

the predicate (are in all [ALL'LY] false). The first point raises no objections as finally leading to the assumption of the sentence's truthfulness entailing its own falsity, which is in itself enough to carry out the reduction of the sentence along with the rule "$(p \rightarrow \sim p) \rightarrow \sim p$." What is unfortunate is the second part of the argumentation, which as we otherwise know would not be possible at all on the Sanskrit form of Dignāga's example. More importantly, the other part of the analysis is not at all only unnecessary, but it hardly makes sense, even if we give the author credit for implicating in this part of the analysis the otherwise interesting additional reasoning that the falsity of the example sentence leads to the recognition of the existence of true sentences. Note also, that the whole two-part analysis is in a sense analogous to the analysis of the previous sentence (on the infertile mother) within the analytical convention making an appeal to the concepts of *dharmin* and *dharma* (*pakṣa-dharma*). The issue of this peculiar linkage of both analyses is most easily explained by their being K'uei Ki's own contribution.

Suggested by Dignāga's authority, the commenter accepted *bona fide* his sentence as an example of "self-contradiction," that is an error of the same nature, to which the example sentence from *Nyāya-praveśa* corresponds. The alleged identicality of the categories of both sentences made the commenter think that Dignāga's example, whose self-contradiction was not explained by himself in more detail, cannot be interpreted in similar ways as in the previous case, with the Chinese formulation of the sentence providing a possibility of an analysis that appeals, in essence, to both subject and predicate (under the protection from the notions of dharmin and *pakṣa-dharma*). K'uei Ki's attempts were doomed to failure here, which he did not realize. Both of his analyses are only comparable in a very broad sense,[76]

[76]In the first case the analysis of the (real) self-contradiction is about contrasting the mutually exclusive members, subject and predicate, of which a sentence is made up. In the second case, which does not belong to the category of *contradictio in terminis* at all, the exposition of the alleged self-contradiction is, according to K'uei Ki, supposed to be about a double juxtaposition: the juxtaposition of the truthfulness of the sentence as obviating its subject; the other juxtaposition is to be about contrasting the falsity of the sentence — or, rather, the consequences of the falsity ("[some] other utterances are not false") — as inconsistent with the quantified predicate. Leaving aside the significant issue of the nonsense of the second "predicative" part of the analysis (which apparently has gone unnoticed so far), what is notable here is the difference in the type of juxtapositions the Chinese used in the interpretations. The similarity between the two boils down to both somehow appealing in some ways (different in both cases) to subject and predicate, the model of an appeal to such a division in the second case undoubtedly being the analysis of the example from *Nyāya-praveśa*, which was correct in itself, but had no application to the other case.

the latter (in its second part) being erroneous in fact, but the attempt to treat both sentences in parallel is unquestionable. Moreover, it must have been upon this stretched analogy that K'uei Ki thought the other analysis as not as bad as the first one if he did not hesitate to attribute it to the famous logician as a reconstruction of his own intentions.

This also testifies to K'uei Ki's ignorance of the Indian Buddhist tradition concerning sentential *reductio ad absurdum*. He would otherwise have been satisfied with the repetition of a simple argumentation, which was also obvious at that level of thinking, without engaging into his own speculations. Even if we assume that he could have known about the Indian methods of reduction in some cases but still, for some reasons, made the analysis of Dignāga's sentence by himself, we will conclude that he would not have attributed this analysis to the Indian thinker realizing the improbability of the reasoning coming from him. In all, the mystification reference to Dignāga paradoxically proves an additional test to prove K'uei Ki's authorship of the interpretation and a proof that the Chinese author did not know the Indian tradition.

Dignāga surely knew the Indian philosophical and logical tradition and a supposition that he may not have known that what we have been discussing would be groundless. He must have been familiar with the procedure of reducing corresponding sentences as well as the previously highlighted Indian thinkers' mistrust in it as expressed in the exclusion procedure, applied *ad hoc*. On the other hand it is directly known from *Nyāya-mukha* that Dignāga considered the sentence "All utterances are false" as an example of the *svavacana-viruddha* mistake; the fact that he limited himself to quoting the sentence without, it must be explained by his recognition of the example as obvious within (rather than without) traditional knowledge. The simplest guess is that Dignāga, first, accepted the traditional procedure of reducing the sentence to absurdity; second, and possibly explaining the thinker's originality in the Indian context, unlike the others, he decisively rejected the possibility of excluding this sentence from the range of "all utterances." So far, it has only lead to the sentence being an explicit example of falsity for Dignāga, but falsity is not the same as self-contradiction. However, because in Dignāga's text the example represents the column of self-contradiction (*svavacana-viruddha*), it appears that the famous logician did not distinguish between the kind of self-contradiction proper as in the example of a barren mother[77]

[77]It is hard to preclude Dignāga's having some awareness of the difference between

What has just been said is a good opportunity to raise an issue that may not be in the mainstream of this discussion but as indirectly related to it and significant should not be overlooked. In any event, the discussion of Dignāga's example has just demonstrated that Indian Buddhist logic did not have a clear concept of self-contradiction. One must admit that the matter is marginal, though, and does not illustrate the confusion that exists concerning self-contradiction in Indian Buddhism and the Indian context at large.[79] Details aside, suffice to say the thing that is possibly

both kinds of sentences but thought the difference was irrelevant from the standpoint of the Buddhist logical practice. Note that for Buddhist logicians a sentence is a potential proportion to put forward the subject of discussion, *paksa*, whereas the occurrence in a sentence of an error of the *paksa-ābhāsa* category disqualifies the sentence as a starting point of a discussion. In the case of *svavacana-viruddha*, which is a peculiar column of *paksa-ābhāsa*, the disqualification of a sentence is assumed, as it were, in its verbal formulation (without an appeal to anything else, unlike the other in the category *paksa-ābhāsa*, which is still found in the example of a barren mother. Dignāga might thus have tried to expand the column to include sentences that may not be self-contradictory in our understanding but are subject to self-refutation by a direct *reductio ad absurdum* and due to that are equally useless as propositions. The example from *Nyāya-mukha* could also have been done deliberately to attract attention to the uselessness of the other types of sentences, too. What is important, as well, is in the Buddhist category of *paksa-ābhāsa, the only allocated column that cannot be taken into consideration as comprising "self-disprovable" sentences, is still svavacana-viruddha (see below n. 78).* from the self-refutability of a sentence (that is the kind of falsity that results directly from the assumption of the truth of the sentence). A hypothesis can also be posed that Dignāga considered his example sentence as self-disprovable in the sense that it should not only state itself ($p$) but as one that entails its own negation ($\sim p$), it would also state its negation, thus jointly ($p \wedge \sim p$). However, here too an error needs to be indicated in the reasoning of the Indian logician, which is similar to one committed in modern times in an even more striking form by a modern interpreter of this example given by Dignāga.[78] What is most important for us, though, that even in such a case, the first step of a reasoning that leads to the rejection of the sentence as (alleged) conjunction ($p \wedge \sim p$) is an ordinary reduction of the starting sentence, implicated in this reasoning, on the basis of the implication ($p \rightarrow \sim p$).

[79]This confusion is compounded by some unfortunate attempts at representing the state of affairs undertaken by some modern scholars (particularly about the quasi syntactic description of contradiction in Buddhist logic, left by the otherwise prominent Russian scholar of Buddhism, Shcherbatskoy; see the chapter "The law of contradiction" in his work, to date considered fundamental (Shcherbatskoy 1932: 400-442). To illustrate his point that has comparative pretenses. He states that the "law of negation" is the most general law of thinking (Aristotle calls it "the law of all laws"), with "the law of negation is the same as the law of contradiction;" (416, 4n). Shcherbatskoy appeals to *Metaphysica* Γ 3, 1005 b, 33-34: *ἀρχὴ καὶ τῶν ἀλλων ἀξιωμάτων αὐτη*

the most important: the technical Buddhist logic did not develop the basic concept of contradiction as an inter-sentential relation. This may seem all the more weird as Buddhist logicians were mainly interested in contradiction in the context of the theory of inference: a peculiar multi-member so-called syllogism (*anumāna*). However, even in this theory a very loose concept of contradiction is used, including contradiction as a strikingly heterogeneous relation that occurs between a sentence and something belonging to an entirely different plane and requires not even a verbal formulation, such as between a sentence and an observation.[80] A systematic study of the multifaceted issue of contradiction in Buddhist thought (as well as Indian at large) as well as an appropriate presentation of formal-logic aspects of this issue and a clear separation of these from extra-logical aspects remains an open task.[81]

To close the discussion, started by a passage from K'uei Ki, one more thing needs to be discussed that might otherwise arouse doubt. It is true that K'uei Ki's commentary, as one by a Chinese author to a Chinese version of an Indian treatise (not a translation from Sanskrit) belongs to Indian Buddhist logic, the more so as there are some deliberations that constitute the Chinese author's own contribution into it. It might, therefore, seem that it should have been presented in the previous chapter as supplementation of the Chinese Moihist examples, thanks to which the example now being discussed was at all noticed.

The discussion showed that the appropriate presentation of the issues inherent in the passage in the context of a purely Chinese exemplification of the subject matter, that is without the appropriate Indian Buddhist backdrop, would be impossible. This demonstrates that K'uei Ki's text as a matter of fact belongs to the Indian Buddhist circle. Let us highlight the

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$\pi\acute{\alpha}\nu\tau\omega\nu$ which in Aristotle's text refers to the principle of contradiction rather than the "law of negation."

[80]This can be illustrated on the basis of *Nyāya-mukha* and *Nyāya-praveśa*. Other than the previously discussed column *svavacana-viruddha* both text identify within the category of *pakṣa-ābhāsa* four more contradictions: *pratyakṣa-viruddha* [an inconsistency with perception], *anumāna-viruddha* [contradiction with what has been established on the basis of inference], *āgama-viruddha* [inconsistency with the testimony of the doctrine posed by the one who makes the proposition], *loka-viruddha* [a contradiction with a universally accepted convention]. An example of a sentence of the *pratyakṣa-viruddha* kind: "Noise is something inaudible," which is inconsistent with a direct perception.

[81]The only modern study I know of that constitutes a general source introduction to the subject: Staal 1962. The article mainly pertains to non-Buddhist Indian doctrines, though.

decisive aspect. As implied by *Nyāya-mukha*, to which K'uei Ki's testimony is unnecessary, the example sentence comes from Dignāga, who thought it illegitimate because of the *svavacana-viruddha* error. Whatever K'uei Ki's interpretation, Dignāga assumes an unconditional reduction of the sentence to absurdity, which means that the Indian logician rejected the previously suggested possibility of excluding the sentence from "all utterances." All this remains in the Indian Buddhist context and has no connection with the Chinese tradition, particularly Mohist. This refers not only to Dignāga, who could not have known the Mohist tradition, but also to the Chinese Buddhist author of our text. In K'uei Ki's day, the Mohist dialectics had been all but forgotten in China and the commenter could not have known it; he therefore did not know the canon, either, thanks to which it was only the modern Chinese scholars who have paid special attention to the relevant passage of his commentary.

In the context of the previous exemplification, it must be noticed that Dignāga's decisive stance on the *reductio ad absurdum* of sentences of the type we are interested in is rather rare in Indian Buddhism. Note also that it was only that stance, which assumed an unconditional rejection of the procedure of exclusion, and thus a recognition of absolute legitimacy of the *reductio ad absurdum* of those sentences (without which Dignāga's example from the manual would lose its sense) essentially corresponds to the stance taken by Ancient Greek and Ancient Chinese thinkers on the issue. There is a notable difference, though: Dignāga had to consciously oppose the procedures of exclusion he knew from the Indian tradition that undermined the legitimacy of the reduction of the corresponding sentences whereas the ancient thinkers from outside the Buddhist circle did not know the very operation of exclusion and did not need to reject it.

The position taken by Dignāga does not close the issue in Indian Buddhism. As we see, the procedure of exclusion can be encountered in later Buddhist philosophy, as per Candrakīrti, who lived long after Dignāga (apologetic comment to Nāgārjuna rather than his own reflection, which makes this testimony somewhat weaker). What is more important is that we see a return to the operation of exclusion in the post-Dignāga period: not just the undermining of the procedure but its rejection. I may be able to refer to just one such case but this one example known to me (there may be others) is proof that the tendency known to us from earlier texts — the tendency to use exclusion — survived until the later period of Indian Buddhist logic, even to its decline; also, it indirectly indicates the exceptional nature of Dignāga's position. His testimony is particularly important as it

comes from a follower of Dignāga's logical theory.

The most important preliminary information is as follows. The most prominent successor of Dignāga's was close to a century's older Dharmakirti ($7^{th}$ century) believed to be the greatest Buddhist logician of the post-Dignāga period.[82] Ha authored several treatises (mostly preserved in a Tibetan version only) including the short manual called *Nyāya Bindhu* (A Droplet of Logic), which was also preserved in its Sanskrit original. This work had a commentary [fika] by Dharmottara appended to it at the turn of the $8^{th}$ century, also preserved in its Sanskrit original. The whole *Nyāya Bindhu Fika*, comprising the basic text by Dharma-kirti along with the commentary by Dharmottara is among the most significant work in post-Dignāga Buddhist logic. It has also remained the most ample source text on the subject which is available in its totality in a western language (English). This monumental translation (albeit in need of revision) was written by the Russian scholar of Buddhism Shcherbatskoy (see n. 79).

Using this translation I did not see in the basic text of *Nyāya-bindu* anything of relevance to the issue in question. *Svavacana-viruddha* column Dharmakīrti illustrated by an example that does not belong with the type of interest to us and there is no need for us to make use of it. The issue in question is indeed touched upon in the commentary to the column, where Dharmottara also discusses his own variant of a sentence similar to those we are studying. He does not allow the reduction of that sentence, which would have led to the ascertainment of its falsity. Conversely, he clearly hints at the sentence going beyond what it itself affirms. This is the opposite of Dignāga's position, and perhaps even a conscious polemic of it. Dharmottara's rationale is peculiar as he states that in the very fact of uttering the sentence there is supposed to be some factor that determines its truth-value and, in particular, he suggests that the sentence would not be uttered at all if it were to be false (Shcherbatsky 1910: 100).[83]

[82]It is likely that it was the popularity of Dharma-kirti's works that contributed to the original copies of his work in Sanskrit having disappeared: they would become the basis of Indian Buddhist education and through them the disciples studies Dignāga's work (Hattori 1908: 15).

[83]Supposing somebody says that whatever I speak is wrong, even then the speaker pronounces this proposition in order to convey that his words (at least) have a true meaning. If this proposition is shown to be true, then his other propositions will (*eo ipso*) be shown to be false. There would then be no use of pronouncing them. He would have never pronounced them. Consequently, when a speaker pronounces a proposition, he (*eo ipso*) really declares that the idea produced by his words, the idea corresponding to the meaning of the proposition, is a true one (i.e. reflects reality). The transla-

So much can be said on the basis of the English version of the text. I had no chance to confront the translation with the original, which is inaccessible to us and limited myself to the above remarks (providing Shcherbatskoy's translation of the key passage in the notes), which should be enough for the modest purposes of the present study. The matter merits some more in-depth study, not only concerning Dharmottara's comments but also in the context of post-Dign$\bar{a}$ga Buddhist logic, its final period included. This is just a small portion of the history of Indian Buddhist logic which should be covered. The insufficient knowledge on the subject has already been mentioned but practically nothing is known about the final period of Buddhist logic in its Indian homeland and its subsequent follow-up in the Tibetan context.

## IV

Having thus demonstrated the illustrations, I will now move on to the initial theses formulated at the beginning, the first of the two that having been illustrated in the previous chapters, which will now have additional explanations appended and discussed. Some of the things to be discussed have already been mentioned, but they will now be returned to against the backdrop of the material now known to us.

First, the oldest extant testimonies of the reduction principle have come from Greek philosophers (Plato, Aristotle). Notably, though, the earliest (and only) extant Chinese Mohist testimonies are only slightly later than the Greek ones, with Indian Buddhist ones coming rather late. Disregarding the Pali Canon, whose testimony may well be the earliest, but where the subject of interest to us appears in a peculiar context, the oldest clear Buddhist testimonies (*Zhu Shi Lan*, N$\bar{a}$g$\bar{a}$rjuna) only come from the early centuries of the Common Era. The late emergence of the subject in Indian Buddhism is compensated by some very interesting factors that have not been ascertained elsewhere, and these will require a separate discussion.

Second, the reasonings representing some unique ways of the application of the *reductio ad absurdum* emerge independently in all three circles. It is obvious that the Mohist dialecticians could not have been influenced by their contemporary Aristotle; neither is it plausible that the Mohist deliberations (virtually unknown outside of their own school and quickly forgotten in

tion is not free from obscurities which may have found their way into if while being retranslated from Russian, such as what the pronoun "them," used twice, is supposed to refer to. Therefore, I reiterate that the quote is rendered with absolute fidelity by the English version of Shcherbatskoy's translation. Despite some reservations, the most important matter of excluding the example sentence from its own range is very clear.

China) could have inspired the Indian Buddhist take on reduction. Not so with the testimonies concerning the independence of Buddhist thought from the Greek thought if we know that Pyrrhon, the founder of skepticism as an independent current in Greek philosophy, reached India with Alexander the Great's expedition. However, there are no grounds to suspect that the oldest known examples of reduction in Buddhist texts could in any way echo Greek influences.[84] Yet, the peculiar attitude on the part of Buddhist authors to the issue of reduction from the moment it emerged in their writings might demonstrate the native nature of the problem and precludes outside inspiration. The principle of reduction (or the scheme of inference which assumes it) as applied to the sentences under consideration seems to belong to the so-called universals of natural logical thinking in the sense that corresponding reasonings appear autonomously in various cultural circles that have reached a certain level of logical reflection.

Third, both the analysis of the similarity between the groups of examples representing the different cultural circles, which was raised at the beginning, and the differences between them call for thorough discussion. This is a complex compound of various issues which will be made more clear by having separate subjects identified within it.

Above all, it ought to be explained in more detail how similar the logical form is to the sentences in question. This similarity conditions the likeness of the reduction procedure of the sentences. This vital issue (and fundamental for the subsequent discussion of the third proposition) cannot really be properly presented in propositional calculus, which we have used in the discussion of most of the examples. The current purpose needs an analysis that penetrated the inner structure of the sentences — an analysis in terms of the functional calculus with quantifiers, which has so far only been used sporadically if demanded by some extraordinary conditions (such as the

[84]Conversely, various Indian influences on Pyrrhon are taken into account, but these concern his attitude rather than his doctrine (Schayer 1931, XXX-XXXIII). As an aside to Schayer's comparison of the similarities between Greek skepticism and the Madhianic doctrine, it ought to be reminded that the latter was formed only several centuries after Pyrrhon's stay in Indian Punjab. Therefore it would be a better idea to compare Pyrrhon's ideas with the early skeptical currents in India, also those outside Buddhism, which are spoken about in the Pali Canon (Jaystilleke 1963: 129f ). Regarding Buddhism, note that the skeptic principle of "suspending judgment" (*ἐποχή*) as leading to ataraxia finds analogy as early as in the stance of the canonical Buddha. He recognizes the non-dogmatically understood principle of *sabaṁ me na khamati* as right but also as the only one that prevents complicities and thus brings peace of mind. See above in the text.

analysis of example stanzas from *Vigraha-vyāvartanī* above). The starting point in all the examples under consideration were sentences that state something about ALL objects ("$(x)$...," i.e. "for all $x$:..." or about all objects at all (as in the Madhianic proposition that ALL is devoid of self-being) or in a more specialized range of all utterances (sentences) or all views.

The inner structure of such sentences can thus be represented with the formula $(x)Fx$, where F symbolizes a function performed (or allegedly performed) by all $x$-s. Because the proposition $(x)Fx$ is itself an object (sentence) from the range of all objects (sentences), therefore one of the $x$-s it talks about, it follows that such a proposition entails itself performing the function it talks about $F$: $\{(x)Fx\} \rightarrow F\ \{(x)Fx\}$, so that in the end, along with the formula of reduction we get a conclusion $F\{(x)Fx\}$. The analogy with the principle of reduction in the basic sentential formulation '$(p \rightarrow \sim p) \rightarrow \sim p$', or the inference scheme corresponding to it will be demonstrated most clearly if we assume $F$ to be the negation of a proposition "$\sim$" (it is not true that ) and the variable x will traverse the set of all propositions (and only propositions, with the exclusion of all other objects). We will then obtain a peculiar equivalent of the reasoning we encountered in numerous examples that refute the proposition "All utterances (sentences) are false." The proposition such as "for any sentence $X$, it is not true that $X$," that is, "$(X) \sim X$" is a sentence itself (one of the $X$-s) and as such seems to lead to a conclusion which is its own negation along the formula $((X) \sim X) \rightarrow \sim((X) \sim X)$, *ergo* $\sim((X) \sim X)$. Considering that the sentence "$((X) \sim X$" seems a special case of a sentential variable p, the analogy with the scheme corresponding to the law of reduction to absurdity in the formulation of the propositional calculus in the propositional calculus formulated as $(p \rightarrow \sim p)$, *ergo* $\sim p$ seems rather obvious.

Having thus noted the *reductio ad absurdum* refuting the thesis that all sentences are false, we have also highlighted the convergence of the applications of reduction for this purpose in all the circles discussed. The variants of such a reasoning occur in Greek thought as well as Chinese and Indian Buddhist. This seems to prove that, first, the not-so-wise proposition holding that all utterances (sentences) are false was thought to be particularly dangerous and in need of refutation; second, the very discovery of the reductionist reasoning scheme is associated with a search for a plausible way of refuting this proposition. The proposition that holds that all utterances are false shares this uniquely heuristic role with the opposite, just as the absurd proposition that all utterances are true. This is at least what things look like in the Greek and Chinese philosophies, but in these circles the

variants of the contradictory propositions practically exhaust the range of topical applications of the reductionist scheme in question. Note that the Chinese Mohists had found themselves at the same level of philosophical speculation as the biggest Greek thinkers. Not so in Indian Buddhist literature, which leads us to reconsider the differences between the Greek and Chinese exemplification on the one side and Indian Buddhist on the other.

It seems that Buddhists were not at all interested in the proposition about the truth value of all sentences (or its refutation); at least I do not know any in their literature.[85] The gap may look all the more strange as they were interested in a number of variants of the opposite proposition, with examples of this reduction not only occurring in Buddhist texts no less frequently than in Greek writings but also cover a broader and topically unconventional range of interest. Let us emphasize that the Indian Buddhists not only discovered these reductionist reasonings, which had been discovered by the Greeks and Chinese before, but unlike their forerunners, content in the reductionist refutation of the proposition on the truth value of all sentences, they were the only ones that applied this discovery on a large scale. This is one of the factors that in a way compensate the late emergence of the reductionist reasonings in the Buddhist literature. The next such factor, much more important and also of a comparative nature, is a direct introduction to the third preliminary proposition, and definitely deserves being presented in the fourth column.

Fourth, between the Greek and Chinese examples on the one hand and Indian Buddhist on the other, a major difference appears in the attitude to reductionist reasonings: Indian Buddhists allowing the procedure (operation) of exclusion, as discussed *ad hoc* before. How significant this is, will be revealed in the subsequent parts of this study. I will first collect and consolidate the individual mentions concerning the difference.

Reductionist reasonings seem irrefutable, particularly that they allow a refutation of an obviously false proposition that collides with common sense (truth/falsity of all sentences) and lead to conclusions in agreement with this common sense. No wonder that Greek and Chinese thinkers treated such reasonings (limited to the striking cases in both these circles) as totally certain and unquestionable. The Chinese testimony may appear less relevant here as we know it was limited to a narrow milieu of Mohists and their conceptions saw no follow-up in Chinese thought. The Greek testimony is

[85]Notably, the canonical Buddha rejects the position of recognizing all views, but here nothing indicates that the rejection is caused by the application of a reductionist procedure, see n. 43.

very important though. It is not only about the first testimonies coming from the most important thinkers of antiquity but also, unlike in China, the fact that there ideas were quoted by philosophers representing various currents of thought over several centuries as evidenced by SextusEmpiricus. Above all, the conviction that these reductionist reasonings are unquestionable had survived practically intact in European thought to date (except the late-scholastic episode, which we will return to in this chapter) to at least the end of the $19^{th}$ century (the classic example being Bolzano).[86]

Against this backdrop, Indian thinkers' bizarre mistrust of such reasonings is unusual. I will go on to discuss that. A tendency to undermine such reasonings emerged in the pre-logical era (in the sense that it precedes the formation of technical Buddhist logic, whose beginnings are usually linked to Vasubandhu). As we know, this tendency already surfaces in the Pali canon and it thus accompanies the reductive reasonings since the moment reduction appeared in Buddhist literature in its early, pre-logical form. Assuming that the exemplification presented in chapter III is representative enough (and I believe it is, at least in the sense that we do not know any documentation other than the Pali Canon), we can say that in the literary tradition, the tendency is not a product of evolution from the initial unconditional recognition of reductionist reasonings as obvious to the later speculation leading to their being questioned (which was the case in Europe, except that the process took more than a dozen centuries). On the basis of the written tradition, a surprising conclusion can be drawn that the early Buddhist discoverers of reduction never went through the stage of being convinced about the unquestionable nature of the reduction at all. However, the source seems to indicate a unique evolution of the early position in two opposite directions, marked by the starting point. This dichotomous concept can be described as follows.

In the beginning (*Dighanakha Sutla, Zhu Shi Lan*), it is only about the permissibility of the exclusion of the basic sentence from the range of the general quantifier inherent in it (which makes it impossible to reduce it). This procedure is roughly equivalent with retaining the basic sentence within what it speaks about itself (which leads to the reduction of the sentence). This inconsistent position in itself opens up two opposite directions in which

[86]Some $20^{th}$ century active philosophers betray the use of such reduction, such as the German Neo-Kantist Heinrich Rickert (deceased 1936) sought to refute the proposition that "es gibt kein absolut wahres Urteil" in a similar way; he regarded it as an token of "the most consistent epistemological relativity" (Rickert 1915: 300-310). This reasoning was also noticed by M. Wallis-Walfisz (1937: 303-304).

the inconsistencies within it can be abolished: either through the recognition of the necessity (rather than just a possibility) of exclusion and thus rejecting the possibility of reduction or the rejection of the possibility of exclusion and hence the recognition of the legitimacy of reduction. Within the margin marked by the Canon and Dharmottara's *Nyāya Bindhu Fika* the Buddhist speculation indeed evolved in the two directions, but in fact it mainly focused around the former. The end stage of this development is represented by Dharmottara who is probably the biggest proponent of exclusion and the rejection of reduction (disregarding his not very successful rationale for the position). The latter orientation, which accepted the rejection of the possibility of exclusion and thus recognizing the inviolable legitimacy of reduction is scarcely represented. However, it deserves our attention also because of its main (or only) representative being Dignāga.

The most important thing in it is the mistrust of the apparently obvious reductive reasonings, manifested by Indian Buddhists from the very beginning, which was correct and precursory from the vantage point of the contemporary logical semantics, in whose light such reasonings prove examples of paralogical overuse rather than just the use of the law. This needs some discussion, which will also constitute the development of the third introductory proposition.

Revealing the paralogical nature of the reasonings is a by-product of modern research on the problems of making logic safe from antinomies — peculiar reasonings which, despite being apparently in accord with the recognized rules of logic, lead to overt logical contradiction and are thus illegitimate. Some striking examples are antinomic sentences that are completely correct grammatically and seem sensible (even if not true) but which have the property that the assumption of their truthfulness implies their own falsehood and *vice versa.* Along with the rules of the *reductio ad absurdum* (simple and reverse), this would indicate that each such sentence is both true and false, which is an obvious contradiction and is illegitimate.

Such antinomies posed a problem as early as in Greece (the paradox of a liar), and in Late Middle Ages the *insolubilia* (as antinomies were then called) were so widely discussed that it grew to a separate field within scholastic logic. The medieval achievements were later forgotten, though, and it was only later, and more specifically recent studies by historians of logic of that period[87] that managed to demonstrate their anticipatory value regarding

[87]A still valuable and in its day pioneering study was published by Rev. Jan Salamucha (1937: 68-69, 320-343) (the study concerns the earlier period only, Ockham included). The only study so far that presents the whole antinomic subject in scholas-

some modern views on antinomies. As this concerns the connections between those issues and the reasonings being the subject of this study, we will return to those medieval antinomies somewhat later.

For now, it needs to be emphasized that in modern times, antinomic issues only entered formal logic at the beginning of the current century, that is at the early stages of the modern mathematical logic. It happened independently from scholastic antecedences, surprisingly and in somewhat dramatic circumstances, which nobody could have predicted by the end of the previous century. The issue was started by the discovery of the fact that within the logical basics of mathematics which was studied by Gottlob Frege at the end of last century (first volume of his *Grundgesetze der Arithmetik* from 1893), an antinomy of the so-called non-reflexive classes could be constructed, that is, such that are not their own elements.[88] In other words, it turned out that the principles of the system that were supposed to be a logical ground for mathematics led to overtly conflicting consequences and this was demonstrated in the design brief for Frege's system where there was a mistake or vagueness. This was discovered by Bertrand Russell and also to him we owe the first modern theory that systematically eliminates the possibility of the emergence of antinomies and which also eliminates the reductionist reasonings discussed here as illegitimate paralogisms that have a structure similar to antinomies proper. This is the Russellian theory of logical types in the form presented to us in the first edition of the first volume of *Principia Mathematica*.[89] Presenting his position on the subject of our interest will not require getting into any detailed technicalities of the theory of types and neither will it require a discussion of further modifications the original theory was later subjected to (thanks to Polish logicians, among others). It will suffice if we limit ourselves here to several points of the Russellian 1910 text. They are both fundamental and can easily be grasped by a humanist.

Before we move on to this, though, consider that the sentence "all sentences are false" seems not to have the nature of an antinomy. The assumption of its truthfulness implies (seems to imply) its own falsehood in reductive

tic logic is given by Bocheński (1962: 275-292). See also W. Kneale, M. Kneale 1971: 227-229.

[88]The class of all classes that are not their own elements is such that if it is its own element, then it is not its own element and the other way round — if it is not its own element, then it is its own element.

[89]Russell formulated the theory of types first in 1908. on modern antinomic issues and the discussion of the theory if types (Bocheński 1962: 448-467; W. Kneale, M. Kneale 1971: 652-672).

terms, but the opposite does not hold true: assuming the sentence is false, it cannot be argued as before that it is true. The antinomic sentence in a strict sense, as in the case of a properly formulated Greek antinomy of a liar, or the Russellian class antinomy of the non-reflexive classes (there are many others), then a sentence like this is true if it is false and the other way round — it is false if it is true (a vicious circle). The difference is about the example sentence (and others with like structure) uni-directionality of inference leading to the falsification of the sentence (and thus to self-refutation), but not leading to contradiction ($(p \rightarrow \sim p)$ is not the same as $(p \wedge \sim p)$), but in the case of an antinomic sentence *sensu stricto* such inference occurs bi-directionality, which falsifies and verifies the same sentence and thus it directly leads to contradiction ($(p \rightarrow \sim p)$ and also $(\sim p \rightarrow p)$, which would demand the recognition of conjunction $(p \wedge \sim p)$).[90]

It is thanks to this unique uni-directionality of inference that directly leads only to self-refutation (but not to contradiction) the sentences of interest to us — as opposed to antinomic sentences — could have seemed a sensible ground for their reduction to absurdity and the procedure might have been thought of as obvious and logically correct for hundreds of years of European thought. In fact these are just appearances that mask the paralogical nature of the operation, with basic sentences in the understanding that makes the procedure apparently possible masked by their grammatical correctness, veiling the violation of the rigors of sense-making, which only modern semantics was able to highlight. This might be the right place to remind ourselves that the normative requirements of a simple natural language grammar are far more liberal from the constraints of logical semantics in the sense that the former allow the construction of grammatically correct and apparently sensible sentences which are, however, flawed or illegitimate from the standpoint of logical semantics. In particular, this involves interrelated issues such as the lack of grammatical differentiation of the levels of language (the separation of the objective language from metalanguage, which are mixed up in a normal language and thus barely noticeable) and grammatically free use of self-reflexion and the linguistic equivalents of the great quantifier, unconstrained by semantics. These properties of a natural language, which incidentally make it a universal system, where anything can be uttered

[90]This difference is something that the authors of the interpretations of the oriental examples do not realize; they refer to the antinomy of a liar (and this antinomy only whereas they are real counterparts) as an alleged ancient Greek example of these examples (Chan Kien Feng 1957: 118 — when discussing the key Mohist example; Suoki Takehiro 1970: 84 — as an aside to the Dignāgi's *svavacana-viruddha* example).

in grammatically correct sentences, are at the same time the sources of antinomies. The reason is that we know (not from linguists dealing with natural languages, but from mathematical logicians) that a "too universal a system where 'too much can be uttered' must be contradictory" (Mostowski 1948: 320, see also 315-320).

It is so with starting sentences, which we are discussing and with the reductive procedure, which these sentences seemingly are subjected to in an apparent agreement with logic and common sense. Essentially, what we deal with here is the same factors that give rise to antinomies, but the intervention of semantic-logical factors that violate the constraints is more concealed and more difficult to notice in such cases than in strictly antinomic sentences. The heart of the matter is more or less as follows. As we know, the antinomic nature can be summed up in the "vicious circle," that is, to the scheme "if true then false," and "if false then true." The same outcome can be obtained with the sentence "all sentences are false," (and the like) but this can be arrived at in other way — by repeating the unidirectional inference procedure which form the sentence "all sentences are false" one can arrive at "it is false that all sentences are false" (which we used to stop at), but also by another application of the same procedure — "it is false that it is false that all sentences are false" (i.e. "It is true that all sentences are false"[91]). This means that we have to make do with a vicious circle here, but this comes about along a slightly different scheme than in purely antinomic sentences: "if true then false," and at the same time "if true, then false that false," which leads to a contradiction, too. The likeness of the sentences we are discussing to strictly antinomic ones is, in essence, very close. There is nothing strange, then, that in the light of the semantic-logical constraints securing a natural language from the possibility of antinomy formation, the reductive reasonings we have been discussing are also eliminated, with the sentences that constitute the starting point of the reductive procedure proving illegitimate structures (pseudo-sentences) in a similar manner as purely antinomic sentences.

According to Russell, his theory of logical types is a consequence of and elaboration on what he calls a "'vicious circle' principle." Note that the term is not very apt because it is not really about a vicious circle but a principle that secures a natural language from constructing expressions that lead to

[91] Of course, this procedure can be recursively applied *ad infinitum*. Taking a sentence that says something about EVERYTHING $(x)Fx$ and assuming that the very sentence belongs to the range of EVERYTHING it talks about, one can arrive at $F[(x)Fx]$, $F\{F[(x)Fx]\}$, $F\{F\{F[(x)Fx]\}\}$, etc. respectively.

the vicious circle and antinomies. Details aside, by focusing on Russell's text' part I that refers directly to the issue in question, three interrelated points can be referred to.

First, Russell limits general quantification making sense only of cases where it does not cause self-reference. This limitation is contained in a rule holding that whatever includes in its own range all the objects of a set (and hence an expression such as "for all $x$: $F$ from $x$"), it cannot itself be one of the objects that belong to the set."[92] The violation of this rule leads to the construction of creations Russell calls "illegitimate totalities." Of course, the example sentence "All sentences are false" as well as the others discussed before, are understood self-reflexively, that is, that they themselves belong to the range they talk about, and constitute the "illegitimate totalities" that violate the rule.

Second, Russell notes that the expression $(x)F$ as one that includes in it the function $F$ cannot in itself be the argument of this function $F$, and this means that the expression built along the formula $F\{(x)Fx\}$ is simply nonsensical.[93] This is an obvious consequence of the disqualification of the expression $(x)Fx$ in the sense of an "illegitimate totality," in the sense that the expression is to be one of the objects it talks about itself. Both formulas taken together highlight the illegitimacy of the reduction procedure in the reasonings demonstrated in the previous chapters. If the procedure is basically about the construction of an implication along the lines of $\{(x)Fx\} \rightarrow \mathrm{F}\{(x)Fx\}$, whose consequent is to be tantamount to a conclusion, then we must say that the whole apparently logical reasoning is in fact a paralogism. In particular, the apparent basic implication is a para-implication, having in its antecedent the Russellian "illegitimate totality" (point one) and in the consequent (conclusion) a meaningless expression point two).

Third, irrespective of the formulation discussed, Russell himself names the counterpart of the sentence "All sentences are false" as an example of an illegitimate construction and notes a paralogical nature of the reduction of such a sentence. He realizes that in this case a reductive reasoning may appear to make sense and may suggest that his "vicious circle principle" allows for some exceptions. As he writes, it might appear that the sentence "$(p) \wedge p$ is false" (a sentence ascertaining the falsity of any sentence $p$) leads

[92]Whitehead, Russell 1910: 40: "Whatever involves all of a collection must not be one of the collection."

[93]Whitehead, Russell 1910: 44: "Since "$(z) \wedge \varphi x$" involves the function $\varphi\hat{x}$, it must, according to our principle, be impossible as an argument to $\varphi$. This is to say, the symbol "$\varphi\{(x) \wedge \varphi x\}$" must be meaningless.

to the sentence "$((p) \wedge p$ is false) is false," where the starting sentence which contains a function "... is false" is in itself an argument of this function — and that, as ascertained previously (see above, point two) is impossible. The author also highlights that in this case the very starting (basic) sentence violates the rule that "there cannot be any sentences about all sentences. (see above the comment one)."[94]

It was only Russell's statements from 1910 that put in a proper light, and allowed for the assessment of, the precursory position of Indian Buddhists, who more than a millennium and a half before the author of the theory of types undermined the alleged truth and legitimacy of the reductive reasonings discussed in chapter III or even rejected these. We mean the operation of exclusion, which can now with more precision be said to essentially be about the sentence $(x)F$ having itself been excluded from the range of the quantifier inherent in it. It can now be seen that this procedure, recommended and sporadically used by early Buddhist thinkers, imposes self-reference and thus protects it from the Russellian "illegitimate totality," and makes impossible the construction of the apparently obvious para-implication $*((z)Fz) \rightarrow F((z)Fz)$ with an illegitimate totality in the antecedent and a meaningless expression in the consequent (and also the alleged conclusion of the reasoning). The Buddhist position on the reductive reasonings corresponds well enough to what Russell formulated in the design brief of his theory of types as late as the beginning of our century that this position can be regarded as a striking anticipation of the modern views on the subject and, more broadly speaking, the anticipation of the modern methods of the elimination of the respective (quasi-)reductive reasonings.[95]

[94]Whitehead, Russell 1910: 44: "Take for example the function '$p\hat{}$is false' and consider the proposition '$(p) \wedge p$ is false.' This should be a proposition asserting all propositions of the form 'p is false.' Such a proposition, we should be inclined to say, must be false because '$p$ is false' is not always true. Hence we should be led to the proposition '$((p) \wedge p$ is false) is false.'

i.e. we should be led to a proposition in which '$(p) \wedge p$ is false' is the argument to the function '$p$ is false', which we had declared to be impossible. Now it will be seen that '$((p) \wedge p$ is false', in the above, purports to be a proposition about all propositions and that, by the general form of the vicious-circle principle, there must be no propositions about all propositions."

[95]This statement contains one of the most important findings of the study in comparative terms, particularly that the issue is unknown to even those specialists for whom it might be interesting. This is a good opportunity to remind us again that the one only scholar who pointed to the issue was S. Schayer (1931, 63n). He did not go in-depth, however, and his note in passing did not cause the issue to be taken up by scholars of Buddhism, with the historians of logic most likely remaining completely

I deliberately restrict myself to the presentation of the issue in the light of the first modern theory, which within the framework of a system that protects logic from antinomies, also exposes the paralogical nature of the reductive reasonings that are the subject of our study. Now, decades later, the theory of types in its original formulation is a mere part of the history of logic. As mentioned before, it underwent modifications; besides that, under the impulse of fighting antinomies, new theories were proposed, more or less independent from Russell. This matter, still not concluded, would go beyond my competence and would miss the main historical and comparative aims of the study, for which *Principia Mathematica* constitutes a convenient and sufficient landmark.[96]

What must be discussed, though, is the scholastic antecedences of the Russellian theory. For the reason of chronology it might seem that they should have been presented earlier, but their historic and comparative significance can now fully come to light in the context of the whole discussion so far. The matter does deserve a more in-depth presentation than will be given here, but the knowledge of scholastic is still incomplete and the competences of the author do not go beyond what can be found in the monographs available.

In the scholastic thought, the problem of universal sentences (with the great quantifier) emerged around the $14^{th}$ century in the writings of (Pseudo-)Duns Scott,[97] particularly in connection with the self-reference of these sentences, in the context of *insolubilia* (antinomies). Since no associations of this kind were found in earlier authors dealing with *insolubilia*, it can be presumed that the inclusion of the sentences we have been discussing, and which can be seen in Duns Scott's writings, to the antinomic issue is his own contribution and at the same time marks the beginning of a more mature phase of the scholastic speculation on the issue, which lasted until

uninformed about it.

[96]As far as I know, after Russell there were no theories that would rehabilitate the reductive reasonings and recognize their legitimacy. Such reasonings apparently cannot be performed on the grounds of any strictly logical language and the only system in which these can be uttered in a way that purports to be correct is a natural language. If so, then any differences between the position described in (Whitehead, Russell 1910) and methods of resolving the issue that are independent from the theory of types are insignificant.

[97]These are comments to Aristotle's *De Sophistia Elenchis,* which were ascribed to John duns Scott (dec. 1308), but which are possibly older and coming from one of his disciples (possibly John of Cornwall). In any event, it is assumed that the text was written later than by the mid-1300s. This is probably *terminus ante quem* of the issue, which might be (just) a little earlier than the oldest documentation that we know of. I will call the author (Pseudo-)Duns.

the decline of the Middle Ages. The first researcher of medieval logic who from this standpoint made a note of (Pseudo-)Duns's text was the Rev. Jan Salamucha (1937: 322-324). The material used to illustrate the matter, where I limit myself to the most important things and leave aside some vague areas that would require a separate discussion, comes from him.

(Pseudo-)Duns Scott (and not he alone) noticed that the source of the difficulty in the antinomy of a liar (his *Ego dico falsum*) is the self-reference of a sentence. It can be seen that at the beginning of his discussion he poses the problem of whether the self-reference of a sentence is at all possible. Using the terminology of the time, the matter boils down to the question whether a term that is part of a sentence can itself refer to (*supponere pro*) the whole sentence.[98] Noticing this self-reference becomes a link between the issues of antinomy with the question of general sentences, which are of interest to us and which, as we know, in an understanding that (purportedly) enables their reduction are themselves self-reflexive. So, into the discussion of the fundamental problem, the medieval author introduces some typical and universal "Any sentence is true" and "Any sentence is false," making an appeal to Aristotle, in whose writings these sentences are in no way associated with the antinomy of a liar.[99] (Pseudo-)Duns Scott puts forward arguments against self-reference which, as Salamacha (over-)emphasizes, "resemble the contemporary deliberations of logicians on the theory of types and the antinomy of the class of all classes that are not their own elements" (Salamucha 1937: 322) Of the several arguments, the most interesting one is apparently the one where the author, on the basis of the quotes from Aristotle's *Metaphysics* (see note 17 above), which are interpreted in a very peculiar way, seeks to prove that self-reference may lead to contradiction."[100]

[98]Salamucha 1937: 333, 67n: "Quaeritur circa hane proositionem:" ego dico falsum." Et primo utrum terminos posit supponere pro tota propositione cuius est pars."

[99](Pseudo-)Duns makes a reference to the Latin version of the same section in Metaphysics, which was presented in chapter I of this study (see above). Aristotle only mentions the antinomy of a liar in very general terms in *De Sophistitie Elenchis* 25, 180b, The text by (Pseudo-)Duns is a commentary to this passage of *De Sophistitie Elenchis*.

[100]The relevant passage in (Pseudo-)Duns (Salamucha 1937: 333-334, 68n): "Et quod non ostenditur, quia in propositione universali affirmativa praedicatum denotatur convenire omnicontento sub subiecto. Si ergo aliui denotetur non convenire, illud sus subiecto non continetur. Sed qui dicit, omnem propositionem esse veram, vel omnia esse vera: non dicit suum esse verum. Per Ari. 4 meta [a quote from Metaphysics:] Accidit itaque; et quod famatum est de omnibus talibus orationibus ipsas seipsas destruere. Nam qui omnia vera dicit, orationis suae contrariam facit veram, quare suam non veram: contraria autem non dicit ipsam esse veram: qui vero et omnia falsa: et

In the end, however, despite the argument he gives, the author is inclined to believe that self-reference is possible, again appealing to Aristotle.[101] In the

ipse seipsum etc. [end of quote] Sed si terminus supponeret pro tota propositione cuius est pars: sequeretur, quod dicens omnia esse vera, diceret suam propositionem esse vera, ergo etc." Allow me to add (Salamucha did not discuss that) the argumentation by (Pseudo-)Duns, which is to prove that the self-reference of a universal sentence can lead to contradiction is in fact rather inept, which may also be proof that we have to do with the first (and thus rather raw) attempt of combining antinomies with some more broadly understood self-reference. First, the medieval author puts the issue in this way that the utterance "All sentences are true" does not aspire to be true because, according to Aristotle, "whoever says that that all is true makes a true utterance contrary to his own and thus makes his own untrue." This is also supposed to mean that self-reference does not obtain in that case because the predicative included in the sentence does not refer to the whole sentence. In the light of the initial part of the text it also means that the sentence does not belong to the range of its subject (*sub subiecto non contineret*). This is to say that what (Pseudo-)Duns suggests here is like the Buddhist operation of exclusion, but this one makes it impossible to perform the reduction of the sentence. This is a very arbitrary interpretation of Aristotle's position, and in fact it is a series of misunderstandings based on his text. Second, what is a consequence of the previous misunderstandings, according to the medieval author the permission of self-reference would lead to a contradiction in the sense that the one who says that "Any sentence is true" would also claim that also this utterance of his is true, and that would go against Aristotle's position on the subject matter. Of course, by applying the same analysis to the sentence "Any sentence is false" one much more easily proves that in the later case self-reference does not lead to a contradiction and is thus legitimate. See next note.

[101]Salamucha 1937: 334, 71n: "Ad oppositum est Ari. in fine quarti [about the same passage from the fourth part of *Metaphysics*] dicens. Qui dicit omnia esse falsa, dicit suum dictum esse falsum; sed hoc non staret, nisi pars [...]" So, according to (Pseudo-)Duns the possibility of a universal sentence being self-reflexive is dependent on the predicative contained within it. On the basis of both quotes, the previous and the present one, we can make the following reconstruction of his position: if the predicative that occurs in a universal sentence cannot be applied without contradiction (very vaguely understood, as we have seen) to the very sentence, then self-reference does not hold; if, however, the predicative of the sentence, without contradiction (and the more so in agreement with what is evident) can be referred to the very sentence, then self-reference is possible and perhaps even necessary. The difficulty of the reconstruction seems to be corroborated by the fact that it corresponds rather exactly to the position that was formulated even less ambiguously by William Ockham (dec. in mid 1300s). He meant the semantic assumption (*institutio*) which pertains to self-reference which concerns the "denotation of the whole by a part of the whole;" *cf.* Salamucha 1937: 340, 100n: "Ideo dicendum est quod quamvis pars posset significare totum cuius est pars tamten talis institutio non est semper admittenda. quando enim per illam institutionem partis habentis eandem institutionem totum significatum mutaretur a veritate in falsitatem et econverso tunc non est talis institutio admittenda" (quote from Ockham's *Summa tatius logicae*). It seems that the sentence is more mature and thus

end, it turns out that all these discussions concerning self-reference that were to be an introduction to the discussion of the *Ego dico falsum* antinomy, are irrelevant to what (Pseudo-)Duns has to say in the main topic (Salamacha 1937: 323).

The latter issue aside, it can be inferred from (Pseudo-)Duns' not very coherent deliberations that, first, he treats the self-reference of universal sentences (corresponding to the formula $(x)Fx$) as connected with the predicative, but he overlooks the part played by the great quantifier as the real carrier of the self-reference of such sentences. This is a rather obvious extrapolation onto universal sentences of a peculiar self-reference which describes a particular (and thus non universal) antinomic sentence "*Ego dico falsum*." The extrapolation is all the more surprising that the author's words would imply his realization of a different nature of universal sentences, which he himself had introduced to the discussion, and in particular, where he noticed a special part played by subject-group quantification in such sentences.[102] The lack of the reference of the self-reference in universal sentences to the quantifier the contain must be the main source of other misunderstandings.[103] Second, as related to the previous point but in need of emphasis, (Pseudo-)Duns in effect overlooks the reduction of the respective sentences.[104] In all, his deliberations will not contribute anything relevant

later than what we have in (Pseudo-)Duns' writings.

[102]See the beginning of the quote cited above, n. 100.

[103]It is about the misunderstandings that I noted *ad hoc* in n. 100 and 101 and which prove that introducing self-reflexive universal sentences into antinomies was far from easy and in the beginning caused difficulty to scholastic logicians. The misunderstandings as found among early scholastic writers, who endeavored to link such sentences with antinomies were unthinkable in Buddhist writings. As we know, the issue of self-reference was from the beginning brought down to whether or not the sentence belongs to the range of the great quantifier it contains (*cf.* a quote from *Zhu Shi Lan*, see note 44).

[104]What strikes one is the omission and an indirect distortion of the reduction of universal sentences in the aforementioned (n. 101, 102) quotations, where the author directly cites *Metaphysics* Γ 8. It is certain that (Pseudo-)Duns failed to notice that the Aristotelian mention he quotes about the self-refutation of the respective sentences (*ipsas seipsae destruere* = *αύτοὺς ἑαυτοὺς ἀναιρεῖν* refers to the reduction of these sentences, nor the fact that Aristotle states the falsity of both (yes, both) sentences on the grounds of the same reductive procedure that assumes in both the same concept of self-reference as linked to the great quantifier occurring in both. The issue of reduction does appear in the subsequent passages of the text, of (Pseudo-)Duns (Salamucha 1937: 334, 72 and 73n; 335-336, 77n) but all that taken together remains vague and proves that the medieval author could not adopt a coherent position on the subject, which he may well have introduced to the scholastic deliberations, but which he entangled in the

to the discussion on the subject matter of antinomy. The text deserved mention and discussion for the mere reason of being the starting point for the scholastic speculation of interest to us. Its subsequent development was to lead to the real anticipation of Russell's position.

The main, albeit secondary, source of knowledge of antinomies in the later stages of scholastic thought has been *Logica Magna* by Paul the Venetian, the early $15^{th}$ century author.[105] In the same work, preserved in its printed edition from the end of the same century, historians of logic have found texts that are significant anticipations of modern views on antinomies, including anticipations proper of Russell's position. Since we have discussed the fact that $14^{th}$ century scholastics, starting from (Pseudo-)Duns started realizing the connection between *insolubilia* and universal sentences on the basis of self-reference occurring in them, it is befitting to start the review of the relevant texts found in *Logica Magna* from a peculiar example concerning the subject. This will also illustrate the evolution from the inept deliberation by (Pseudo-)Duns to some later formulations.

Paul the venetian quotes a revelatory definition of an *insolubile* (unsigned and undatable but possibly rather late as per the way it is formulated) that should be quoted verbatim. According to the definition, *insolubile* is "propositio habens super se reflexionem suae falsitatis aut se non esse veram totaliter vel partialiter illativa" (after W. Kneale, M. Kneale 1971: 228).[106] The revelatory quality of the definition is about it clearly linking *insolubilia*, that is antinomies, with self-reference and does so independently from the earlier speculations about "denoting the whole by its part." What is most important is that the definition covers in range both antinomic sentences (in a general sense) and the universal sentences in their basic Aristotelian variants. Consider that, thanks to its latter part "propositio [...] se non esse veram [...] illativa," the definition treats as *insolubile* not only the sentence "any sentence is false" (which would hardly be stretched to it the framework of "propositio habens super se reflexionem suae falsitatis") but

very beginning.

[105]In actuality Paolo Nicoletti, deceased in 1429.

[106]Apparently the authors as first historians of logic to make a note of this definition, did not fully appreciate it In their intention, the definition quoted is just an example of the fact that medieval logicians were aware that the difficulty posed by *insolubilia* derive from their self-reference ("derive from the attempt to produce a certain sort of self-reference"). This does not highlight the significance of that definition, which in my opinion is one of the highest accomplishments of scholastic thought in the discussion of antinomies.

also "any sentence is true."[107] The precursory nature of the definition vis-a-vis Russell's position is about the scholastic writer's conscious equation of self-referenced antinomic sentences with self-referenced universal sentences. Like his medieval predecessor, Russell, too, treats both kinds of sentences in the same way. The difference in terms used by Russell as opposed to the scholastic writer should not overshadow the agreement of both positions because self-reference, emphasized by the medieval author, is also the essence of the vicious circle highlighted by Russell.

The definition also deserved to be raised because it was not presented in this light before (see n. 106). Moving on to other texts from the same source, it must be noted that Paul the Venetian describes a dozen or so scholastic methods for resolving the issue of *insolubilia*, of which fourteen coming from others (for the most part those can hardly be attributed), which he does not accept, and his own, fifteenth attempt. None of the solutions quoted overlaps Russell's theory, most of them having nothing to do with it. However, in the context of some solutions, some new views flashed, with an anticipation of those points of Russell's theory that were previously highlighted as relevant to our subject.[108] Leaving aside some solutions that deserve our attention from the perspective of modern approaches to antinomies but are unrelated to our issue,[109] from among the attempts presented by Paul, it is number

[107]It might appear that the latter sentence does not fall under the definition. This illusion is caused by the fact that in this sentence falsity is not mentioned and that rendering the sense of the definition adequately may be difficult (*cf.* its English translation in the *Development of Logic*, p. 750, which seems to be flawed). In particular, this refers to the term "illativa" (one from which I can be inferred that .../ allowing the argument ...), used in the definition. Both sentences are such that their falsity is trackable to or derivable from (a conversion of the Latin *illativa*) themselves on account of their self-reference. It ought to be accepted that the author not only realized this but also wanted to highlight this in the second part of his formulation.

[108]The only thorough review so far of the respective parts of Paul the Venetian's text from the vantage point of the contemporary historian of logic is presented by J. M. Bocheński (1962: 280-292). In particular the author cites (along with quoting the German text) numerous passages from *Logica Magna* that correspond to the respective solutions and makes a note of some novel formulations. This is to describe the points of utmost importance to us solely on the basis of this study (I had no access to *Logica Magna*).

[109]One can mention two anonymous solutions, for example, no. 5, according to which *insolubile* is devoid of meaning at all, or no. 8, which denies *insolubilia* the truth value on the grounds that they only have an appearance of sentences but are not ones (Bocheński 1962: 281, 282). There are indeed "modern" positions, but in the passages from Paul the Venetian nothing indicates that the positions should concern not only antinomic sentences proper but also the ones we are interested in. This would

thirteen (Bocheński 1962: 284-287) that seems the most important to us, one that was among those he had rejected.

The solution in question is an extended and complicated system of propositions and resolutions. Within the context of our interest, three points need to be discussed as well as the forth one, implicit in the other three, even though not to be found in the text. Those basic propositions contain an injunction against formulating expressions (sentences) leading to a vicious circle. Even though the unknown author (or perhaps the one who gives the account, such as Paul himself) falls short of using the term, and in his deliberations uses some peculiar terminological distinctions foreign to us, but the mere fact of such an injunction goes beyond doubt and this very prohibition is undoubtedly the scholastic equivalent of Russell's vicious circle principle (Bocheński 1962: 285).[110] Note that Russell knew that (even if just indirectly or in very general terms) the inquiries of medieval logicians had led to the recognition of the vicious circle as the source of contradiction in *insolubilia*.[111]

The problem of the vicious circle is key for the whole solution and other deliberations and recommendations are, in essence, their consequence. On account of the close interconnections occurring between the construction of universal expressions that contain the vicious circle or lead to it and the self-reference of sentences, the injunction against the vicious circle is

be so if the definition of *insolubilia* formed part of these solutions (no. 8!). However, the comparison of the respective references to *Logica Magna*, which indicates that the definition is to be found in places other than each of the solutions, seems to preclude such a possibility. It would be worthwhile to study this in depth because so far it is unclear if Paul connects the definition he quotes with any of the solutions he discusses (and if so, then with which one).

[110]Bocheński stresses that in the passages he quotes "enhalten eine exemplarich scharfe formulierung des Verbotes des circulus vitiosus und somit des wichtigsten modernen Gedankens sur Losung der Antinomien."

[111]Russell learned about this from the encyclopedic article *insolubilia*, written by the American logician C.S. Peirce (Kneale, Kneale 1971: 656 and the note). Because it is otherwise known that Peirce as the only one forerunner of $19^{th}$ century logic read Paul the Venetian, it cannot be precluded that the information he gives in his encyclopaedic article is about solution number 13. What is not known is to what extent Peirce knew Paul's work and the chapter about *insolubilia*; Bocheński (1962: 440) suggests that he had noticed only one of the dozen or so solutions that Paul talks about, but fails to say which one he means. The matter is apparently minor and raising it here may seem unnecessary meticulousness, but on account of Paul being a major source and the role of Peirce as an intermediary for scholastic antinomies for the author of the types, it would be desirable to establish things more precisely, which would be possible for the historians of logic.

basically a reformulation of the prohibition of using self-reference. It is not surprising, then, that the injunction appears in the context of solution no. 13. This point requires no explanation except mentioning that the injunction is formulated in the terms known to us from (Pseudo-s)Duns': the relation of a part to the whole. It is stated that a constituent part of a devised sentence in its proper sense cannot subordinate the whole of the sentence to itself. The third point is more of interest to us owing to the reference it makes to universal sentences. The author of the solution leaves no doubt as to the fact that his injunction against the vicious circle (and the related ban on designing self-referenced sentences) needs to be understood as referring to both antinomic sentences *sensu stricto* and quasi-antinomic universal sentences of the type in question. The proposition that states the impossibility of a sentence that is supposed to mean that it is itself true or false is illustrated by the medieval author through a self-referenced universal sentence. "Any mental proposition [*propositio mentalis*] is false," making a clear note that he means such an understanding where the subject of the example sentence covers the very sentence (Bocheński 1962: 285). The ban on the recognition of self-referenced universal sentences as permissible entails the ban on their reduction as a procedure at least as illegitimate or meaningless. The fourth point, interesting for us in particular in the context of what we are discussing, is not directly addressed in the texts available to me, but it can be accepted that the annulment of the reductive procedure which assumes the self-reference of the starting sentence is implicitly inherent in the solution.

It is easy to notice that the recommendations of the solution no. 13 could have been inspirational for Russell. Therefore it must be reiterated at this point that Russell's theory is independent from scholastic antecedences, just as it is independent from its Buddhist antecedences (which goes beyond doubt, of course). The technicalities of the theory of types aside, as there is no medieval prototype for these, and limiting ourselves to the basic design brief of the theory, which is of interest to us, suffice to say that Russell did not conduct any studies on scholastic logic, and given the near ignorance of scholastic thought in those days, he cannot have known about the things discussed here. The only interface can be the problem of the vicious circle as the source of antinomies, which Russell himself makes a reference to in an earlier paper.[112] This is, however, a generality whose extrapolation onto

[112]See above n. 111. Note that the issue of the vicious circle surfaced several years before the publication of Whitehead, Russell 1910 in the context of the debate between Russell and Henri Poincare. The French interlocutor was the first to use the term to

scholastic discussion of antinomies as we know them (incompletely though we do) is out of the question for a number of reasons.

The late medieval anticipations of the new ideas that laid the groundwork for Russellian theory of types do not and cannot be evidence of the genetic dependence of the latter on the former. Indeed, they do testify, in their areas, which is not so rare, about the founders of modern logic having to rediscover the achievements of scholastic thought, which the anti-scholastic currents (humanism) disdainfully doomed to oblivion (Bocheński 1962: 18).[113] Irrespective of this little-known fact, the anticipations presented above basically have historical and comparative value in the broader context of our study and as such deserve our attention. Of particular interest is the comparative juxtaposition of the differences between the set of facts making up the scholastic antecedences of the Russellian position and the peculiarly precursory part played by the Buddhist approaches towards this position.

At the beginning of the comparison, chronological differences must have been highlighted for two reasons. First, as we know, the earliest testimonies that can be considered the early stages of scholastic anticipation (self-reference), come from the first half of the 1300s,[114] with the Buddhist idea of excluding the sentence from the range of the sentence speaking about "everything" appearing at the same time as the concept of the reduction of the respective sentences, that is, at the beginning of the common era at the latest (Pali Canon, *Zhu Shi Lan*). It means that in this case Buddhist thought came before all European anticipations by at least a millennium. Second, and what is no less important, the achievements of scholastic thinkers proved to be a short-lived and quickly forgotten episode, the only one in the history of European thought from antiquity to the $20^{th}$ century[115] whereas in the Buddhist context, the use of exclusion was a lasting phenomenon, consistently recurring over the centuries that separate the pre-logical era

describe "non-predicative" definitions (Russell's term) as ones which "contienent un cercle vicieux." In his response to Poincare's paper, Russell made a reference to the medieval recognition of the vicious circle in the antinomy of a liar (Kneale, Kneale 1971: 635-636).

[113]The author calls the Russellian vicious circle principle as a rediscovery of what already existed in Paul the Venetian's writings.

[114]Noting the rudimentary nature of the (Pseudo-)Duns' deliberations presented before, it does not seem likely that more medieval research could reveal the existence of an earlier and more advanced speculation on the subject.

[115]An analogy comes to mind with the Mohist period, also one of its kind in the Chinese context; however, it was about the principle of the reduction to absurdity as applied to the sentences of interest to us without an intention of undermining the procedure itself.

(the Pali Canon) and the closing stages of Indian Buddhist logic. So, in both time aspects, the Indian Buddhist attitude in the subject matter discussed here, a millennium earlier, has definite supremacy over the corresponding European speculation that was much later and short-lived.

The difference in content is much more complex. On the basis of the materials discussed before, it can be presented as follows. The most essential thing is the juxtaposition of two facts: in the scholastic speculation the issue emerged only in the context of the resumption and the subsequent development of interest in the antinomies, which had existed since antiquity, and it immediately became a constituent part of the issue;[116] second, the Buddhist approach to this issue had from the very beginning been entirely independent from antinomies. Buddhist thought did not know the problem of antinomies in the strictest sense, as was in the case of the Old Greek paradox of a liar, as a result of which any considerations on antinomies in our understanding, for whom a starting point was lacking, were, through necessity, left out.[117]

[116]Let us emphasize that in the European context the issue does not appear detached from antinomy. It only appears as part of the issues in their mature phases. So, it first appears in the Late Middle Ages and then only at the beginning of our century. It is interesting that when in the period of the Renaissance that opened the modern era, continuity had been lost with the achievements of the scholastic logic, the problems of antinomies had disappeared, as well, for four centuries, and along with it all reservations concerning the reduction of self-referenced universal sentences. Of course, there was no lack of referring to the respective reductive reasonings. These, however. Were just paraphrases of expressions taken from Aristotle or other ancient authors, with the legitimacy of the reasonings not only ceasing to be questioned but, conversely, exposed as common-sense and unquestionable, in line with the stance of ancient thinkers (the classic example being Bolzano, cited in chapter I).

[117]The reader should be forewarned that in the professional Buddhist literature the term 'antinomies' (or their derivatives) are often used about issues that would not be called antinomic here. (or in the new approaches to the history of logic). "Buddhist antinomies" are often referred to as a juxtaposition of general philosophical propositions that are mutually contradictory and ones where the mind would have a hard time deciding which to accept and which to reject. We are thus talking about antinomies in the sense close to Kant's understanding of cosmological antinomies (Schayer, 1931: XXVI-XXX). A more convincing example, and one that originates from technical Buddhist logic, is an illustration of a purported antinomy, which is a peculiar set of misunderstandings. Dignāga introduced to the list of the general category of "apparent reason" errors (*hetv-ābhāsa*, which should not be confused with the category of *pakṣa-ābhāsa*, which we already know about, being superior to the other contradictions discussed here in n. 80} a separate item he haplessly calls *viruddha-avyabhicāri*, approximately "does not depart from contradiction." It is not clear what this error is supposed to be about. In *Nyāya-mukha*, Dignāga mentions it as one of the "insecure reason" er-

The above difference, which is about the very origin of the scholastic and Buddhist anticipations, is superior to other detailed differences, which are in turn derived from this main one. Even a superficial look at the materials allows one to say that a collection of scholastic anticipations is characterized by its relative theoretical, evolutionary and complex nature, which is different in the Buddhist context: a practical approach, no evolution and the simplicity of reasoning. Also, it is not very difficult to notice that in both of these systems there is an interdependence of features that make it up. Below I will have a look at pairs of opposing component parts of both systems.

Firstly, the approach of scholastic thinkers to the issue is clearly theoretical from the very beginning (even though the beginnings may have not been very successful). Things had to unfold that way because as the problem was noticed as such against the backdrop of earlier scholastic theoretical deliberations on the subject. Not so among Buddhist thinkers, where there were no such connections and could not have been and the issue surfaced because of the doctrine (*Dīghanakha-sutta*), which inclined and possibly forced an *ad hoc*, pragmatic way out.[118] A practical and simple solution appeared by itself without much theoretical speculation, and thus most probably intuitively.. As we know later attempts at the justification of the operation of exclusion (*ad hoc* and for apologetic purposes, and thus also pragmatic) are theoretically irrelevant and again this could not have been otherwise.[119] The striking fact that the respective scholastic reasonings (the

rors (*anaikāntika*, a subcategory to hetv-*ābhāsa* and gives no examples. It is only from other non-Dignāga texts that we find out that it is apparently about contrasting the so-called Buddhist syllogism ("Sound is transient because it is an artifact, just like a pot") with a counter-syllogism ("Sound is permanent because it is audible, just like the essence of sound.") (Kunst 1939: 87). All that is vague and no wonder that the concept of *viruddha-avyabhicāri* was rejected by later logicians (Dharmakīrti). However, Tucci (1930: 35) translated the term *bona fide* as antinomies and this pushed the author of Buddhist logic to entitle the section on the item "The antinomic fallacy (Shcherbatskoy 1932: 316-327 suggests it could be about the "cosmological antinomies")."

[118]In scholastics, such factors of doctrine and pragmatics were out of the question. The reductive reasonings we are dealing with had long been known and raised no doubt for centuries; moreover, the authority of the ancients, which sanctioned the unquestionable nature of the procedure, also went against seeking to spot a problem in it. This is another argument to prove that in scholastics the problem could have emerged in peculiar theoretical speculation: the one which was brought up by antinomic issues then studied.

[119]The justification of the operation of exclusion must have been beyond the possibilities of theoretical Buddhist speculation. This must have been the main reason why Dignāga rejected this operation, who could not have recognized as persuasive the extra-logical motivation for the operation (rightly so), and was unable to notice the

earliest included) are theoretically incomparable to what we find among later Buddhist logicians is usually if not solely explained by the basic difference in the starting points in both cases. Note that all this is not to belittle either the practical value of the Buddhist solution or the inherent real theoretical value, which the discoverers and users did not realize. Neither does that violate the historical and comparative meaning of the operation of exclusion. On the contrary, it brings them to light.

Secondly, the scholastic solution of interest to us, and in effect the outcomes, add up to create an evolutionary sequence from some early attempts of little significance to ever more subtle formulations, which constitute the anticipations proper of modern views. Also, the evolutionary nature is derived from the origin of the issue in the scholastic context as noticed in the background of antinomies and developing within these issues, once intensively pursued. The pragmatic Buddhist solution, which appeared as early as at the pre-logical stage, was from the very beginning subjected to *ad hoc* purposes and required no modifications; also, it would be hard to imagine what that would be supposedly to be subjected to. The operation could either be accepted and used (not always consistently) or rejected. This is, as we know, what the peculiar evolutionary nature was about in the Buddhist context.

Thirdly, the variants of scholastic anticipations, scattered throughout various antinomic deliberations, and implicated in various attempts of solving the main problem, that is, strict antinomy had to lead to a complex set of partially overlapping elements, corresponding to various aspects of Russell's position. The complexity of scholastic anticipations contrasts, rather successfully, with the double simplicity of the Buddhist operation of exclusion that comes down to one simple formula, which does away with the Russellian "illegitimate totality," and eliminates the possibility of a para-logical overuse of the purportedly obvious reductive procedure is not only a simple but also a more direct anticipation of the Russellian issue than what we can find in the theoretically more elaborate scholastic studies (at least regarding the materials so far prepared by contemporary historians of logic). We will risk saying that in the Buddhist context a lack of connection between the (purportedly obvious but otherwise undesirable) reduction of self-referenced universal sentences and the issues of antinomy may have rendered impossible the attempts at a theoretical resolution of the problem of reduction, but it also allowed for a pragmatic and simple solution. In this sense the Buddhist

logical-semantic core of the issue.

formula, despite its pragmatic and intuitive origin and a lack of theoretical rationale, is not only chronologically earliest but, with its simplicity, it is also the historically strictest anticipation of the way it was presented in Whitehead and Russell 1910.

This is the conclusion the previous solutions were supposed to prime for (see above) but the fact may seem rather surprising and we need to dwell upon it for a little longer. As there is no doubt that the early Buddhist discoverers of the operation of exclusion hardly realized the logical nature of the problem they were dealing with, it cannot be denied that the source of their "modern" idea was pure intuition. It must now be said that the mere reference (made here before) to the intuition of the discoverers does not suffice even though overall it is no doubt right. It can be misleading, too, as it does not explain what could have been the intuitive starting point of the idea (other than the cause that set it in motion), and it can suggest *ex silentio* that what we are dealing with is some random chance, which is not conditioned by anything or whose conditioning we cannot point out. Also, considering that we are dealing with an idea that goes beyond the common sense obvious, regarded as such (except the late scholastic period) by the best thinkers until as late as the end of the $19^{th}$ century, such an unintended suggestion might unnecessarily magnify the unusual fact which is otherwise interesting and may also create an impression that a degree of mystery has been included into historical and comparative issues.

Explaining this point, which we are now moving onto, will do away with the possibility of such misunderstandings, but this is not the only reason for such an explanation, which could have been reduced to a mention in passing during the previous argumentation. The simple thing in question is interesting enough in itself that it deserves to be separately discussed at this particular moment as the most fitting conclusion of the series of comparative insights.

The early Buddhist idea of exclusion, which is surprising in its novelty had intuitive origins in the some commonly known facts (or acts) of natural language use. The thing is that a natural language leaves ample space for the use of what we would today call a universal quantifier of a purportedly (superficially) unlimited range in cases where we indeed have to do with general quantification but in some ways (sometimes drastically) limited in range.[120] Usually, an appropriate limitation of the range of the quantifier

[120]This must be a property common to all natural languages, and as such, one of the language universal. Suffice to say that this is so in the Indo-European languages, Sanskrit included. In Polish we know this from everyday experience, with examples too

thus used (more precisely, its linguistic counterpart) is implicitly inherent in the context (if only situational) with the very procedure of limitation so natural that it is usually overlooked by the usual users of language. In such cases, the "superficial" EVERYTHING (and its variants) is in fact no longer EVERYTHING as claimed — as early as in the context of the operation of exclusion — by the author of *Zhu Shi Lan* (see above). Note that the addressee of a sentence with a general quantification with a purportedly (and only purportedly) unlimited range, which interprets this sentence in line with the author's intention, imposes (not always consciously) on the quantifier a limitation and thus does something that in Buddhist context would be called the operation of exclusion. These two procedures do differ (more on that later), but faced with the obvious fact that both boil down to the procedure of exclusion of something from the surface-structure of the range of EVERYTHING, their similarity is this respect is clear and can overshadow, the otherwise quite significant, differences. Considering, too, that we do not find in a natural language anything that would resemble the Buddhist operation of exclusion more, it cannot be denied that this natural procedure of the interpretation of sentences with general quantification with a purportedly unlimited, but in fact limited range constituted the intuitive source of the "technical" Buddhist operation or (which is the same) that the latter is the intuitive extrapolation of the former.

The differences between both procedures are rather subtle and we can assume that the Buddhist discoverers of the operation of exclusion did not have full understanding. The differences can be reduced to two points. First in the natural interpretative procedure, the exclusion has a positive nature in the sense that it is about isolating from the superficially unlimited quantifier range all that it is supposed to cover and what would be included under it if the sentence were to be formulated precisely, that is, with an explicit imposition of a limitation on the quantifier. In the technical Buddhist operation, however, exclusion is a negative procedure in the sense that it is about the removal from the range of the quantifier of what ought not to be included in it (despite what the quantifier suggests is its unlimited and thus unexceptional generality). Second, more importantly in terms of logic, the natural interpretative procedure does not have any connection with self-reference of a proposition, whereas the technical operation of exclusion is related to sentential self-reference of a proposition (or view) and is directly about the removal of this self-reference. This has a quantitative consequence

banal to include here.

because only one object (sentence or view) is then removed from the range of the quantifier.

There is no indication that Buddhists noticed these differences clearly and, above all, that their procedure was about the removal of self-reference in itself. The formula of *Zhu Shi Lan* according to which the procedure of exclusion means that EVERYTHING is not really EVERYTHING is no testimony of some more knowledge on the issue. This general formula also covers an interpretation of purportedly universal sentences as actually general ones only in a limited range, which is automatic for the users of language, as well as the technical operation of exclusion, which was invented purely for the sake of satisfying some doctrinal and pragmatic needs. The formula of *Zhu Shi Lan* above all is evidence of there having been no clear distinction between the two different procedures, associated with each other upon the mere likeness and possibly a lack of awareness that the technical variety of the procedure having this pragmatic application for which it had been devised. On the other hand, because in the intention of *Zhu Shi Lan*'s author, its broad formula, encompassing both procedures, is directly related to the "technical" operation of exclusion, we are entitled to believe this formula to be a testimony to (or a trace of) the origin of the procedure as an intuitive extrapolation of a corresponding natural procedure of linguistic interpretation. This modest testimony is all the more important as the one and only known trace of early Buddhist reflection on the issue in question.[121] Apparently, even this tiny trace of a peculiar relationship between both procedures was soon forgotten.

To be precise, it needs to be added that even though the testimony of *Zhu Shi Lan* to a degree corroborates the legitimacy of the explanation (which seems uncontentious), this would hardly be regarded as the proof that settles the issue. The explanation, which has been put forward here for the first time, is necessarily hypothetical, that the hypothesis is about a process that is *a priori* regarded as intuitive, apparently there can be no question of it being proved in the strictest sense. Here, the role of the hypothesis is about it having a rational and explicative role, and in these terms it seems to satisfy the conditions. It explains the natural and coherent way in which this "modern" early Buddhist concept came about in anticipation of Russell's

[121] As a personal aside, the oft-cited *Zhu Shi Lan* passage had a heuristic meaning for me. It was this excerpt that made me aware of the possibility of reconstructing the intuitive strand leading to the "technical" operation of exclusion and which also brought me a linguistic starting point as the most natural (and possibly the only one that can be considered here).

position. Thus it deprives the issue of the appearances of mystery and makes it intelligible. It would be hard to find a rational explanation that would have a stronger explicative power.

Having thus concluded comparative deliberations, some more remarks have come up, motivated by a desire to prevent some more misunderstandings that could arise against the background of the whole study. The oft-highlighted fact that the examples testifying of the *reductio ad absurdum* having been discovered in all the cultural circles discussed is solely made up cases of paralogical overuse of this principle could make an inquisitive reader who is unfamiliar with formal logic ask themselves a question which the logically correct applications of the principle are and even evoke doubt whether the very principle is indeed a logical law.

So, it must be said that the so-called principle of *reductio ad absurdum* in its basic sentential formulation "$(p \rightarrow \sim p) \rightarrow \sim p$" and its reliable counterparts in the form of a functional calculus are logical tautologies which cannot be questioned. The peculiar quasi-applications of this principle are rejected; these come down to the self-referenced and vicious circle formula (see above), which, despite superficial likeness to a reliable formula of reduction, is its paralogical extrapolation. Back to reduction in its basic sentential formulation, suffice to say that it finds an appropriate logical application in indirect evidence (apagogic) as regards the proving of the negative proposition $(\sim p)$. The truthfulness of the positive counterpart of the proposition is then assumed $(p)$ and if the negation of the counterpart can be derived from this assumption $(\sim p)$, the negative proposition is considered proved on the basis of the law of reduction. The examples of such reasonings have a different structure than the paralogical reasonings we were discussing, but discussion is unnecessary here.[122] Note that the reverse procedure of reduction is used in the event of indirectly proving a positive proposition $(p)$. The truth of the negation of this proposition is then assumed $(\sim p)$ and if from this assumption an original positive proposition can be derived, it is presumed proved on the basis of the reverse law of reduction "$(\sim p \rightarrow p) \rightarrow p$." All that mainly concerns peculiar mathematical reasonings and because in mathematical practice there is a more common need for using apagogic argumentation for positive rather than negative propositions, the scope of using the reverse law of reduction is broader than the ordinary law of reduction. The more frequent applicability of the reverse law of reduction must have contributed to it having been discovered in antiquity (used for

[122]For the exemplification of logically correct apagogic law [principle] of reduction to absurdity (Mostowski 1948: 24-25; Czyżowski 1949: 25).

the first time) in reference to a mathematical reasoning (Euclid), whereas all the known examples of the application of ordinary reduction are paralogical extrapolations that correspond to the law.

Therefore, the recent remarks have led me back to the fact that the discovery of the law of regular reduction occurred in all the cultural circles in the context of the same paralogical applications of the law. We know that the convergence is explained by the factors that have been highlighted before, such as the similarity of the issues, which by itself gave a reason for such solutions, but also the simplicity and the suggestive obviousness of the procedure that imposes itself under the circumstances. The revelatory applications never went beyond the paralogisms and never led their discoverers to logically correct reductive reasonings. This is partially explained by a peculiar and narrow range of reliable applications of the principle of ordinary reduction (as mentioned before), but a more important factor must have been that logically correct applications of this principle are less easy to grasp than its paralogical extrapolations. Paradoxical as it can be, noticing reliable applications of the law of reduction does require more intuition and logical skill than the finding self-declared purportedly obvious, but in fact paralogical, quasi-applications of this law.

## ADDENDUM

After completing this study I got the newest book by A. C. Graham *Later Mohist Logic, Ethics and Science* (1978). This close to 600-page-long volume is and will long remain a unique study of the multifaceted issue of the so-called dialectical chapters of Mo Tsy (40-45). Since, in the discussion of the examples of reductive reasonings in Mohist canons of chapter II of this study, I used Graham's earlier study (1959), I feel obliged to write a supplement with ex post references to the new work and comment on them. Of course, the remarks, where I will limit the scope of the comment to a small section of Mohist issues, should not suggest any overall generalizations concerning this work as a whole.

In brief, the new book by Graham makes obsolete only my remark concerning the significance of his previous study (see n. 16). His modern translations of both basic canons constitute an almost complete reformulations of the previous editions of the canons, but the changes are basically about style, with the contents having been little changed in passages that are irrelevant to us. Therefore, my position on his earlier translations are, in essence, also true about his new interpretations of both canonical texts. I will address three points. Regarding the first of the canons I discuss (see above and *cf.* item

B 71 on pp. 445-446), I uphold my interpretation, that is, the explanations where I adopted the Sub I Zhang's *shen* → *tang* emendation (overlooked by Graham in this edition, too). See note 17 above. On top of the graphic similarity of both signs, I will now also note the fact that in the *textus receptus* of all four canonical chapters (40-43) the sign *sen* appears only this once and in a context that is rather unusual for it (Graham translates *pu shen* simply as 'ill-considered', which is artificial), with *tang* being a rather frequent sign there (19 times at least) and makes perfect sense. All that corroborates Sub I Zhang's emendation, which Graham does not accept (nor does he mention it), which causes logical vagueness of the significant sense of this item in the translation.

The thing about the next canon (see above; in Graham's work B 79, 453) is more complicated because the choice of the expositions of the beginning of the explanation (*shuo*) is related to a peculiar issue of the so-called heading signs in chapters 42-43. This issue was consciously overlooked in my study, which I did not want to overburden with technical-philosophical details which are barely perceptible for non-Sinologists. Apparently I must raise it, though.

In essence, at the front of each explanation there is a sign of explanation, identical with the one which begins the text of the respective basic canon (king), that is, the one the *shua* refers to. This heading sign does NOT belong either syntactically or semantically to the *shuo*, whose actual text only begins with the first sign after the heading sign. The heading sign is only supposed to perform the function of indicator that associates the *shuo* that follows with the right canon (which we know is found in another chapter); it goes without saying that the arrangement of these signs in the whole text also marks the boundary between *shuo*'s belonging to different canons. This important composition principle of chapters 42-43 had long been forgotten and its discovery (or, rather, gradual discovery) by Chinese scholars only in this century is one of the most important achievements of the textology of Mo Tsy's canonical chapters.

The principle described is proven unmistakeably in a surprisingly high number of cases, including the previous example), which obviously highlights its instrumental meaning. However, given a number of various distortions in the *textus receptus*, it can be expected that some of these also affect heading signs. This is so in this case where the beginning of *shuo* is undoubtedly distorted and requires emendation. This is what we know for sure, but the kind of distortion and the emendation required are, as always in such cases, debatable.

The difference between the exposition of *shuo*, which is the basis of the interpretation given in my study and Graham's exposition is that I have adopted Sub I Zhang's emendation of the first sign as the beginning sign *shuo* with an additional assumption that, in this case, the heading sign was entirely lost from the *textus receptus*, with Graham moving the sign that in *textus receptus* comes second to the front as heading (with this sign in that position still requiring a minor emendation), and considering the rest as *shuo* text. This exposition may be more economical than mine (it does not assume the dropping out of the heading sign but only a shift of the sign by one place and a minor emendation of this sign), but it seems that both are more or less equally legitimate, particularly that in both cases the logical interpretation of the positron (at least in my understanding) boils down to the same. Therefore in my study I also mentioned Graham's exposition as an alternative version of *shuo*, which does not alter the logically significant sense of the whole. See notes 18 and 19 above. Also, my remarks about Graham not noticing the need of the interpretation of this canon (regardless of the choice of the *shuo* exposition) in terms of quantification remain valid as in this rendition his present interpretation is no different from the previous one. Overlooking quantification is still, in my opinion, the chief reason of keeping the logical aspects of the text discussed blurred in its present, reformulated translation by Graham, too.

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**Maciej Grochowski**

# NATURAL LANGUAGE DICTIONARY AND THE ARTIFICIAL METALANGUAGE IN GENERATIVE DESCRIPTION

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1. 1. Practical value of each theory of language is decided above all by the capability of such theory to be used for description of particular natural languages. It is impossible to expect that a theory of language will be developed, which would have a universal explanatory power with respect to all facts, concerning all languages. Although numerous theories of language developed over the last twenty five years, belonging to the broadly understood generative trend[1] make it possible to explain a considerably greater number of linguistic facts than the structural theories, still it is impossible to speak of practical significance of the generative models, since no natural language has been described in a comprehensive and detailed manner with the use of a model of such kind.

What is especially convincing are the ideas of generative linguistics (shared by most of its representatives, more general, however, than the language description models represented by each of them)[2], and in particular the postulates that generative grammar is to model the language competence of an ideal sender-recipient, that it should be formulated explicitly and that it should be of prognostic (predictive) character. One of the initial theses of generativism, that there exists an analogy between the description of

[1]Cf. e.g. Chomsky, 1957; 1965; Katz, J.A. Fodor, 1963; Chafe, 1971; Katz, 1972a; Bartsch, Vennemann, 1972; Melčuk; 1974; J.D. Fodor, 1977.

[2]Cf. e.g. Chomsky, 1965; Katz, 1972a.

language and the description of a finite set of organized operations aimed at production of a certain type of products seems to be fully correct. It is also impossible to reject the hypothetico-deductive method approved of by the generativism. Even if one embraces the mere doctrine of generativism, it does not mean that one is forced to acknowledge the adequacy of any of the proposed generative description models, even less so that one is to accept the prevalent conceptual apparatus or the "generating" technique.

Generative linguistics assumes, as it follows from the analysis of but a few models, that it is possible to describe a natural language with the help of an artificial one[3]. Therefore, one assumes as given a system of nonterminal symbols (i.a. consisting of such variables as: S, NP, VP, N, A, Adv), which in accordance with the rules of substitution, represent various subsets of terminal symbols, i.e. natural language expressions. Sets of terminal symbols and the collection of generative rules are also considered to be given. Linguistic competence modelling is aimed at determining how to apply rules to a set of symbols, so as to make it possible to generate an infinite number of sentences of a given natural language[4].

One of the most important assumptions adopted by construction of generative models, namely that the natural language dictionary is a set of elements given a priori, is difficult to accept. If one rejects such hypothesis as being too strong, it is impossible to determine in advance, what set of artificial language symbols is necessary and at the same time sufficient, to represent the full set of expressions of a given natural language.

1.2. One of the objectives of this paper is to justify the thesis that a natural language dictionary is not a fully a priori given set of elements. This issue will be discussed in the light of syntax and semantic facts of the contemporary Polish language.

A thesis formulated in such manner immediately results in another issue, i.e. whether it is possible to assume a priori a specific artificial language dictionary, which would be adequate for description of a given natural language, and above all, to what extent such dictionary of artificial metalanguage is at all necessary for determination of the rules of generation of sentences in the natural language. An attempt at answering this question constitutes the principal objective of this article.

[3]Cf. footnote 1

[4]Pazuchin (1979) seems to be right to observe that the hypothesis that generative rules are adequate for an indefinite number of sentences is too strong. In his opinion it is impossible to prove such hypothesis, since it is possible to verify it only on the example of a finite number of sentences.

In accordance with the reductionism principle[5], any and all entities which are not necessary in science, are at the same time dispensable. Reduction of the number of auxiliary notions by formulation of a hypothesis is a course of action exposed to a smaller degree of falsity than multiplying the notions without any particular need[6].

It is also assumed that every natural language contains such signs, which are fully comprehensible for all native speakers of this language, and therefore do not need to be explained. One rejects however the assumption that there are commonly comprehensible artificial language signs, whose explication would be absolutely redundant.

It is assumed that sentence generation rules constitute an idealisation of certain actual human actions on objects in the form of language units. The generating rules should be of the character of ordinary practical rules, which would make it possible for a human being to master a language as a foreign language. If one assumed that generative grammar has nothing to do with the practical conduct of a language user, as it is often claimed by the theoreticians of generativism[7], then the answer to the question whether it is possible to present a description of a natural language with the use of a generative model would have to be "no". A description of a language competence obviously does not include a description of such empirical phenomena, as streaks of occlusal movements of the speaker, or the psychological processes occurring in their brain, nonetheless competence modelling is based on the samples of language performance[8].

It is also assumed that description of the rules of sentence generation should meet the requirements of maximum precision and maximum simplicity. Generative models, in particular those which are an attempt at description of semantic relations between expressions[9], have the flaw of being too general,

[5]Cf. Okham, 1971.

[6]One should also adopt Popper's (1977: 219) methodological postulate of reduction of the number of axioms in science to a system of axioms of maximum universality.

[7]Cf. e.g. Chomsky, 1965; J. D. Fodor, 1977.

[8]Bartsch and Vennemann (1972: 9) accuse Chomsky's theory of being internally inconsistent, claiming that since his model is to be a language competence model, and the competence is in his opinion an inborn feature of the human mind, then it should also have some sort of psychological reality. Chomsky however rejects the feasibility of the competence, maintaining at the same time that it is inborn. Also Wierzbicka (1977) sees Chomsky's refusal to acknowledge the feasibility of competence as resignation from his initial intentions, namely, that a formal theory of language would make it possible to reveal how the human mind operates.

[9]Cf. e.g. the articles in the collection edited by Nawrocka-Fisiak (1976), as well as the works of Dowty (1972) and Ross (1972).

and therefore, the description is anything but precise.

2. In order to determine the semaxntic and syntactic rules of joining lexical units, one needs to dispose of a given set of such units. Items in the dictionaries of natural languages (e.g. in The Dictionary of Polish Language ed. W Doroszyński), only for practical and technical reasons (i.e. for one to be able to find a given item quickly) are identified with graphical words, i.e. streaks of diacritic elements occurring between two subsequent pauses. One cannot however assume a priori that shapes distinguished solely on the basic of graphic criteria have some semantic features. In other words, graphical boundaries between the words do not correspond in any regular way to the boundaries between meaningful units. Therefore, it is usually necessary to distinguish streaks of diacritic elements longer than those resulting from orthographical conventions, and first such streaks – proper lexical units – should be ascribed meaning. Lexical units are therefore such semantically indivisible sets of diacritic elements, which can be automatically reproduced as ready formulas by the speakers in the course of generating a text.

If a hypothetical lexical unit consists of at least two graphical words (segments), then one may find whether such unit is actually indivisible into two units, by making attempt at a general semantic characterisation of the substitutive classes, to which the given words belong. Such an attempt is bound to fail, if the graphical words constitute a closed class, i.e. if they are possible to enumerate only[10].

In the Polish language it is impossible, for example, to determine any such regularities, that verbs from semantic class A imply co-occurrence of preposition x, or that verbs from semantic class B imply co-occurrence of preposition y. Therefore, it is only possible to enumerate the verbs requiring a given preposition. The verbs together with the prepositions constitute inseparable lexical units, cf. the examples of the verb units containing the preposition do [to; up to; as far as; at, etc.][11]: ktoś celuje do kogoś [someone is aiming at someone], ktoś dodzwonił się do kogoś [somebody has reach someone over the phone], ktoś przyzwyczaja się do czegoś [someone gets used to something], ktoś skłania się do czegoś [someone feels inclined to do something], ktoś szykuje się do czegoś [someone is preparing for something],

[10]The presented hypothesis on semantic indivisibility of multi-segment lexical units is based on the theory of language units formulated by Bogusławski (1976a, 1978a, 1978b)

[11]Translator's note: as the entire paper is based on the analysis of the phenomena of the Polish language, the translator did not attempt to provide a similar discussion of the English language, limiting herself to providing a translation of the examples in Polish [in square brackets].

ktoś tęskni do kogoś [someone misses someone], ktoś zapisał się do czegoś [someone signed up to something], ktoś zaprowadził kogoś do kogoś [someone has shown the way to someone to someone][12].

Similarly, adpositional phrases containing more than one preposition should also be considered to be indivisible lexical units, e.g.: bez względu na (coś) [irrespective of (something)], na domiar (czegoś) [in addition to (something)], na mocy (czegoś) [by virtue of (something)], na przekór (czemuś) [in defiance of (something)], na skutek (czegoś) [as a result of something], w miarę (czegoś) [in the course of (something)], w razie (czegoś) [in case of (something)], w związku z (czymś) [in connection with (something)], z uwagi na coś [in view of (something)], as well as conjunctions, e.g.: chyba, że [unless], chyba, żeby [unless], dlatego, że [for this reason], dopóty..., dopóki... [as long as], ilekroć..., tylekroć... [whenever], im..., tym... [the more... the more], mimo, że [despite], podczas gdy [whereas], w miarę jak [while], wprawdzie..., ale [although], zarówno..., jak [both..., as well as...].

An attempt at determination of the rules according to which one would be able to add negation in the Polish language (and in particular the segment nie [no, not]) to the lexical units from various classes, would require that one first distinguishes all such units, in which nie is one of the graphical segments. The following expressions belong to the class of such units: bynajmniej nie [by no means], ktoś nie ma za grosz czegoś [someone has no something], nie tylko..., ale także [not only..., but also...], o mało nie [nearly], omal nie [nearly], zgoła nie [no whatsoever]. The fact that negation is a part of the abovementioned units does not follow from the application of any rules; such units cannot be juxtaposed with sequences without negation. Cf. the abovementioned expressions with the following oppositions: czyta – nie czyta [he is reading – he is not reading], ładny – niełady [pretty – not pretty], wczoraj – nie wczoraj (ale przedwczoraj) [yesterday – not yesterday (but two days ago)], pies – nie pies (lecz kot) [a dog – not a dog (but a cat)].

There is no material difference between the presented examples of multisegment lexical units and the expressions described in Polish philology linguistic literature as phrasemes (idiomatic phrases). Cf. the above examples with such phrasemes as: ktoś dał komuś kosza [someone gave someone the mitten], ktoś rzuca słowa na wiatr [someone speaks idly], ktoś trzyma język za zębami [someone keeps his/her mouth shut], ktoś zmieszał kogoś z błotem [someone hauls someone over the coals], ktoś zrobił kogoś w konia [someone

[12]Expressions ktoś, do kogoś (someone, to someone), are characterised by the valence properties of the listed units. These features are an inseparable part of the description of the units.

fooled someone]. The only difference between one-segment lexical units (graphical words) and the phrasemes is merely of external character. The difference is irrelevant both from the semantic, as well as from the syntactic point of view, and pertains to the continuity of those units: a phraseme is a discontinuous unit, i.e. a sequence of diacritic elements containing pauses.

If one accepts the provided justification of the thesis that lexical units in the Polish language in a prevailing majority of cases do not correspond to the graphical words of this language, then one also needs to assume that a set of lexical units of the Polish language is not fully given. It is necessary to successively discover new units and to register the units already known, although the latter are not always fully realised by the scholars. Without having this task fulfilled, it will not be possible to determine a full set of rules of generating sentences.

3. Classes of lexical units may be described, in particular from the semantic point of view, only in a very approximate manner. All the more that the rules of joining units from different classes may be formulated only with the use of a considerable simplification. With respect to classes of units one may obviously use the symbols of an artificial meta-language, however as long as no analysis of the classes is carried out, there will be no guarantee, that indeed a given class constitutes a not closed set of units, and therefore, that it is subject to general semantic description. If it turned out that description of a class may only consists in enumeration of the units, then consequently, one should ascribe different symbols to particular units. Such enterprise, boiling down to multiplying artificial symbols, would be inconsistent with the explanatory function of science. Therefore, use of artificial meta-language symbols is possible only in instances where there is a considerable probability of a generalised description of the class of the units.

Below are examples of two general rules of generating purpose-communicating sentences in the Polish language:

1. xnv1 + żeby [so that] vinf // ynvpraet;

2. xnv2 + v1inf.

Particular symbols have the following meaning: x – personal noun, y – noun, n – nominativus, v – verb, v1 – action-naming verb, v2 motion-naming verb, inf – infinitivus, praet – praeteritum.

The set introduced by żeby is limited by the following formal limitations ((a) rule): if the expression represented by v refers at the same time to the

expression represented by xn, i.e. if the v and v1 reference are identical, then v has the form of infinitivus and the noun in nominativus is used once only (it is not repeated). If v and v1 do not have the same reference, i.e. if v refers to an expression represented by yn, then v is in the past tense form. If v is used in the first or the second person (both singular or plural), then the morphemes -m, -ś, -śmy, -ście, are added to the conjunction żeby. The schemata provided are written down in a simplified form, i.e. for one-argument predicates. On the basis of the same rules it is possible to construct sentences with more than one-argument predicates.

Below please find sentences exemplifying the application of these rules[13]:

1. Jan wybiegł z mieszkania, żeby zdążyć na pociąg. (John run out of the apartment to make it for the train.) Matka przyniosła kożuch, żeby Piotr nie zmarzł. (Mother brought a coat for Peter not to get cold.) Prokurator wezwał cię, żebyś złożył wyjaśnienia. (The prosecutor summoned you so that you would provide explanations.)

2. Jan skoczył do wody ratować tonącego. (John jumped into the water to save the drowning man.) Jan idzie do biblioteki wypożyczyć książkę. (John is going to the library to borrow a book.)

Although it is justified to assume that the classes of verbs, both the action-naming and motion-naming verbs, can be described generally and not by enumeration of particular units, nonetheless, without an explanation of the notions of action and motion, it will be impossible to provide such a description. All the more that the symbols used for recording the proposed rules are only of auxiliary character, but without an explanation of their meanings they would be nothing but empty shapes.

4. The proposed postulate to minimise the dictionary of the artificial meta-language should be considered in the light of certain conventions of syntactic description, and in particular of the semantic description, popularised in the generative linguistics.

Non-terminal symbols representing syntactic construction classes (e.g. NP, VP) and classes of parts of speech (e.g. N, V) are useful for designation of connection of units or one-segment units[14]. It is impossible to describe multi-segment lexical units in detail, either in terms of the construction, or

[13]These rules are discussed in more detail in: Grochowski, 1980.

[14]Uselessness of the initial generative description symbol of a sentence (S) was pointed out by Chafe (1971: 47). A sentence may be represented with the use of a predicative element together with all of its implied positions.

in the terms of the categories of the parts of speech, cf. e.g. ktoś dał nura [someone dived], ktoś plecie trzy po trzy [someone is talking nonsense], ktoś nie ma za grosz czegoś [someone has no something]. A claim that a given unit may be described with the use of the functional logic terminology, and then assuming that this unit is an n-argument predicate, is an admissible generalisation for all units with the exception of index expressions.

One of the basic hypotheses formulated by the generative semantics, namely that surface structures are generated from deep structures [15], is impossible to accept. The idea of lexical decomposition resulting from this hypothesis, according to which syntactic structures with a given lexeme should be described with the use of abstract atom predicates (written down with the use of capital letters), result in solutions characterised by arbitrariness, imprecision and lack of simplicity. E.g. the common semantic interpretation of the unit kill as derived from CAUSE TO DIE (or CAUSE BECOME NOT ALIVE) is erroneous, since there is no equivalence between the derivative base and this unit. The meaning of the base, unlike the meaning of the unit, does not imply that the persons (the killer and the killed) meet in time and space, and the meaning of the unit does not imply the component of "cause" or the awareness of the perpetrator of the action, which on the other hand follows from the derivative base[16]. Similarly e.g. a sentence On otwiera drzwi [He opens the door] cannot be derived from the base On robi coś z drzwiami w tym celu, żeby były otwarte [He does something to the door so that it would be open], since only the base implies the will and the awareness of the acting person[17].

The mere idea of generating sentences from a semantic base cannot be confirmed by empirical facts[18]. Hypotheses which surface structures have the same deep structure can be justified only on the basis of the semantic analysis of the surface structure. There is no possibility to know the semantic structures deprived of any shape, and shaping such as sequences of artificial language symbols[19] brings an inevitable question as to the meaning of these symbols. Answering this question one cannot escape from

[15] Cf. footnote 9, as well as e.g. Chomsky, 1997: 393

[16] A critical analysis of the descriptions of the expression kill (in the works of generative semantics) is presented i.a. in: Bartsch, Vennemann, 1972, Wierzbicka, 1975; J. D. Fodor 1977.

[17] Cf. more on the topic in: Bogusławski, 1974: 48.

[18] Cf. elaboration on the topic i.a. in: Bogusławski, 1976b: 11.

[19] Artificial semantic meta-language expressions are e.g. Katz's and Fodor's marks and distinguishers, abstract atom predicates of generative semanticists, Melčuk's semantic graphs, Melčuk's and Apresjan's lexical functions.

the use of natural language expressions. Katz (1972: 162) stated that the elements of the artificial language are unambiguous, and the ambiguity of the natural language expressions makes it impossible to use them in semantic interpretation. If one finds correct the view that the artificial language expressions are understandable first after they have been translated into natural language expressions, then one needs to reject Katz's view on the non-ambiguity of artificial symbols. Moreover, there is no basis to ascribe the feature of ambiguity to all natural languages expressions. Separation of multi-segment lexical units makes it possible to eliminate the ambiguity of graphic words to a considerable extent[20].

5. In the light of the above deliberations, the basic question of this paper concerning the usefulness of the artificial meta-language for generative description of natural language should be answered in the following manner:

There is no need to use an artificial meta-language in the process of determination of the rules of generating sentences. It is admissible to use the artificial meta-language symbols only in such cases, when the existence of generalisation can be fully justified. Reaching authentic (and not apparent and proximate) generalisations of semantic facts of a given natural language is indeed a very difficult path, since it requires a full register and full semantic analysis of the lexical units of such natural language.

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# THE EQUIVALENCE OF THE BABIRA (ZAIRE) WORLDVIEW AND DIDACTIC STORY STRUCTURE

Originally published as "Problem odpowiedniości wizji świata i struktury opowieści dydaktycznych u Babira (Zair)," Studia Semiotyczne 12 (1982), 113–124. Translated by Lesław Kawalec.

In semiotic dissertations an issue is often brought up about the relationships between the complex linguistic discourse — a literary text — and the contents which, included in the text, cannot be extracted from the text with the linguistic mechanisms we know. In the case of narrative prose, the issue is all the more (differently) complex than in, say, lyrical work, in that the elements of the piece neither overlap with the elements which are possible to separate by linguistic categories nor are in any obvious ways implied by their combinations. It has not seemed possible so far for any intersentential relationships analysis to be able to find a transition from a linguistic form of narration to the phenomena as complex as character, plot setting etc. Moreover, unlike in other kinds of discourse, in narration we do not only deal with a static structure of a text but also with a deeply-motivated "occurrence" of things; what matters here is not only some fixed relationships between the elements, but also what undergoes transformation as a result of such an "occurrence." The investigation into this sphere of meanings requires a reference to such elements of culture, whose ties with language are not yet clear to us, and which we will term "world outlook," "value system," etc.

Without trying to resolve the many theoretical difficulties that appear in the semiotic analysis of narrative pieces, I should like to share some observations concerning folk stories of an African tribe. These observations

shed new light on a type of relations between narrative prose and the totality of the culture in which it functions.

The present analysis of the structure of the story will include two of its aspects: 1. manners of the categorization of phenomena, proper to stories, 2. a set of rules determining the sequence of the phenomena reported in these stories. The method of investigating the structure will be in a way similar to the one which W. Propp proposed in the *Morphology of the Folktale* (Propp 1968). Like he did, so do we assume a possibility of investigating the structure [of a "folktale"][1] conforming to the rules of the temporal sequence of the events reported in the text. The purposes of this analysis are different, though: if Propp set out to find such a method of investigating the structure of text that would allow a general classification of folktales and generate new prospects for the comparative study of "folktales" coming from different, culturally remote areas, our task has been to investigate the interdependencies between the culture of the society and the tales passed round in that society. So, although in both cases the basis for the investigation of the component parts of the text is the search for general categories that allow the treatment of the plot as a repetitive sequence of elements bound up by stable rules, the way these elements are singled out is different: in his analysis Propp sought to establish the tiniest repetitive elements; we will identify various levels of analysis that allow for the decoding of various mechanisms that are proper to the worldview of the Babira community.

The relations of the time sequence that bind the elements of the plot will be treated as an implication relation in the intentions of the Babira, whereas the same categories of events will be reported in an undistorted order in stories of the same type. The nature of the implication relation will remain indefinite for us, as its analysis goes beyond the possibilities that the material gathered — literary fiction above all — provides us with. Therefore, it will not be subject of inquiry whether the relation is one of cause and effect or of action-reaction, etc., but it will suffice to state that what we are dealing with is possibly a partly unconscious intention of causing a conviction on the part of the reader that some categories of phenomena entail others. Since in an analysis of a story I will rely on repetitive phenomena only and eliminate whatever is random and singular, it ought to be supposed that I will be able to treat the mechanisms thus arising that govern the sequence of categories

[1] Any folk narratives based on literary fiction will be called "stories" here. W. Propp uses the term "skazka" in a very similar meaning, but I prefer to avoid the corresponding word "bajka" for the aassociation with literary fables this word evokes in Polish.

occurring in folk tales as the equivalents of selected mechanisms perceived by the Babira in reality as properties of their culture.

Among the texts collected from the informants who were older than 40 years of age, there is a large selection that enable the recognition of two parts of the structure: the first one represents behaviour contrary to traditional norms; the other — the negative consequences of these actions. In all cases, the consequences of this are borne above all by the person who breaks social rules, with the source of the consequences being supernatural. These could then be interpreted as tokens of the existence of an order other than human, which a human community is subjected to and which the system of behavior norms, passed from one generation to the next, is connected with. These types of stories will be called didactic stories.

The compositional principle signaled here is illustrated by the first part of scheme 1 and the second part of scheme 2. In the story presented in the former, we have to do with a double violation of traditional norms of comportment. First, it is a violation of norm to demand a compensation for something that one has donated to someone. Second, taking possession of an unburied dead human body is an obvious contradiction of the traditional custom which imposes a sequence of a long series of mourning ceremonies, lasting a month or longer in the Babira community. Failure to observe some of these puts the spirit of the dead person in jeopardy as it may wonder and do evil things to the living. The girl's burning is an initial manifestation of this activity. Further symptoms are illustrated by the second part of the scheme where the mushrooms collected at the burial site cannot be cooked as fire opposes the cooking. These mushrooms appear to make the mindless cursing by a woman come literally true and her whole family die (this is suggested by the family raising from the dead after these were thrown away and a magical procedure was performed by the daughter). The actions by the daughter restore the initial order in the second part of the text. As we see, in this story we are dealing with two heterogeneous text parts, only linked by the theme of mushroom. The context seems to imply that the latter is a carrier of the dangerous powers of *Bàgili* (spirits). The first of the two parts has a two-part structure (norm breaking and the consequences). There are two parts too in the structure of the second part, but these are different in that the manifestation of the activity of supernatural powers (*Bàgili*) destroys the existing order and this is opposed by man.

Scheme 1 *Dèmanâga shèyO*

| | |
|---|---|
| 1. A girl called *Dèmanâga shèyO* is weeding her grandmother's field. | the initial equilibrium |
| 2. The girl kills a rat, and it is then abducted by a hawk. The hawk brings down an egg, which the woman breaks. A woman draws water for the girl, the girl gives water to the smiths and extorts an ax from them. She gives the ax to a woodpecker and she wheedles some honey from it. She gives the honey to fishermen and wheedles some fish from them. Then she gives the fish to the harvesters but wangles some goose-grass, which she then gives to shepherds. She manages to get a cow from them and gives it to the mourners but, in exchange, swingles a corpse from them. | a breach of order |
| 3. The corpse makes it impossible for the girl to escape from a burning field. The girl gets burned down alongside the corpse. | the restoration of order |
| 4. Mushrooms grow in the place of incineration. | the connector |
| 5. A woman picks mushrooms, but when she tries to cook them, fire will not ignite. When the woman's sons and then the husband want to fuel the fire, the fire directs verbal abuse at them. The woman curses the husband and sons and they all die. | a breach of order |
| 6. A daughter, living in a different village, throws the mushrooms away and performs a magical procedure. The whole family rise from the dead and the mushroom returns to the place where it once grew. | the restoration of order |

The story presented in scheme 2 has a different composition. The starting point is a breach of order by supernatural powers unknown to man (represented by a bird), which is opposed by an individual. The second part is a breach of the norm and its consequences. Other than disobedience to the husband, which is a breach of traditional norms, we are dealing here with a breach of a traditional ban on women to eat meat and fatty foods until they get pregnant for the first time. It is claimed that failure to observe this injunction puts man in danger of eating human flesh and thus becoming indebted to the *Balèmba* — people who are in touch with the ghosts and "eat human flesh." The repayment of this debt means one has to kill someone from one's local tribal group, and thus it poses a danger to the community.

Scheme 2 *Mbôho nà mbòlo* (A man and a bird)

| | |
|---|---|
| 1. A man plows a field | initial equilibrium |
| 2. A bird arrives whose chirping makes grass grow again. The field overgrows, man plows it anew, the bird comes and the field overgrows again. | breach of order |
| 3. The man kills the bird. | restoration of order |
| 4. He brings the bird to his wife, has it cooked but forbids her to taste the sauce. | establishment of a ban |
| 5. The wife tastes the sauce. | breach of order |
| 6. The bird is reborn and flies away.* | restoration of order |

The greatest element of the structure of the story, useful for this analysis, is the sequence of the two parts that are about the breach of the order and its restoration (if not objective, then at least subjective: the guilty bearing the consequences of their actions, and either being physically annihilated or being taught a lesson that prevents the error recurring in the future). Such a two-part sequence can be an independent story or — as in the schemes presented — can be linked with a second part, also resting on the same principle. In a large number of cases, a regularity can be observed that is illustrated in Table 1:

| | Breach of order | Restoration of order |
|---|---|---|
| A | By an individual or (exceptionally) by a group | By supernatural powers |
| B | By supernatural powers | By an individual or group |

Without accounting for all possible combinations, this table rather generally delineates the sphere of the Babira culture which the stories thus composed pertain to: their main point is to tie human actions to the supernatural world order. The symmetry of this scheme, and actually the regularity it expresses, suggest there being an opposition in the Babira world outlook between man (or group) on the one hand, and what has here been termed "supernatural powers," on the other. The activity of the two poles is bidirectional, with the ideal state, as perceived by the community, being some sort of equilibrium, expressed in a normal unshaken course of life. The Babira beliefs imply that this equilibrium does not come about by itself. Its

attainment requires, on the one hand, the performance of a series of ritual procedures seeking the favors of the supernatural powers or those that would counteract these powers, and on the other, refraining from any activities that might weaken the group or be a pretext for activities to surface that would be disadvantageous for the group. One of the very important elements of equilibrium is a social order, that is, in the first place the observance of the rules of behavior. A breach of an injunction is a factor that destroys the order — anyway it is a potential breach of the state that is beneficial for people and thus a dangerous factor. A perturbation of the equilibrium can also be a manifestation of the activity of "supernatural powers," though, rather than just some mistakes in human comportment. The group then tries to counteract the breach of equilibrium by all available means. In the stories, the group always comes out victorious from such situations.

The vague term "supernatural powers" is used here on purpose as these are rather indefinite in the Babira stories. In the text demonstrated in Scheme 1, the word *ngili* does not appear. Still, as far as I know, the word for the mushroom, *sèngèlèbe*, has no particular meaning in the Bira culture and, taken out of context, the word simply means a small mushroom with a thin stem, occurring in groups and often eaten; it brings no associations with any supernatural powers. It is only the presence of the corpse that has not been buried along with the accepted ritual that justifies the role which this mushroom plays in the story, and then only very general knowledge of the Babira beliefs enables one to understand it. Also, in the many versions of the story of the bird and the farmer, the bird is called by the very general term *mbòlo* (bird) or, in one instance, the name of the species (*makètiki*), and its special meaning in the text does not have any clear cultural rationale. The supernatural powers may thus be represented in stories in an allegorical manner by various unusual phenomena, most commonly destructive. It is possible, though, to roughly establish a domain in the Bira culture that would generally correspond to "supernatural powers." Mbali (*mbàlè*), the transcendental Creator, is a power of the sort for sure; in ways only he understands, he intervenes in the life of the group. Others include *Bàgili* (spirits), *leha cal0* (dusk), being the moment these become active, as well as *lèmbà*, which can directly be interpreted as a manifestation of their activity.

The *Bàgili* appear in numerous stories, and they take a special place in these. Their attributes are the same as the interviewed Babira ascribe to *Balèmbà*. In the first place, they devour people; they might be killed, through which we tend to attribute a material nature to them.[2] It is possible to

[2]The nature of both these characters and any other spirits is indefinite and it is

distinguish between two separate categories. The first of these comprises the figures called *nka gili* (wolverine);[3] werewolves are not humans, but they can take human shapes. The other category refers to human characters that "eat people;" they are usually akin or related to their victims, and although the word *lèmbà* never appears in these stories, apparently it is *lèmbà* that seems to be the right domain for their activity. Different interpretations of the two categories of *Bàgili* are clearly reflected in the structure of the stories. An intervention of a werewolf is always preceded by the future victim violating the laws that govern the human and supernatural world. In the fight against werewolves, human beings are helpless unless assisted by animals and other non-human forces. It is not so with the characters that practice *lèmbà:* their intervention does not imply any guilt on the part of the victim, and once their activity is detected, they are punished with death by the family that has been harmed.

As we can see, in the Babira stories one can see a reflection of the belief in indefinite supernatural powers, which in some cases we can relate to the known categories of the supernatural powers occurring in the Babira culture (*Bàgili*, *lèmbà* and black magic). However, we do not find a reflection of a special place that the spirits of the deceased occupy in the beliefs of the Babira, and we find no rituals meant to enlist their favors. For obvious reasons, the belief in the Sakana is not reflected in those stories either: his cult only brought together adult males in some secret societies.

As noted above, the table falls short of mentioning all possible combinations that occur in the stories discussed here. Moreover, four categories have been introduced into it: two kinds of actions and two kinds of active subjects seem — in the context of the deliberations on the *Bàgili* — insufficient to fully describe the structure of the story. We have noticed the mechanisms which, in a more detailed way, regulate the sequence of events

rather likely that the death of *nka gili* is just a symbolic representation of the total victory over an evil spirit (werewolf) and cannot be treated as a token of their materiality. At any rate, there are no grounds for a belief that the Babira make a distinction between the material and the spiritual in the same ways as is done in the Europeans culture.

[3]Making a terminological distinction between various kinds of *Bàgili,* introduced to achieve a better clarity of discourse, might be misleading as it markedly separates what in the Babira language is either vaguely distinct or not distinct at all. The term *ngili* (plural: *Bàgili*) can mean a spirit of an ancestor as well as any evil spirit, but also someone practising *lèmbà.* It can also refer to other non-natural phenomena: in one story a gluttonous woman has a tail growing: thus she becomes *ngili*, but then becomes human again after her tail is cut.

that are reported in the texts and thus determine the necessary relations in the stories' represented world. Considering the issue of the compatibility of mechanisms noticed in the stories with the world outlook proper to the Babira culture, no general thought was devoted as to what the texts investigated mean within the culture where they are passed on and how the transfer of meanings is possible within them; it is the (even approximate) answer to these questions, though, that ought to give us a key to a fuller elucidation of the issues discussed here.

In the texts investigated, like in any literary texts, the original code is the natural code of the language in which the texts are written, i.e. Kibira. From the standpoint that is of interest to us, we can assume, though thus simplifying the interpretative mechanism, that the original meaning of the text is some plot — a sequence of interrelated events concerning a group of characters. A number of functions that the story performs seem to correspond to this original interpretative level: making the evenings spent around bonfires more pleasant, calming down children before sleep, etc. These functions imply one of the most basic requirements put before stories: above all, they need to be entertaining and grasp the attention of the listeners. The storyteller tries to satisfy this requirement by means of some stylistic procedures, dramatizing the text, voice modulation, gestures, etc. Depending on the resourcefulness of the speaker, these procedures, which can alter each time the story is told, are to a large extent improvised, but some of them can be permanently pegged to some plots. In the transmission of the story, their role is *ad hoc* and they are usually forgotten in the course of the story's development. What very seldom changes is the essential scheme of the plot, and this is the main addressee of the requirement of compliance with tradition. It perpetuates in the memory of the listeners by the very fact of its immutability in the many variants of the story man encounters in their lifetime. It also contains the essential didactic message, which the listener may generalize to a larger or smaller extent, depending on how sophisticated they are, and treat as a specific occurrence, typical occurrence or a message concerning the unchanging and necessary mechanisms that govern the world. The way the text is received may then be about the perception of single facts, unrelated to one another or perceiving (through individual facts) the whole categories of phenomena, associated with one another by some lasting rules. In the case of the story presented in scheme 2, the events making up the second part of the plot may be comprehended at four levels:

1. behavioral (tasting the sauce — the flight of the bird),

2. axiological-particular (disobedience to husband — negative impact of supernatural powers),

3. axiological-generalized (breach of norm — negative consequences),

4. cosmological (breaking-restoring the equilibrium).

The four levels of comprehension correspond to four detectable ways of generalizing the mechanism governing the phenomena presented in the text. In reality, there can be more because (disregarding the possibility of bequeathing a completely different sense on the events) there are intermediate levels between the levels 1 and 2, 2 and 3, etc. It is also extremely difficult to determine the part of consciousness in the perception of the relationships between the events reported in the text. Probably, conscious reception rarely goes above level 2, with level 4 attainable only intuitively. Along level 2, in each case the sense of the story is explained by the narrators, who were asked to do so. Importantly, the story performs a didactic function only when level 2 or higher is achieved by the listener at least intuitively. However, it is not level 2 but levels 3 and 4 that add up to form the rules to which the way of associating the events in all the stories presented here as didactic is subjected.

So far I have used the level 4 of generalization, the highest one perceptible to us. This enabled me to demonstrate the compatibility of the mechanisms that govern the story with the mechanisms we find in the worldview characteristic of the traditional Babira culture. One could expect that other, more detailed mechanisms will also be subordinated to the laws pertinent not only to the very story but also to the worldview that the Babira represented or sought to transmit to the addressees: women, children, youths. The following deliberations will focus on the level 3 of generalization as it seems useful for the establishment of the storys' structure elements of interest to us.

When we state that the comprehension of the text does not end with the *signifié* of the natural linguistic code, but that a given set of *signifiés* means something more than a simple sum total of the meanings of words and sentences would indicate (refers to some categories of phenomena), and when we also seek permanent relationships between those "second order" meanings, we assume the existence of a secondary code in didactic stories, where interesting contents are inscribed that have a vital cultural significance. The following then sets out to analyze this code, treating it as a peculiar "language" of the didactic stories.

A contrastive analysis of all texts of interest here allows for the determining of the following categories of phenomena, which are at the same time a set of elements of a hypothetical "language:"

A — human actions incompatible with norms (*kèzèrà*, *nginyo*, other behavior condemned by the community);

B — defensive actions undertaken, also with allies;[4]

C — the activities of *Bàgili,* excluding *lèmbà* (in the stories, these are always directed against people);

D — *lèmbà* and black magic;

E — the activity of supernatural powers other than *Bàgili* (in stories — always targeting people).

The rules governing the association of these elements of "language" into sentences may be understood as the aforementioned rules of temporal sequence (in this attempt at their formalization, the relation of temporal sequence is represented by the symbol 'n'):

1. $\Pi_A\ [A\ n\ (B \vee C \vee E)]$
2. $(\overline{A\ n\ E}) \rightarrow\ (E\ n\ B)$
3. $\Pi_C\ (C\ n\ B)$
4. $\Pi_D\ (D\ n\ B)$

To express the relationship of temporal sequence in full sentences, we can say that:

1. every breach of norm entails a counteraction of people or the activity of supernatural powers (but not *lèmbà*) targeting people;
2. unless the activity of supernatural powers against people is caused by these people breaking norms, the people oppose this activity;
3. people oppose every activity of *Bàgili* that adversely targets people;
4. every activity that may be interpreted as *lèmbà* or black magic entails a human defensive reaction.

[4]In several cases, man's ally is a toad, in one case — an indefinite character living in a *ngili's* cottage. A toad is the only personified animal that I have encountered in older-generation didactic stories. Its role is slightly puzzling in didactic stories as the way it acts is characteristic of humorous stories, structurally different. An ally appears in the sequence *A n B n C* only.

It needs to be stressed that the sentences by means of which these rules have been formulated are also statements that are fully in line with our knowledge of the Babira culture. The "language" of the stories, based on the five categories of phenomena and four rules of their association discussed here, is very limited and allows the formulation of just 5 sensible sentences (in terms of code). The "sentences" are also fully compatible with what is known about the mindset characteristic of the Babira culture:

1. *A n B* (breaking a norm entails a defensive reaction by people);
2. *A n C n B* (breaking a norm entails the intervention of the *Bàgili,* which in turn causes a defensive reaction of the people and their allies);
3. *A n E* (breaking a norm entails a reaction by unidentified supernatural powers);
4. *F n B* (the intervention of unidentified supernatural powers entails a defensive reaction by people);
5. *D n B* (symptoms of *lèmbà* entail a human defensive reaction).

All the five combinations of elements are indeed found in the material collected. So, these indeed make up the list of really occurring combinations, repeated in the didactic stories passed down to us by some Babira elderly, if we allow these combinations to merge into sentences consisting of "coordinate clauses." It then takes a connector ("conjunction") — an event that belongs to none of the categories that have been introduced here. In the story presented in Scheme 1, we have to make do with a combination (*A n E*) + (*E n B*), and in the story presented in Scheme 2 — (*E n B*) + (*A n E*). Moreover, at the beginning of each story, an initial equilibrium is presented before it is shaken by one of the factors *A*, *C*, *D* or *E*.

If we compare the five possible combinations of elements ("sentences" that are sensible from the perspective of the rules governing the secondary code investigated here) with table 1, we will see that it has been enriched by making the category of "supernatural powers" more detailed and that two combinations of elements have been introduced, which the table did not include: *A n B* (breaking a norm entails a defensive reaction by people) and the three-part construct *A n C n B* (breaking a norm entails the intervention of the *Bàgili,* which in turn causes a defensive reaction of the people and their allies). The table thus supplemented looks like this:

Table 2

| Breach of equilibrium | Restoration of equilibrium |
|---|---|
| Breach of norm by man ↓ → | Intervention by non-human powers |
| *Bàgili* intervention → | Defensive action by humans and their allies |
| *Lèmbà* and black magic → | |
| Intervention by unidentified non-human powers → | |

As noted above, some elements of the worldview never appear in folktales. The relationship of the world represented in the stories, to the world outlook characteristic of the Babira culture cannot be reduced to the former being fragmentary in relation to the latter. The model of the world, hidden behind the mechanisms ruling the stories is not only a simplified model of the real world, but it constitutes a kind of its transformation, apparently resulting from the basic didactic function these stories serve. The transformation is visible if we reckon with the second rather than the third level of text comprehension introduced here. In most general terms, it consists in expanding the scope of operation of the mechanisms that are really present in the Babira cosmology. The Babira commonly believe in a supernatural sanction regarding some of the norms only (prohibition to kill or even touch some animals). This sanction, however, is absent from the ban on girls and young women eating meat. The Babira asked about the consequences of breaking the ban, were mainly mentioning the negative social effects (a depreciation of the girl, problems getting her a husband, sending her back to the family and a demand for the marital payment to be refunded if the girl was already in her husband's home). A rational justification for the ban was that the woman who cannot resist the temptation to eat meat not meant for her, is more at risk of accidentally eating human flesh than others, which always entails her being involved with *Balèmbà* and the group being put at risk. Only one of the texts I know of reflects this justification, but only in very general terms: a woman eats meat that was not meant for her; so a tail grows from her and, as a consequence of that according to the narrator, she becomes *ngili* (again, to the Babira *lèmbà* supposedly is associated with *Bàgili* even though it is not treated as a direct consequence of their activity). In all remaining texts where eating meat in contradiction to accepted norms is reported, we have to make do with a number of supernatural sanctions, unrelated to *lèmbà*.

Indeed, what is relevant in the stories is not some particular punishment for some particular offense, but the very association of a norm (whatever it is) with any — but always severe — punishment. The norm is an absolute value here. There are texts that report highly deplorable consequences of breaking norms that are unknown in the present Babira culture, such as a ban on addressing a man by his first name which, moreover,

would apply to wives rather than mothers or sisters.

Evidently, the first two of the story comprehension levels identified here need not — even if they may — lead to conclusions compatible with the worldview characteristic for the Babira culture, but the second comprehension level usually conforms to the intention of the storyteller and makes it possible for the story to perform the basic didactic function at least in those cases where the norm, broken in the story, is true in the community where the text is circulated. The basic didactic function is about the perpetuation in the psyche of the listener of the attitude of conforming to norms by way of these being linked to dangerous sanctions, even if those are not recognized by the narrators themselves. In the semantic layer, the stories are mainly addressed to children and youths, i.e. to this part of the community which has not been initiated into the arcana that only adult males are familiar with.

Behind this universally accessible layer of meaning, there is another one, though, which perhaps even the narrators can hardly be aware of. It is formed by the code of the didactic stories which has been discovered to contain within itself a model of the world; more than that, it constitutes such a model, coherent within itself, simplified but corroborated by ethnographers' attempts to systematize the Babira beliefs and by the information gathered by miself.[5] It contains a general outline of the relations in which a human individual and a social group are implicated.

The manner of interpretation of Babira didactic stories does not account for the totality of the meanings found in the texts of interest to us. The paper focused on an attempt to detect the meanings contained in a narrowly understood structure of the text, whose definition was provided at the beginning of the paper. Investigation of the symbols included in the texts and the analysis of other possible secondary codes they contain, not necessarily based on the temporal sequence relation, would require separate studies.

The above analysis concerned the texts of didactic stories only — those whose connection with the official worldview is the strongest. However, it is possible to perform such an operation on humorous texts, as well. The categories subjected to constant rules of temporal sequence will be different then, and so will be the secondary code and interpretations. The ties that

[5]The literature on the Babira is rather scarce. Constance Marie (1947) in *Babira: Essai d'Adaptation* and H. van Geluwe (1956) in *Les Bira et les peuples limitrophes* touch upon the issues of their beliefs. I have also used the unpublished typescript of Sister Carmela, titled *La vie su Bira.*

bring together humorous stories with the totality of the culture will be more complex and ambiguous then, but even in that case, the description of the secondary code of the story can be made by means of a set of sentences taken from the Babira culture.

It needs to be realized, though, that the reconstruction of the code reflecting the elements of the worldview is relatively easy in the case of a closed landlocked tribal culture, betraying a high degree of integration (this analysis has been based on accounts coming from people aged 40 or above, that is, still deeply involved in traditional culture). This task would be very difficult, and maybe unfeasible, when it comes to cultures that are open and dynamic, where literary tradition is far more complex and reflects a number of totally different, highly individualized worldviews.

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# SYMBOL

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The word "symbol" (Gr. *σύμβολον*, Lat. *symbolum*) has many senses. Originally, symbol was understood as an identification sign, especially one created from two pieces of one object (e.g. a ring) divided with this purpose in view. Later, it could refer to any type of signitive objects — Goclenius writes: "Symbola accipiuntur pro indiciis significantibus animo aliquid, ut loquuntur, intimantibus."[1] The term "symbol" also covered certain legal acts, agreements and ritual professions of faith. This sense has survived till today in such Polish names as "symbol apostolski" (*the Apostoles' Creed*; Lat. *Symbolum Apostolorum*), "symbol nicejski" (*the Nicene Creed*; Lat. *Symbolum Nicaenum*), "symbol trydencki" (*the Trent Creed*; Lat. *Symbolum Tridentinum*).[2] Also, contemporary semiotics offers various conceptions of symbol. There are logical and mathematical symbols in science, quality symbols in technology and industry, religious symbols, symbols in poetry and art, symbols and symbolism in night dreams. A number one is the symbol of truth in Boolean algebra, and the symbol of an object's high quality in technology. However, it is also said that the Cross of Lorraine became the symbol of the Resistance in France, while a skeleton has been a symbol of death for ages. There are symbols that are emotionally neutral (introduced

[1] *Lexicon Philosophicum Graecum*, Marchioburgi 1615: 215.

[2] The relationship between this sense of the term "symbol" and the sense we shall discuss further in the considerations to follow, was observed by C. G. Jung who wrote: "Ein solches Breviarium fidei führt von der Psychologie her betrachtet mit Recht den Namen ŏSymbolumŕ, denn es ist ein symbolischer Ausdruck ein anthropomorphes Bild gesetzt für einen nicht rational [...] zu deutenden transzendenten Tatbestand [...]" (1949: 364)

in order to improve certain cognitive operations, for better communication of information, simpler reasoning, etc.) but also such that are used, while designating objects, to communicate certain values and evoke axiological experiences. What they all have in common is that they were designed or agreed to have a specific semantic function, that is to indicate or refer, in a more or less specific manner, to other objects. Such a broad understanding of symbol, in which it is difficult to differentiate symbols from other signs, is used by E. Cassirer. He names symbol "a clue to the nature of men," since "in language, in religion, in art, in science, man can do no more than to build up his own universe — a symbolic universe that enables him to understand and interpret, to articulate and organize, to synthesize and universalize his human experience" (Cassirer, 1963: 23, 221).

Cassirer does not define the sense of the term "symbol", however, on the basis of his argumentation it is visible that he tends to call "symbol" any signitive way of referring to reality by the subject (Cassirer, 1922).

Also Ch. W. Morris understands symbol in a broad sense in *Signs, language and behavior* (1946), but attempts to elaborate on the notion on the grounds of his general pragmatic — behavioral theory of signs. It is worth noticing here that he himself changes the scope of the term "symbol" that he established in an earlier work from 1938, i.e. *Foundations of the theory of signs*. (The two works are quoted here as *Writings* from the volume *Writings on the general theory of signs*). In the earlier work, Morris, while differentiating indexical signs and characterizing signs on the grounds of semantics, included symbols NEXT TO iconic signs in the latter group. Thus, he regarded them as signs denoting the referent on the basis of semantic convention and not, as in the case of iconic signs, on the basis of properties that an object needs to have to be denoted by such signs. Therefore, discussing symbols, Morris meant certain conventional linguistic signs.[3] Whereas in his work from 1946, he divides all signs into signals and symbols and broadens the sense of this notion by regarding as symbols all linguistic and non-linguistic (i.e. pre- and post-linguistic) denotative signs

[3]Cf. Morris 1938: 37. This work by Morris is, to some extent, a continuation of semiotic research of Ch. S. Peirce who also juxtaposes iconic and conventional signs, and characterizes symbol as "a sign which refers to the object that it denotes by virtue of a law, usually an association of general ideas, which operates to cause the Symbol to be interpreted as referring to that Object" (Peirce 1960, §249, 1960: 143). And adds: "A Symbol is a Representamen, whose Representative character consists precisely in its being a rule that will determine its Interpretant. All words, sentences, books, and other conventional signs are symbols" (1960: 165). Cf. also "To Lady Welby on signs and the categories" (Peirce 1958: 228).

that are not signals.[4]

However, there is today a tendency in semiotics, based on ordinary semantic intuitions, to narrow the scope of the term "symbol," and to juxtapose it with other types of signitive entities. This is also the line of considerations in the present article which is aimed at elaborating on two separate, but important from the point of view of contemporary semiotics, senses of the term "symbol," and which focuses especially on the second one. In order to characterize these senses it is necessary to ascertain data concerning the notion of sign. The term "sign" is used either in a narrow or broad sense. A sign in a broad sense is any object perceived by somebody which can stand for each person something different than itself but which semantically indicates or denotes this something. What is a sign, thus understood, can be a certain state of affairs or a process signaling certain information (e.g. an index), as well as certain objects indicating other objects. Signs in this broad sense, let's call them $Z(\mathrm{I})$, divide into denotative signs and informative signs. Denotative signs (that is certain gestures, voices, iconic signs, symbols) considered in separation are more or less indeterminate, and have a denotative function only in a certain structure (i.e. a situational or verbal context). Such structures (that is indices, signals, maps, sentences, etc.) can be called informative signs. However, in a narrow sense, the term "sign", $Z(\mathrm{II})$, refers only to what creates the class of denotative signs in a broad understanding of $Z(\mathrm{I})$, that is to certain objects whose sense can stand for other objects. Below I shall use the narrow understanding of the term "sign" to introduce a preliminary distinction between a simple and a complex denotation of a sign. Sign $Z$ in semantic structure $\Sigma$ has a simple denotation when it denotes an object (or objects) that is not a signitive element in this structure. The semantic structure is an ordered set which is comprised of: sign $Z$ in a particular sense, object or objects $O$, relation of indication $\rightarrow : \Sigma = F(Z, O, \rightarrow)$. Thus, in the case of a simple denotation, $Z$ indicates $O$, but $O$ does not indicate anything different than itself. In this understanding, even when $O$ belongs to objects of sign nature, it does not indicate anything different than itself in the semantic structure with a simple denotation. (It does not, of course, exclude the polysemy of sign $Z$ which in another sense can have a different simple or complex denotation). On the other hand, a complex denotation is characteristic of sign $Z$ used

[4]This behavioral definition of sign reads: "Where an organism provides itself with a sign which is a substitute for the control of its behavior for another sign signifying what the sign for which it is a substitute signifies then this sign is a SYMBOL [...] When this is not the case, then the sign is a SIGNAL (Morris 1938: 100).

in semantic structure $\Sigma$ when sign $Z$ in a particular sense denotes object $P$ which is different than $Z$ but which has a signitive function and indicates another (different than itself) object or objects $P'$, which are then indirectly denoted by $S$. The restriction that object $P$ is not identical with $S$ excludes linguistic words used in material supposition as signs of themselves from the scope of signs with a complex denotation, and thus excludes e.g. the case when the word *dog* denotes the name *dog* which in turn denotes the animal.

In a certain conception of symbol, a symbol can be the first element of a complex denotation of sign $Z$, that is, it can be the object which being denoted in formal supposition by $Z$ itself has the semantic function of indicating another object, which is then INDIRECTLY denoted by $Z$. It has been stated that a symbol CAN BE, and not that it IS, denoted by $Z$, in order not to exclude situations when an object, which is in principle asemantic, receives the function of indicating another object, for example when somebody looking at a winter landscape "sees" it as a symbol of death. However, from the point of view of intersubjective semiotic research, what is of interest here are symbols expressed by means of verbal or iconic signs with a complex denotation.

Before we focus on discussing the notion of symbol in which a symbol can be a signitive element of a complex denotation of a sign, first we need to discuss the understanding of "symbol" as a certain type of sign with a simple denotation. This understanding is characteristic of such conceptions of sign in which "symbol" stands for certain simple conventional signs used in science and technology. In such a use, symbols are simple expressions in formal language of certain sciences (e.g. logics or mathematics), and conventional signs that denote norms or qualities of products of technology. A set of this type of signs, called symbolics, and rules for operating signs, constitute the grammar of a particular symbolic language, the "ars characteristica seu symbolica" as Leibniz (1903: 521) called it when he planned, inspired by the language of algebra, to create a universal precise symbolic language for science. This idea of Leibniz is partly carried out today by different systems of mathematical logics, whose formal language, which consists of stable symbols (functors and quantifiers) and variable (sentence and name) symbols and rules for operating them, finds wide application in various semantic models.

However, there is yet another understanding of symbol, which is closer to both common intuitions and intuitions of the representatives of humanities, which, as highlighted earlier, can be characterized by means of the conception of a complex denotation discussed above.

This conception will serve to analyze the question about the conditions that object $O$ denoted in semantic structure $\Sigma$ by sign $Z$ needs to meet in order to itself indicate, as SYMBOL $S$, another object different than itself called a symbolized object $O(s)$. For a characteristic feature of object $O$ in this case is something that can be called its duality: it can be asemantic or semantic (when it is a symbol).

What decides if $O$ is semantic as a symbol? In order to answer this question, we need to analyze a few examples from different areas of culture which deal with objects (usually called symbols) that are able to have a signitive function of indicating another object in systems with a complex denotation, not assessing whether every such object will be included in the set of symbols after the notion has been defined. In Pythagorean philosophy, the tetractys, that is an ordered set of the four first natural numbers (1, 2, 3, 4) is a symbol of perfection, and the number 10, that is the sum of these numbers, a symbol of the universe. In religious symbolism, a snake biting its own tail, denoted by an iconic sign, is regarded as a symbol of eternity. A unicorn is a symbol of chastity, and in Christian iconography is regarded as a symbol of the Virgin-Mother; a peacock in this iconography symbolizes immortality, and in Islam it is a symbol of the sun in zenith. A scepter symbolizes royal power, and a trowel is a symbol of freemasonry. In all of these examples a symbol is an object which can be denoted by a (verbal or iconic) sign, and simultaneously itself indicates another object called a symbolized object, becoming a specific type of sign.[5] What follows is that sign $Z$ in a structure with a complex denotation, despite the literal meaning thanks to which it denotes $O$, also has another, indirect meaning which indirectly denotes an object symbolized by $O$. Whereas symbol in this understanding differs from other signs in the previously mentioned duality, i.e. that it is, by nature, a certain asemantic, real or ideal, object but at the same time has the semantic function of denoting another object. This property of having the semantic function cannot be, according to some researchers, a result of convention, but has to always be sufficiently conditioned by a certain analogy between a symbol and a symbolized object. Such a stance

[5]Some researchers, e.g. M. Wallis (1970: 526), claim that symbols are not signs ("Symbols are no signs"). It results from a considerable narrowing of the notion of sign. I rather opt for the stance that all denoting entities, including symbols, can be regarded as signs. This stance is strongly represented by e.g. Ricoeur (1959: 64) who wrote: "Que les symboles soient des signes, cela est certain. [...] sont des éléments de l'univers ou de choses [...]. Il en est de même du rêve.

is taken by H. Delacroix[6] and M. Wallis[7] who also narrows the notion of symbol to the notion of a sensually perceptible object.

By agreeing with the thesis that the subject who spontaneously refers to an object as a symbol, and who thus creates or uses the symbol, in many cases, does so on the basis of a visible analogy between properties of the symbolizing object and properties of the symbolized object, I do not think that: firstly, it is the only possible relation between the objects which creates conditions referring to one of the objects as a symbol of the other — unless a very general and not sufficiently precise sense of the word "analogy" is applied. This is what e.g. Ricoeur does by referring to M. Blondel's opinion that "les analogies se fondent moins sur des ressemblances notionnelles (similitudines) que sur une stimulation intérieure, sur une sollicitation assimilative (intentio ad assimilationem)," and claims that it is not possible to "objectiver la relation analogique qui lie le sens second (symbolique) au sens premier (littéral) (...) le symbole est le mouvement même du sens primaire qui nous fait participer au sens latent et ainsi nous assimile au symbolisé sans que nous puissions dominer intellectuellement la similitude" (Ricoeur, 1959: 65).

What can be seen in Ricoeur's vivid but not sufficiently precise opinion is the observed difficulty of reducing the relation between a symbol and the symbolized to the relation of analogy in the common sense of the term. The term is also avoided by D. Durand (1963: 20) who discusses the relation that conditions symbolizing and writes: "[...] le symbole présuppose homogénéité du signifiant et du signifié au sein d'un dynamisme organisateur,"[8] though the term "homogénéité" may also be misleading since symbols very often indicate objects belonging to a principally different ontic category (e.g. a concrete empirical object symbolizes a certain ideal or spiritual entity) or certain non-specified areas.[9]

Secondly, I believe that defining this relation is only a basis for establish-

[6]"Il me semble que symbole, au sens moderne emporte toujours l'idée d'une correspondance analogique naturelle et non conventionnelle entre la forme concrète et l'objet qu'elle symbolise" (Lalande, 1960: 1079).

[7]"By a (sic!) 'symbol' I understand a sensually perceptible object, produced or used by a living being or not, which is able to evoke in a recipient a thought neither on the basis of resemblance (...) nor on the basis of a custom or convention (...) but on the basis of some analogy between it and the object symbolized" (Wallis, 1970: 526).

[8]The quotation comes from *Dictionnaire des symboles. Mythes, rêves, coutumes, gestes, formes, figures, couleurs, nombres* (1969), p. XV. The dictionary is also a source of some examples.

[9]What is meant here is not polysemy characteristic of many symbols, but principal non-specification of a symbolic meaning.

ing a convention (in the sense of usus, agreement or decision) which makes it inevitable for a symbol to have an intersubjectively signitive character. Lack of recognition for such a type of convention sometimes makes it impossible to understand symbols used in other epochs or other cultures. This, of course, does not exclude the previously mentioned subjective situations in which certain objects are spontaneously referred to or created as symbols that show other ontic areas. Such situations are often motivated by the search for expression when conceptually precise reference is not possible. In such situations object $O$ is a symbol when it shows and indicates, through its properties to the subject of cognition, a certain existential area that is especially significant in the subject's individual experience. Furthermore, mutuality or similarity of certain human experiences results in that symbols thus understood may appear spontaneously in subjective operations of many individuals, or may be shared by individuals (e.g. in poetry or a painting[10]), and become intuitively understandable. However, they may be so hermetic, so linked to somebody's unique experience, that even when shared with other individuals they are not understandable or regarded as asemantic, and thus lose their symbolic reference. However, if they become components of the information system, they lose their spontaneous nature and conventionality on the grounds of usus.

When Wallis juxtaposed symbols and conventional signs, his intention was probably to exclude objects that have a signitive function assigned not on the basis of analogy, but an arbitrary, randomly motivated decisions (as in the case of emblems or arbitrarily established state emblems), from the scope of the notion of sign. An example of a signitive object present in the semantic structure with a complex denotation which is not a symbol, could be the fish as a recognition sign for Christians because the sign was created on the basis of a convention which made use of the fact that the Greek name *ίχΘύς*, *ichthys* 'fish', is an acronym for *Ίησούς Χριστός, Θεού Υίός, Σωτήρ*, *Iēsous Christos, Theou Yios, Sōtēr* 'Jesus Christ, God's Son, Savior'. In other cases of a complex denotation, the fish is, on the basis of a convention which makes use of an alleged analogy, a signitive sign symbolizing water, fertility or wisdom (Chevalier 1969: V). Thus, Wallis's claim about an unconventional nature of symbols most probably is based on a false identity between conventionality and arbitrariness. Conventions which make some objects function as symbols are not arbitrary, but originate

[10]The phenomenology of this type of symbols is in the interest of G. Bachelard (cf. *La poétique de la rêverie*, or *La flamme d'une chandelle*, or *La poétique de l'espace* and other).

from alleged (though difficult to define) kinship between a symbol and the symbolized.

Also, I do not think that it is necessary to define symbol as a sensually perceptible object. The sensually perceptible are symbolic SIGNS, and concretizations of many general objects, but what often, though not always, functions as a symbol is not the concretization but the idea (a white dove in general is a symbol for peace or, in another convention, the Holy Spirit, but not this or that particular representative of the species). Also, ideal objects are symbols which are sensually imperceptible by nature, e.g. the previously mentioned number ten — a Pythagorean symbol of the universe.

Another tendency in defining the notion of symbol focuses on the second element of the relation, that is on the symbolized object, and highlights either that it is always an object which is beyond perception or that it belongs to a transcendental, unknown, and clearly unconscious area.[11]

The former idea seems to be wrong since it would involve excluding many symbolizing objects from the scope of the notion of symbol, e.g. in the religious iconography of saints (the eagle as a symbol of saint John the Evangelist) or star constellations in astrological symbolism. The latter idea, though a result of an interesting analysis of functions of unconsciousness of the human mind which operates with symbols when it comes to conceptually vague or hidden matters, would also involve excluding many signitive objects commonly recognizable as symbols that indicate things available for cognition, from the scope of the notion of symbol, e.g. symbols of virtues and vices known from medieval iconography. However, it seems that symbolized objects are usually characterized by certain axiological properties, they are important, emotionally unneutral, or cognitively significant for the creator or user of the symbol, which in turn is reflected in properties of symbols as means of expression, and in their affective dynamism.[12]

Thus, perhaps, the closest to common intuitions would be to understand symbol as an asemantic object in one of its aspects, and in the other aspect — as an object with the semantic function of the type that makes the object an expressive sign that denotes another axiologically qualified object thanks to their kinship. However, when it comes to a precise definition or an intersubjective use of a symbol, then the indication of another object occurs in the system of a complex denotation on the basis of a convention which is not random but motivated by an impression of special kinship between certain properties of a symbol and the properties of the symbolized.

[11] This approach is represented by C. G. Jung (1923: 601ff).

[12] "Le symbole est chargé d'affectivité et de dynamisme" (Chevalier 1969: XV).

It is clear that even this formulation — as any other in the case of words with unspecified scope — and especially, to use Wittgenstein's expression, in the case of family concepts — is only of a preliminary nature. It seems, however, that this formulation distinguishes among denotative signs a class of signitive objects which under the name of "symbols" are of central interest to many humanities disciplines: anthropology (P. Ricoeur), religious studies (M. Eliade), ethnology and sociology (C. Lévy-Strauss), psychology (C. G. Jung), aesthetics (S. K. Langer) and others. However, on account of making the conceptual apparatus necessary for these sciences more precise, and on account of the nature of the issue itself, in this understanding contemporary semiotics is expected to work out a coherent theory of symbol.

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