ALEXANDER FRIEDRICH

Metaphorology of Networks

I Introduction

The ubiquity of the “net” or “network” in both scientific and everyday discourse raises the question: What makes this metaphor so popular? To understand it as a buzzword means neglecting its status as a technical term in theoretical discourses. But since the word is also used colloquially it cannot simply be defined as a paradigm.1 With network theories presently engaged in developing terms to describe the laws of networks dominating our “interconnected world,” we have become accustomed to using the word colloquially to refer to new technologies, infrastructures, pressure groups, economic and natural phenomena.

We can thus speak of a cultural key metaphor, providing us with a key concept seemingly for all of life matters. ‘Cultural’ in this context means that this all-encompassing thought pattern is determined by a longing for familiarity. The metaphor both satisfies and menaces this longing: Promising to make us familiar with basic structures of reality, it also alienates us from familiar perceptions of the world and the self. This ambivalence generates a peculiar fascination, involving both hopes and fears. I intend to focus on this ambivalence within cultural key metaphors as exemplified by the metaphorological field of networks.2

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1 Jochen Koubek, however, considers “networking” as a “cultural paradigm” in his dissertation Vernetzung als kulturelles Paradigma (Berlin: Humboldt-Universität, 2004), but his definition of “paradigm” consequently has a broader meaning than Thomas Kuhn’s definition in The Structure of Scientific Revolutions (Chicago: U of Chicago P, 1962).

2 In the German dictionary of philosophical metaphors, the editor Ralf Konersmann proposed the concept ‘title metaphor’ (Titelmetapher) to signify metaphors framing and inducing coherent world views. See Ralf Konersmann, “Figuratives Wissen” Wörterbuch der philosophischen Metaphern (Darmstadt: Wissenschaftliche Buchgesellschaft, 2007) 7-21. Stephen C. Pepper introduced the similar concept of root metaphors for metaphors on which every world view or world-theory is based upon. See Stephen C. Pepper, World Hypotheses: A Study in Evidence (1942; Berkeley: U of California P, 1972). However, in this paper I intend to highlight the ambivalent state of such metaphors. Emphasizing this ambivalence I propose the expression ‘cultural key metaphor.’
II The Metaphorical Field of Networks

Unlike in German, in English we can distinguish between webs, nets, and networks. In the *Oxford English Dictionary* and the *Merriam Webster Dictionary* we can find the following definitions:

A web can be a spider’s web, a woven fabric, gossamer, an endless wire mesh, a membrane that joins the toes of some birds and animal that swim (for example ducks and frogs), and the World Wide Web. Furthermore it is lexicalized as a complicated pattern of things that are closely connected to each other.

A net can be a meshed fabric made of string, thread or wire, twisted, knotted or woven together at regular intervals; something resembling a net in reticulation (as of lines, fibers, or figures); it can be used as a piece of sports equipment or as a device for catching fish, birds, or insects. Furthermore it is lexicalized as an entrapping situation (for example, one can “be caught in the net of suspicious circumstances”) and last but not least as a group of radio or television stations, as in network.

Aside from being a group of broadcasting stations, networks are complex systems of roads, lines, tubes, nerves, wires, and waves that cross and connect each other. Likewise, a closely connected group of people, companies, and institutions that exchange information or cooperate with each other is called a network. Accordingly, to network or networking is an activity of meeting and connecting. As the *Oxford Dictionary* exemplifies: “Conferences are a good place to network.”

Depending on its context the German word ‘Netz’ can mean both ‘web’ and ‘net.’ The English ‘net’ as well as the German ‘Netz’ are related to the Gothic ‘nati’ and the Latin ‘nodus’ which means ‘knot.’ ‘Netz’ can be translated just as well with ‘web.’ In this regard the word ‘Netz’ has strong associations to the German counterparts of ‘tissue,’ ‘cocoon,’ or ‘textile.’ And since the ‘net,’ ‘web,’ and ‘network’ are used metaphorically, a rich interaction between their different meanings can be evoked by implying one context in another.

Accordingly, the domain of contexts that ‘nets,’ ‘webs,’ or ‘networks’ implicate can be considered as the ‘metaphorical field’ of networks. According to Max Black, a metaphorical field can be defined as the association of frames (source domains) that can be implied by a focus (target domain). In other words, a metaphorical field consists of the interaction between different systems of associated commonplaces. The number of the possible frames relies,
first, on traditional manners of use or “commonplaces” which may be lexicalized in dictionaries and, second, on new usages of particular metaphors, be it in poetry, science, or everyday life. As can be seen in the case of networks we do not deal with only one system of commonplaces. In the following, I will focus on the interaction between the ancient and the modern “web of life.”

III The Web of Life

The metaphorical field of networks has a long tradition. In several cultures we encounter the net as a symbol of trapping and gathering. But as already mentioned there is another important context: the domain of textile processing — a domain, which, at least in Europe, was presumably female. In several mythologies of ancient cultures we encounter spinning and weaving goddesses of fate wielding power over death and life, above and beyond the patriarchic peak of the cosmos.5

In Greek mythology the Moirai spin, measure, and cut off the thread of a person’s life. Let us visualize the process of spinning: The yarn is wound around a spindle. The thread is coiled up to a cocoon just like a shroud which spiders spin around their prey. And viewing the life of a person as a spun thread, life as a whole must result in an interwoven web, the “web of life.”6

Athena, the goddess of wisdom and the patroness of weaving was offended by Arachne, who had once defeated her in a weaving contest. In revenge, the goddess destroyed the tapestry and loom of the mortal weaver and finally turned her into a spider.7

Relying on different contexts the web can embody either life-saving, life-sustaining or ominous, life-threatening situations. According to Homer, Penelope, waiting for Ulysses, had to weave his shroud daily to prevent his

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odyssey ending with failure upon his return. If she had finished it, it would presumably have sealed his fate. By unravelling in the night what she had woven by day she preserved his life as the king of Ithaca.

More a life-threatening than a life-sustaining entity, the web as a fateful metaphor traverses The Oresteia. By blending in the context of hunting and trapping, Aeschylus employed the metaphorical field of networks to stage history as a disastrous chain of human action involving violence, revenge, and deceit.8

On the one hand, the web woven by the fates and the web of fate in The Oresteia; on the other, Penelope’s weaving as the attempt to escape from fate: Webs and nets as products of weaving, plaiting, tying, and braiding represent one of the oldest and yet also the most modernized cultural techniques.

The invention of the Spinning Jenny (ca. 1764) figures as a milestone of the industrial revolution. And due to the rapid progress of science and technology the metaphorical field of networks has extended into the context of physiological and technological communications systems. As Laura Otis has shown, 19th-century physiologists and physicists drew upon each other’s representations of communications networks, studying telegraphs and nerves, stimulating one another in a “complex feedback loop.” This metaphorical coupling still affects “the way we see our bodies, our neighbours, and the world;” for example:

The image of the world wide web […] did not begin with the computer. Emerging from studies of nervous and electromagnetic transmissions, the web has been upheld for two centuries as nature’s own apparatus for transmitting information. Images of bodily communications nets have inspired us to build technological ones, and images of technological ones have inspired us to see them in the body. 9

In other words, since the functionality of nerves had been understood in terms of electrical telegraphy, a new target domain was established in two steps: Represented on a map, the centralized telegraph system looked like a spider’s web — without this mode of visualization the telegraph system would not have been called a network.10 But since nerves and neurons have

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8 Aeschylus, The Oresteia: Agamemnon, the Libation Bearers, and the Eumenides, trans. Alan Shapiro and Peter Burian (Oxford/New York: Oxford UP, 2003) 566-67: “ELECTRA. Remember the strange net they cast to catch you in! / ORESTES. You were tangled in chains forged by no blacksmith, father!”; 632-35: “ORESTES. The plan is simple: Electra, you go inside / and keep what we’ve arranged to do a secret, /so that the ones who killed an honored lord / by treachery, will by treachery be killed, caught in the tangling net they caught him.”


10 In Samuel Johnson’s Dictionary of the English Language (London, 1822), “network” is defined as “[a]ny thing reticulated or decussated, at equal distances, with interstices between the intersections.” The existence of interstices, however, requires some cross
been understood as a communications system they have been called a network, too.11 In 1883 the Italian physiologist and Nobel Prize laureate Camillo Golgi published his *Recherches sur l’histologie des centres nerveux*. In this paper he proposed the existence of an anastomotic network connecting the whole nervous tissue: “the diffuse nerve network.”12

Although a detailed analysis of the metaphorical field of networks still needs to be done, I would give a first tentative outline concerning this particular context: During the late 19th century the target domain (focus) “telegraphy” became a source domain (frame) for “neurophysiology” with both together becoming a second-order target domain: “communications systems.” Having been established within the metaphorical field of networks, the new target domain “communications systems” began to interact with the system of commonplaces associated with the traditional metaphor “web of life” by applying it as a source domain.13

This can be seen, for example, in Herbert Casson’s *History of the Telephone* (1910). In this paper Casson described the work of the switchboard operators in a telephone exchange as “weaving a web of talk” whose rhythm represents “the very pulse of the city’s life:”


13 In terms of the cognitive-linguistic theory of metaphor this “complex feedback loop” or “metaphoric circuit” could be described as a “feeding back” metaphorical entailment. Concerning the concept of “metaphorical entailments” see Zoltán Kövecses, *Language, Mind and Culture: A Practical Introduction* (Oxford/New York: Oxford UP, 2006) 91-105.
the switchboard lights must feel that he has looked upon the very pulse of the city's life.\textsuperscript{14}

Christian Emden described the complex epistemological interaction between images and language of neurophysiology and telegraphy in the 19\textsuperscript{th} century as a “metaphorical coupling,” which was about to become a concept.\textsuperscript{15} Today, the concept of networks has been developed into an almost ubiquitous term in biology, chemistry, physics, ecology, sociology, economics, ethnology, linguistics, computer science, and mathematics — only humanities are said to be still resisting. But aside from being a descriptive term it has gained a new, prescriptive dimension, since “networking” is considered a matter of socialization — associated with the promises and discontents of the “network society.” On the one hand, Manuel Castells — the theorist of the “network society” — argues, in a world which is constantly changing, it is essential to adopt the logic of networks to provide what he calls “a combination of secure personalities and flexible personalities.”\textsuperscript{16} On the other hand, the promises of networking correspond to the demonization of networks — be it in the shape of computer-aided observation, epidemics, or terror.

IV The Connected Age

Succeeding as a name for new technologies, infrastructures, and pressure groups, networks are considered a key factor of social change and stratification. Connoting the good and the bad fortune of the web of life, the network has become an cultural key metaphor.

Engaged in developing concepts to describe the laws of networks dominating our “interconnected” world, the emerging “network science” has been defined by the National Research Council (USA) as “the study of network representations of physical, biological, and social phenomena leading to predictive models of these phenomena.”\textsuperscript{17} According to Duncan J. Watts — profes-

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sor of sociology at Columbia University in New York and a member of the Committee on Network Science for Future Army Applications — the “science of networks” is the “science of the connected age.”

Particularly known for his mathematical theory of the “small world phenomenon,” Watts did not just deliver the scientific evidence for the platitude that everything is connected with everything else somehow. He and other network scientists such as Albert-László Barabási emphasize the fact that the ways of mutual influences between different agents in complex societies are very short even though the connections concerned might still be unknown.

Aware of the numerous interdependencies in complex societies, we use network metaphors colloquially to label the ways things are connected in our daily existence — while not really understanding all these relationships in detail. But it is a widespread assumption in our society that, somewhere out there, there are scientists able to offer us the explanations that will fill in these gaps. Max Weber denoted this state of assumption with his famous expression of the “disenchantment of the world” — die “Entzauberung der Welt.” We should remember that the “disenchantment of the world” does not mean an increasing general knowledge of our living conditions [...] but rather it means something else: the knowledge or belief that we could know, if only we wanted to; that there are in principle no unpredictable or uncanny forces, that play into it, but rather that all things — in principle — could be controlled by calculation.

As Weber illustrated, we do not need to know exactly how the engine works when we go by tram. It is sufficient to know that it was made by engineers. By the same token, we do not need to know the physical causes of lightning to enjoy it as natural phenomenon and not to fear it as the wrath of God. It is sufficient to know that it has been explained as an effect of atmospheric electricity.

Now, 90 years after Weber’s lecture on Science as a Vocation (1919) it still describes our living conditions: Although it is a permanent feature of our life,

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nobody who is not an electrical engineer actually knows exactly how a mobile phone works for example. Thus treating modern societies as "complex" does not mean to consider them as more sophisticated than others. Instead it means that society as a whole is profoundly mediated by economics, technology, and communication. Furthermore, this society lacks a general representation of its identity, and as a result of these two facts, it is obliged to deal with a multiple set of concepts, all competing for the honour of representing the unity of society.

V Cultural Key Metaphor

Obviously, metaphors are well-adapted to supersede this position. As a cultural key metaphor the "network" has become an "absolute concept," in the words of the German theorist Erhard Schüttpelz, who argues that it claims a universal validity. Referring to its metaphorical substructure, his argument implies Hans Blumenberg’s concept of "absolute metaphors" with which the German philosopher and cultural theorist founded what has come to be called metaphorology.

Blumenberg has defined absolute metaphors as metaphors that can neither be reduced to nor replaced by an “actual” term. Nevertheless, such metaphors are unavoidable in theories or assertions referring to the “never perceptible whole of reality.” This phenomenological insufficiency of our “world view” demands metaphorical evidence. Absolute metaphors give an answer to the least decidable and — for that very reason — always decided question: what the world actually is.

Based on an anthropological history of ideas, Blumenberg argues that the answer is different from age to age. But the problem is always the same, since it is a question of being. Any culture has to cope with what he called the “absolutism of reality.” As the embodiment of life-threatening hazards and existential menaces, “absolutism of reality” means for Blumenberg the state

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23 See Herbert Grabe’s paper in this publication on the metaphorology of the changing concept of truth in the early modern age.

of consciousness prior to culture. As a “limit concept”\textsuperscript{25} (Grenzbegriff) the “absolutism of reality” signifies an existential menace to desires for familiarity and safety, clearness and continuity, predictability and control, assertiveness and autonomy. In this context, the function of “absolute metaphors” is to make the world a familiar and therefore reliable place; what Rüdiger Zill describes as “domesticating the uncanny and the alien” — but in the process of domesticating, as Zill points out, these metaphors also alienate the familiar.\textsuperscript{26}

Indeed, this can be observed in the case of the network metaphor: As a cultural key metaphor the concept of networks promises to acquaint us with basic structures of reality, apparently providing us with a key concept for all manner of life matters. By the same token, however, it undermines the quest for familiarity, alienating us from our familiar concepts of the world and the self.

VI Conclusion

I would like to conclude by giving an example: The German philosopher and cultural theorist Hartmut Böhme sees a need for a network theory in the humanities. He argues that, since the “semantic core” of networks is both the spider’s web and the fishing net, there is no use for a systematic distinction between “culture” and “nature,” and he proposes the following definition:

Networks or webs are biological or anthropogenic artificial forms of organization for producing, distributing or communicating material or symbolical objects. […] They do this according to stable principles but in instable balances, (they are) self-regenerating, self-steering, self-expanding, thus autopoietic and evolutionary.\textsuperscript{27}


Obviously this definition is meant to apply to more than just communications or supply systems, but actually it applies best to them. Furthermore, when we try to apply it to the above-mentioned “semantic core” of network, the spider’s web and the fishing net, we obtain a paradoxical consequence: The definition misses its primary object. Neither do cobwebs produce material objects nor do they communicate symbols. This circumstance dispenses with the question of whether they behave according to stable principles or not. The same applies to fishing nets: Just imagine how surprised a fisherman would be to find that his net had suddenly grown since the last time he had used it; or if a second net had emerged overnight! Likewise, a spider’s web can hardly be described as “self-producing” (autopoietic) without defining the spider as an executive agency of the evolutionary procedures of its web.

If we are not inclined to approve these paradoxical consequences, we ought to assert a difference between ‘nets and webs as items’ and ‘networks as structures of organization.’ Then we can recognize this difference as crossing the difference of culture and nature. In both “nature” und “culture” we can find netted and reticular objects as well as networked proceeding structures. But considering the difference between them we have the ability to watch how attributes and properties of networked or woven items affect and shape networked structures, or more specifically: affect the network as a term for talking about complex interdependencies.

To sum up: By claiming universal validity, the cultural key metaphor of the network intertwines the ancient and mythical with the modern scientific implications of the “web of life,” as can be seen in the conclusions of Hartmut Böhme:

Captured by the fascination of the epistemological concept ‘Netz’ we get increasingly entangled in this self-woven web and become increasingly aware of the fact. Webs are thus our prison as well as the mode of our liberation. The same act creates both our entanglement in the web and the reflexive emancipation from this entanglement. The web as a universal metaphor of biological or social existence implies that we are always simultaneously inside and outside the web, in the meshes and through the meshes.28

The attempt to appropriate the preconditions and consequences of network theory in the humanities is certainly relevant and productive. But as promising and fascinating as it might be: We ought to pay attention to the fact that

the modern “web of life” increasingly tends to interact with the implications of the ancient “web of life.” Thus, we can say, the more network science claims to be disenchanting the world by reasoning and predicting events, the more it runs the risk of re-enchanting the world, and the more it will tend to reinforce the uncanny instead of domesticating it.29

To acknowledge this ambivalent state of cultural key metaphors does not mean merely asking what such metaphors can say about “structures of reality.” It means asking what such metaphors can tell us about the concerns and expectations of a particular culture. I see the posing of this question as a major task for metaphorology.

29 Umberto Eco’s Foucault’s Pendulum, for example, can be read as a narrative evolvement of the web metaphor and as a fictional examination of this problem. The more the protagonists tied phenomena and events to the mysterious web of life, the more the occult history becomes real to them. I owe this observation to Daniela Meinhardt.
Works Cited


Johnson, Samuel. A Dictionary of the English Language: In Which the Words are Deduced From Their Origin and Illustrated in Their Different Significations By Examples From the Best Writers, to Which are Prefixed a History of the Language, and an English Grammar. Vol. II. London 1822.


