////// tematická studie / thematic article //////////////////////

EPISTEMOLOGIES OF SPACES AND PLACES: AN INTRODUCTION

Abstract: *The article introduces a special themed issue of Theory of Science on epistemologies of spaces and places. It provides a disciplinary context of the theme and reviews some of the key arguments that led to the so-called spatial turn in social sciences and the humanities. Science studies in the broad sense (including social studies of science and technology, history and philosophy of science) have also been affected by this shift of research interest to spatial aspects of science at both micro- and macro-levels. Scientific knowledge has been subject to analyses that stress its local contingencies, mobility and dependencies on spatial arrangements. The ensuing new epistemologies require novel concepts or reconsideration of the older terms, such as universality or objectivity.*

Keywords: *space; place; epistemology; geoepistemology; local nowledge; geography of science*

Epistemologie prostorů a míst: úvod

Abstrakt: *Tento článek uvozuje zvláštní tematické číslo Teorie vědy věnované epistemologiím prostorů a míst. Článek představuje oborový kontext tématu a poskytuje přehled některých klíčových argumentů, jež vedly k takzvanému prostorovému obratu v sociálních a humanitních vědách. Výzkumy vědy v širokém smyslu (zahrnujícím sociální výzkumy vědy a techniky, dějiny a filosofii vědy) byly také ovlivněny tímto přesunem badatelských zájmů k jejím prostorovým aspektům na mikro i makro úrovni. Vědecké vědění je podrobováno analýzám, které zdůrazňují jeho místní nahodilosti, mobilitu a závislost na prostorových uspořádáních. Následné nové epistemologie vyžadují nové koncepty či přehodnocení starších termínů, jako univerzalita a objektvita.*

Klíčová slova: *prostor; místo; epistemologie; geoepistemologie; místní vědění; geografie vědy*

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Spatial, or geographical turn in the history and philosophy of science constitutes one of the possible orientations by means of which researchers attempt to overcome more traditional ways of inquiry that have perceived scientific knowledge as universal by definition.[1] While we have become accustomed to speak of historical epistemology or changing epistemes, can we identify spatial or geopolitical arrangements and boundaries that would accord space a role similar to that of time in the production, evaluation and dissemination of knowledge? Relying on historical and empirical material and theoretical reflection, the articles collected in this special themed issue are attempting to provide elements of a possible affirmative answer to the preceding question.

Localization and positioning of scientific knowledge

Folk wisdom would have it that science is made in ivory towers. As a metaphor for the separation of scientists from concerns of everyday life, the idea of ivory tower certainly contains a kernel of pungent truth. Yet the image also subtly conveys a notion of science as knowledge abstracted from any particular place, a notion to which many scientists, past and present, would willingly subscribe. Robert K. Merton postulated universality as one of the fundamental norms of science.[2] Thomas Nagel saw it as a duty for scientists to strive to achieve objectivity by detaching themselves from their position in the world: "We must get outside of ourselves, and view the world from nowhere within it,"[3] even if this ambition is metaphorical and ultimately remains impossible. Jean-Jacques Salomon, although he too was skeptical about the actual implementation of the principle, argued "science is by nature universal. The truths which scientists seek to discover are not national truths; they are the same everywhere and so can be unanimously recognized."[4] The claims of these venerable scholars, however, were made in

[1] The theme and this introductory article draw on the author's previously published essay: Radim HLADÍK, "Místo a pohyb vědění." In: DVOŘÁK, T., (ed.), *Současné přístupy v historické epistemologii*. Praha: Filosofia 2013, pp. 177–196.

[2] Robert K. MERTON, "The Normative Structure of Science." In: *The Sociology of Science: Theoretical and Empirical Investigations*. Chicago – London: University Of Chicago Press 1973, pp. 267–278.

[3] Thomas NAGEL, *The View from Nowhere*. Oxford: Oxford University Press 1989, p. 67.

[4] Jean-Jacques SALOMON, "The Internationale of Science." *Social Studies of Science*, vol. 1, 1971, no. 1, p. 23 (23–42). It should be noted that Salomon did not think this to be the actual state of affairs in science; nevertheless, he interpreted the current state as a distortion of science by extraneous, namely political, factors.

particular time and place and increasing number of researchers come to see this very fact as a necessary aspect in the analysis of knowledge. The ivory tower, it turns out, has its geographic coordinates, it can be located and its ground plans can be sketched out.

Fieldwork makes anthropologists particularly sensitive to the attributes of their environment. According to Clifford Geertz, our knowledge is always local, i.e. most of what people know, believe in and do, makes sense and can be meaningful only in a predefined space. Geertz was among the first thinkers who contended that science is no exception to this rule, that it is yet another form of local knowledge: "The opposition, if we must have one […] is not between 'local' knowledge and 'universal,' but between one sort of local knowledge (say, neurology) and another (say, ethnography). As all politics, however consequential, is local, so, however ambitious, is all understanding."[5] Science, from the perspective of cultural anthropology, is meaningful only in the symbolic universe of North Atlantic civilization. Indeed, we could – following Geertz – argue that even the claim of universality for scientific knowledge can be interpreted solely as a product of European values.

At around the same time that anthropology embarked on critical reflection on its own nature as social science, feminism also began to question the basic tenets of universalist epistemology. By discovering the body as a site and mechanism of oppression, feminist scholars were instrumental in raising our awareness of space and place in the making of knowledge. Dorothy E. Smith perceived the separation of soul and body in its modern articulation of abstract reason and concrete body as a ramification of power-imbued social relationship.

> Entering the governing mode of our kind of society lifts actors out of the immediate, local, and particular place in which we are in the body. What becomes present to us in the governing mode is a means of passing beyond the local into the conceptual order. [...] It [this mode] establishes two modes of knowing and experiencing and doing, one located in the body and in the space it occupies and moves in, the other passing beyond it.[6]

[5] Clifford GEERTZ, "'Local Knowledge' and Its Limits: Some Obiter Dicta." *The Yale Journal of Criticism*, vol. 5, 1992, no. 2, p 129 (129–135).
[6] Dorothy E. SMITH, *The Conceptual Practices of Power: A Feminist Sociology of Knowledge*. Boston: Northeastern University Press 1990, p. 17.

Donna Haraway asserts that science, despite its dependence on the distinction between the universal and the specific, is essentially a "situated knowledge". Against Nagel's "view from nowhere", she posits a requirement of "positioned rationality":

> The only way to find a larger vision is to be somewhere in particular. The science question in feminism is about objectivity as positioned rationality. Its images are not the products of escape and transcendence of limits, i.e. views from above, but [...] views from somewhere.[7]

The recurring motif of space and place across social sciences and humanities resulted into yet another "turn", which were changing the disciplinary landscape in the second half of the 20th century. The spatial turn as a term has been circulating around since the late 1980s. It has been current in anthropology, sociology or social geography and, consequently, affected social studies of science as well as history and philosophy of science. The versatility of the term has been instrumental in its spreading across disciplines and research orientations. The notion of space traverses several levels (e.g. architectural, urban or global) and this variety is well represented in the herein collected thematic articles rallied under a rubric entitled "Epistemologies of Spaces and Places".

Geography of science

Initially, the calls for more attention paid to the geographic dimension of science were formulated as a critique of an idealistic interpretation of the history of science. Adi Ophir and Steven Shapin, who identified a gradual increase of spatially informed analyses over the 1980s, concluded that

> identification of the place of knowledge is part of any inquiry concerning the ontological status of scientific objects and the epistemological standing of scientific statements. The place of knowledge lays down conditions for the appearance of the objects of science, for their validation as real, and for the terms on which they are knowable.[8]

[7] Donna J. HARAWAY. *Simians, Cyborgs, and Women: The Reinvention of Nature*. New York: Routledge 1991, p. 196.
[8] Adi OPHIR – Steven SHAPIN, "The Place of Knowledge A Methodological Survey." *Science in Context*, vol. 4, 1991, no. 1, p. 15 (3–22).

David Turnbull insists that "Western science, like all knowledge in all societies, is inherently local."[9] It should count among other "systems of knowledge" that have not failed to produce significant impacts in their respective societies, be it the indigenous system of navigation in the Pacific, medieval masonry or traditional ways of farming in Indonesia.

The ideas of objectivity and universality of science has been also discredited by demonstrations of its coupling with the project of colonization. Research on science informed by postcolonial perspective attempts to portray the purportedly universal knowledge as a notion forcefully asserted and sustained through geopolitical domination of Europe over other continents. Boaventura de Sous Santos did not shy away from dubbing this eradication of varied indigenous knowledge as "epistemicide".[10] Other strands of research emphasize that this global expansion of European knowledge systems was a key component in the emergence of scientific thought inasmuch as the conquest of new territories brought about requirements of standardized forms observations and reports that provided a tangible dimension to the idea of universality. David Livingstone highlighted three power-laden techniques that contributed significantly to the nascent science.[11] Firstly, the disciplining of the senses of observers allowed to compare independently gathered reports about the nature and culture in the lands previously unknown to Europeans. Secondly, standardization led to the creation of unified cognitive space and encompassed especially the systems of measurement. We may add that standardization had also its linguistic facet and affected the forms of scientific communication. And finally, Livingstone argues, the centers of calculation – such as European universities or royal courts – were essential in the formation of networks along which the scientific knowledge could be transferred and accumulated It is precisely the mobile, traveling aspect of science that many scholars deem as its defining characteristic. David Turnbull saw it as the secret behind the power of this form of knowledge: "The source of the power of science on this account lies not in the nature of scientific knowledge but in its greater ability to move and apply the knowledge it

[9] David TURNBULL. *Masons, Tricksters and Cartographers: Comparative Studies in the Sociology of Scientific and Indigenous Knowledge*. London – New York: Routledge 2000, p. 38.
[10] Boaventura de Sousa SANTOS, "General Introduction." In: SANTOS, B. de S. (ed.), *Democratizing Democracy: Beyond the Liberal Democratic Canon*. London – New York: Verso 2005, pp. xvii–xxxiii.
[11] David N. LIVINGSTONE, *Putting Science in Its Place: Geographies of Scientific Knowledge*. Chicago: University of Chicago Press 2003.

produces beyond the site of its production."[12] Similarly, Bruno Latour associated the power of science with its embodiment in "immutable mobiles", the various portable artifacts – for example, a map of a terrain – that can easily uproot knowledge from its original location and move it elsewhere.[13]

Building science

The geopolitical framework represents one level of space that has been shaping science. Nevertheless, the spatiality of science can be discerned on much smaller scale as well, including the architectural level of rooms and buildings. Here, the spaces of sciences become places, or spaces imbued with meanings, which support the claim that "buildings can be viewed as statements",[14] The close ties between architecture and scientific epistemology were classically explored by Michel Foucault, most notably in his notorious exposé on Bentham's Panopticon.[15] A circular structure segmented into individual cells that are easily observable from a central tower was not only the perfect prison, as Bentham imagined it, but it was an entire machine for producing power/knowledge that is typical of science. Panopticon allows for a precise definition of the units to be observed, counted and experimented upon. Indeed, it is an epistemologically informed spatial arrangement the architectural echoes of which run through many academic and research establishments.

The positioning of scientific buildings in urban and rural landscapes and their architectural makeup also speak of the culture of science in any given society. Peter Galison made this claim when he argued that "architecture can therefore help us position the scientist in cultural space; buildings serve both as active agents in the transformation of scientific identity and as evidence for these changes."[16] An example of a study guided by similar conviction is Thomas Gieryn's analysis of a new biotechnological building at

[12] TURNBULL, *Masons, Tricksters and Cartographers*, p. 39.
[13] Bruno LATOUR, "Visualization and Cognition: Thinking with Eyes and Hands." In: Kuklick, H. – Long, E. (eds.) *Knowledge and Society, Studies in the Sociology of Culture Past and Present*. Vol. 6. Greenwich, CT: JAI Press 1986, pp. 1–40.
[14] Sophie FORGAN, "Context, Image and Function: A Preliminary Enquiry into the Architecture of Scientific Societies." *The British Journal for the History of Science*, vol. 19, 1986, no. 1, p. 91 (89–113).
[15] Michel FOUCAULT, *Discipline and Punish: The Birth of the Prison*. New York: Vintage Books 1979, p. 195*ff*.
[16] Peter GALISON, "Buildings and the Subject of Science." In: THOMPSON, E. A. – GALISON, P. (eds.), *The Architecture of Science*. Cambridge, MA: MIT Press 1999, p. 3 (1–25).

a university campus. The design of modular labs helps to promote equality among researchers and the usage of light facilitates their work. Moreover, the materiality of the building changes the structure of science itself, insofar as it is a confirmation and testimony to the disciplinary status of nascent biotechnology.[17]

The emblematic space of science can be found in laboratories. While they are not architecturally extravagant, they have a special significance for scientists. Their origins trace back to 17th century, when rooms were established and devoted specifically for research purposes. Beforehand, research had been conducted in lecture halls, libraries or private residencies. The existence of a new space marked the empowerment of science from pedagogical purpose of universities. At the same time, science took on an appearance of standard vocation, not limited to curiosity of private persons. A sense of researchers' identity could be promoted in this new space that was not publicly accessible.

A proprietary scientific culture has gained a space (pun intended) in which it could develop. It is a place destined to produce universal knowledge. Gieryn remarked that "the walls of the laboratory demarcate a space where both natural and social orders are reconfigured: nature inside is no longer wild but disciplined, and people inside become machines for measurement."[18] Yet despite their universal aspirations, they are invested with meanings that are inherently of local nature and tied to a place. Karen Knorr-Cetina noted the paradoxical principle that the purportedly objective and universal knowledge is produced in places that are dependent on local knowledge: "Research laboratories develop local interpretations of methodical rules, a local know-how in regard to what is meant and how to make things work the best in actual research practice."[19] The laboratory-made knowledge, far from being easily replicable, relies, according to her, on many aspects that are meaningful only locally. Among these "local idiosyncrasies", Knorr-Cetina counts the interpretation of rules, composition and quantification of researched substances, experimental materials or the instruments used.

Bruno Latour and Steve Woolgar are the best-known scholars who conceptualized laboratories as terrains for ethnographic inquiry. What they found when they looked at a laboratory through anthropological lens, was

[17] Thomas F. GIERYN, "What Buildings Do." *Theory and Society*, vol. 3, 2002, no. 1, pp. 35–74.
[18] *Ibid*., p. 48.
[19] Karin KNORR-CETINA, *The Manufacture of Knowledge: An Essay on the Constructivist and Contextual Nature of Sciencei.* Oxford: Pergamon Press 1981, p. 37.

a place designed to produce inscriptions by means of numerous machines. Yet the materiality of the scientific process, they notes, becomes obscured when the inscription leave the laboratory wall: "Without the material environment of the laboratory none of the object could be said to exist, and yet the material environment very rarely receives mention."[20] Their findings support a thesis that scientific knowledge, like any other type, requires a spatial indexicality. Based on his laboratory studies, Latour extrapolated epistemological effects of these places of science. He claims that they are destined to dissolve the inside/outside dichotomy and to change scales by making visible the invisible (e.g. a microbe) and to make local events (e.g. weakening of microbe's virulence in the laboratory) relevant nationally or globally (e.g. change polices).[21] These epistemological effects, as expounded by Latour, owe a great deal to the manipulation of spatial dimensions rather than to universality and objectivity of knowledge.

Mapping the epistemologies of spaces and places

The spatial turn, directly or indirectly, launched a research orientation that pinpoints the importance of space in the production of scientific knowledge. The space is a relevant context for science in the most concrete instances such as laboratories or lecture halls. It is also an indispensable influence on larger scale and the hierarchies of knowledges have been shown to be tied to geopolitical boundaries. In other words, space enters epistemology (or should we put this vice-versa?) in many different forms. David Finnegan encapsulated the spatial features of science in three distinct categories:

> On one account the spaces of science are tangible places that condition cognitive content and sanction scientific authority. On another they are social or cultural spaces that both constrain and enable particular kinds of scientific practices. On yet another account spaces are rhetorical or imaginative constructs used to ratify the public credibility of scientific institutions.[22]

[20] Bruno LATOUR – Steven WOOLGAR, *Laboratory Life: The Construction of Scientific Facts*. Princeton: Princeton University Press 1986, p. 69.
[21] Bruno LATOUR, "Give Me a Laboratory and I Will Raise the World." In: Biagioli, M. (ed.), *The Science Studies Reader*. New York – London: Routledge 1999, pp. 258–275.
[22] Diarmid A. FINNEGAN, "The Spatial Turn: Geographical Approaches in the History of Science." *Journal of the History of Biology*, vol. 41, 2008, no. 2, p. 383 (369–388).

In response to the call for contemporary studies of epistemology of places and spaces, this special issue of *Theory of Science* brought together essays that, each in its specific way, address these varied notions of space as a factor – tangible, cultural or imaginative – in knowledge production.

Alison Reiko Loader brings readers' attention to the efforts of Maria Short to run a popular observatory in 19th century Edinburgh.[23] She treats the science as precisely a demarcated "imaginative construct" that Short had to confront as a woman who was forced to limit her activities to the less contested space of popular knowledge. Loader shows that doing science in Edinburgh was not the same as doing it elsewhere. The city itself provided a scientific structure that was both different from other places in the United Kingdom of the time, but, simultaneously, the structure derived from the position of Edinburgh in the country. Short's observatory functioned as a disruptive element in local scientific culture, yet its materiality provided it with endurance and presence that could not be ignored. The important focus is on the womanhood of Short and the burdens imposed on it in Victorian era. Loader's study thus echoes the bodily experience that was instrumental in raising the awareness of space in the works of feminist authors recalled earlier in this introduction.

In her methodological and conceptual reflections, Jennifer Walklate takes her readers on the tour through a museum.[24] Similarly to laboratories, museums count among the most important places dedicated to knowledge. They have been shown not only to conserve or disseminate it, but they have a crucial role in producing it. Walklate argues that we can best understand the epistemological effects of museums if we conceptualize them as timescapes, places with an essential temporal dimension. Indeed, in her perspective, museums are places that use space to organize time. The author argues that methodological innovations are necessary for the investigation of the museum's timescape and finds the needed inspiration in literary criticism. Once we take a walk in the museum, we realize that by coordinating space and time, exhibitions use a language that is susceptible to literary analysis. An individual narrative is created by the succession of spatial arrangements that serve grammatical, prosodic or stylistic purposes.

[23] Alison Reiko LOADER, "From Near to Far: Maria Short and the Places and Spaces of Science in Edinburgh from 1736 to 1850." *Teorie vědy / Theory of Science*, vol. 36, 2014, no. 1, pp. 15–47.
[24] Jennifer WALKLATE, "Museum on the Edge of Forever." *Teorie vědy / Theory of Science*, vol. 36, 2014, no. 1, pp. 49–76.

Whereas the first article oscillates between national, urban and personal spaces and the second one fixates on the architectural level, the text by Ben Jefferson calls forth the geoepistemological dimension of postcoloniality.[25] Jefferson collocates the rhetorical space of colonial schoolhouse as it appears in the oeuvre of Derek Walcott with the historical space of the colonially subjugated Caribbean. While the schoolhouse was a space that was intended to replicate the hegemony of the metropolis in the colonial periphery, Jefferson's profound analysis shows that in the poetry of Walcott, it becomes a space where the hierarchical geopolitical boundary becomes porous. Once a space designed to discipline colonial subjects turns into a place infused with local knowledge, new ways of thinking open up. In Jefferson's account, Walcott own work is a testimony to the ability of local knowledge to survive the epistemological confrontation and thus subdue the universalizing claims of knowledge made in European centers. Instead of a dichotomous interpretation, however, Jefferson asks us to ultimately adopt "border thinking", in which each knowledge is reciprocally transformed rather than made triumphant or vanquished.

The last contribution to the topic of epistemology of spaces and places illustrates the impact spatial turn may have in empirically oriented social sciences.[26] Magdalena Łukasiuk and Marcin Jewdokimow found the hitherto existing spatial categories of empirical research as insufficient in their work on migration. The two authors convincingly argue that the dwellings of migrants shun the traditional terms associated with housing. With the assumption that living spaces are embedded in socio-cultural context and profuse with meaning, Łukasiuk and Jewdokimow review the fundamental scholarly literature on the notion of space in philosophy and social theory, in search of a conceptualization that could better account for the frailty of migrants' dwellings. They coin the term "non-home" as a proposition for "introducing both the discursive and material dimension into the analysis of habitation".[27]

The texts collected in this issue come from different disciplines, but each article demonstrates that the problem of spaces and places and their intersection with knowledge production demands further reflection and gener-

[25] Ben JEFFERSON, "Contesting Knowledge, Contested Space: Language, Place, and Power in Derek Walcott's Colonial Schoolhouse." *Teorie vědy / Theory of Science*, vol. 36, 2014, no. 1, pp. 77–103.
[26] Magdalena ŁUKASIUK – Marcin JEWDOKIMOW, "Non-home: A Theoretical Approach to Migrants' Dwellings." *Teorie vědy / Theory of Science*, vol. 36, 2014, no. 1, pp. 105–124.
[27] *Ibid*., p. 124.

ates new questions. The explicit pleas for introducing methodological and theoretical innovations indicate that the ramifications of spatial turn have reached a stage that goes beyond mere thematization of space and place in the studies of science. Our transformed understanding of spaces and places of science challenges us to consider new epistemologies.