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How archaeological communities think: re-thinking Ludwik Fleck's concept of the thought-collective according to the case of Serbian archaeology

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> Both thinking and facts are changeable, if only because changes in thinking manifest themselves in changed facts. Conversely, fundamentally new facts can be discovered only through new thinking. (Fleck, 1981: 50–51; translated by Fred Bradley and Thaddeus J. Trenn).

Introduction

Serbian archaeology offers fertile ground in which to apply Fleck's concepts of thought-collectives and thought-style.[1] To this end, this chapter seeks to delve into Fleck's theories on knowledge production to study how they function in practice in the history of archaeology, as based on empirical data consisting of various texts and citation relations that are used to track a particular thought-collective in a clearer, more visual manner. In doing this, a further aim of this chapter is to introduce new theoretical tools for the history of ideas as well as how they may be implemented as inherent to specific methodological strategies.

Kuhn's concept of a paradigm is limited in its applications since its broad expanse proves too unwieldy to apply to all aspects of a localised phenomenon. Paradigm shift is an appropriate term to describe significant changes that encompass totalities, but not for analysing the specifics of one non-generalised change (Kuhn, 1970). As a matter of consequence, in order to take an initial step into researching the history of localised ideas (such as the history of archaeology), it is necessary to find an approach adequate to understanding the sociology of knowledge production and archaeological epistemology. In this sense, Fleck's concepts are better fitted to taking into account nuances within change

that do not correspond to overarching paradigms within larger narrative scopes. Fleck accounts for change as a continual process rather than a single event, and incorporates the social group's role in such changes (Brorson and Anderson, 2001). That said, Fleck's theories by themselves are not theoretically sufficient to cover all issues arising when examining shifts in thought. This chapter's objectives include a retooling of Fleck with corresponding and supporting theoretical sources so as to be able to solidify his theories into an applicable methodological strategy.

This chapter draws on thought-style and (social) network analysis from the actor-network theory (ANT) of Bruno Latour to supplement Fleck in this regard. Because Latour relies on social and natural worlds existing within constantly shifting networks of relationship, the theory can complement the representation of communication between scholars reflecting real-world changes in flux. While ANT does attempt to 'open the black box' of science and technology, it contains no concrete or coherent methodological strategy per se; rather, ANT may be viewed as more akin to a general perspective applicable to understanding social dynamics. ANT's abstract approach distinguishes it from many other sociological network theories. In utilising ANT, it is necessary to do so in conjunction with citation network analysis in order to provide a concrete framework for the methodology itself (Latour, 2005).

Focusing on this constructed methodology in this chapter, we will be able to better comprehend the cultural history school in Serbian archaeology. In doing so, I argue that the school overcame its dogmatic character in the local archaeological community to develop a more democratic academic function. I selected the history of Serbian archaeology as it is a field unique to itself, owing to the extreme difficulty of integrating events affecting Serbian archaeologists with the narrative of the development of European archaeology as a whole. The history of Serbian archaeology has been subject to numerous influences and various shifts in thought over the last century, which distinguishes it from contemporary archaeology elsewhere for its conservatism. A dissection of the development and evolution of Serbian archaeology, therefore, is fruitful for examining how specific shifts in thought occur in non-overarching exceptions to the norm (Palavestra and Babić, 2016).

As a case study, this work directly treats what Kuhn would call a 'paradigm shift': the late introduction of cultural-historical archaeology to Serbia. The objective is not to describe practices in archaeology in detail, but rather to discuss differing theoretical perspectives and tools by reference to Serbian archaeology as it developed over time amid shifts in thought and academic traditions among scholars.

With this objective in mind, this chapter will delve into how it is possible to understand the production of knowledge as a phenomenon of

communication within a group when examining this through the prism of a thought-collective. However, as the case study will bear out, while analysing it as such, it is still necessary to take account of the problems of trans-generational transfers of knowledge, and to understand how scientists relate to one another within a network and how to become an authority in a specific scientific field.

Ludwik Fleck in brief

Ludwik Fleck (1896–1961) was a Polish microbiologist, whose studies of the history of medicine and science were written mainly in German and Polish, but remained unnoticed by a wider scientific audience until their rediscovery in the late 1970s (Jarnicki, 2016). Most contemporary scholars now admit that Fleck's contributions are original, even pioneering, in the field of epistemology (Löwy, 2008: 375).

Fleck graduated from medical school at the University of Lviv. From 1920 to 1923, he assisted Rudolf Weigl, famous for his research on typhus. Fleck then went on to specialise in bacteriology in Vienna. From 1925 to 1927, he served as the head of bacteriological and chemical laboratories for the State Hospital in Lviv. He spent 1927 in Vienna, during the heyday of the Vienna Circle.[2] From 1928 onwards, he continued his laboratory practice in Lviv, writing papers on serology, haematology, experimental medicine, immunology, bacteriology, the methodology of science, scientific observations and the history of discoveries. In 1935, owing to his Jewish identity, he was dismissed from the laboratory at which he had worked since 1928. When the Germans occupied Lviv at the start of the Second World War, he was the director of the bacteriological laboratory within the city's Jewish hospital. It was at this time that he succeeded in developing a reliable diagnostic test for typhus, which provided swift detection and isolation in the midst of a typhus epidemic. Fleck was arrested in 1942, along with his family and staff, and they were all deported to the concentration camp at Auschwitz. There, Fleck and his staff were forced to produce a vaccine against typhus for the German forces. In 1944, he was transferred to Buchenwald, where he continued to prepare typhus vaccine. It was only after the Second World War that he received affirmation for his work in the field of microbiology. He became an authority figure in the medical field, which drew attention away from his work on epistemology. In 1957 he migrated to Israel, where he died in 1961 (Trenn and Merton, 1981: 149–53).

Fleck's most significant epistemological papers were published in the 1930s, but became known only with the emergence of constructivist programmes of philosophy and the sociology of knowledge. He has come to be regarded as a standard-bearer in his field, side by side with

Karl Popper or Robert Merton. Further, owing to the influence of Fleck's ideas on Kuhn's *Structure of Scientific Revolutions*, the latter's efforts greatly contributed to the affirmation of Fleck's work after the Second World War (Eichmann, 2008: 26–8; Condé and Salomon, 2016).

According to Cohen and Schnelle, Fleck's scientific work in the field of cognition developed through three phases. First, he slowly migrated from the history of medicine to the history of science with two short essays in 1926 and 1929, in which he began to question scientific reality itself more radically. The main phase of his work on the philosophy of science relates to the publication of his monograph entitled *Entstehung und Entwicklung einer wissenschaftlichen Tatsache* (*The Genesis and Development of Scientific Fact*, 1935). In this work he defined his own theory of cognition. After the Second World War, Fleck's experience called into question the collective basis for scientific work, since he had relied solely on his own experience to develop a typhus vaccine while imprisoned. In July 1960, near the end of his life, his ideas were summarised briefly in an article published in the journal *Science* (Cohen and Schnelle, 1986: x–xi).

When speaking about Ludwik Fleck, his unusual scientific path stands out foremost. The bizarre fortune of his expertise saving him from probable death, his near-invisibility in the philosophical profession, his deferred recognition within that community and the posthumous reception of his work are markers of his unique life, from which his ideas may in part derive their originality. Fleck's contributions to epistemology and science alone bring his genius and tragedy to the fore. Such myths are precisely a type of idea he tended to question and distrust the most: he repeatedly pointed out that the scientific collective must remain the focus when approaching the production of scientific knowledge. Fleck saw the role of an individual as interlocked within a community. He considered claims easily condensed into the form of 'someone discovered something' as vague, since they fail to show any additional dimensions such as social context, social networks and the understanding of the claims such statements make. To establish that 'someone discovered/recognised/pointed out/dug up something' is possible only when the basis of the existing knowledge is already known. This is to say that a conclusion may be reached only within a particular cultural ambience, thought-style or thought-collective (Fleck, 1986 [1947]: 134–40; Weissmann, 2002: 112–13; Condé and Salomon, 2016).

To summarise, the concept 'thought-collective' represents the idea of a community of people in constant intellectual interaction exchanging their ideas. The members of the thought-collective accept specific ways of perception and thinking and tend to share a style of thought that gives birth to 'the real explanation'. Even though a thought-collective

is a group of individuals, crucially it does not form by simple addition of people or by their actions within a single frame (Fleck, 1981: 41). It instead forms by a group dynamic, which imposes a collective manner of thought from which individual thought shows no variance.

Re-thinking knowledge production on a Fleckian basis

In Fleck's manner of thinking, the transformation of an idea originating from interpersonal communication is key. The backbone of a thought-collective lies within communication which values three main processes: understanding as well as disagreeing; diverse understanding of the same phenomena; and linguistic articulation of ideas. While different thought-collectives can research or describe the same subject, communication between thought-collectives can be very difficult. Since Fleck regarded thought-collectives as working not only in science but in the arts, religion or politics (to name a few areas), he put forward astronomers and astrologists as an example of such impossibility of communication between two thought-collectives. Even though both collectives reach conclusions by observing celestial bodies, their styles of thinking are incommensurable. By defining this as the problem, Fleck does not underestimate the significance or the position of science, but allows irrational elements in scientific thinking to be susceptible of analysis. Furthermore, in his view there are differences between scientific and non-scientific thought-styles, which relate to the density of interactions between participants in thought-collectives. Scientific communities are characterised by a high density of social interactions; as a consequence, scientists tend to produce consensual and homogenised knowledge (Löwy, 2008: 382).

It is difficult to overlook the social structure of scientific communities, even when considering only the formal aspects of their actions. Simply examining the distributions of work, cooperation, co-authorships, aspects of technical support, the exchange of ideas and controversies within the scientific community will call attention to this. Moreover, groups and hierarchical positions within the same community can be distinguished through observing participation in meetings, congresses and professional journals as well as different approaches to professional training, field experience and academic exchange (Fleck, 1981: 38–44).

However, the question here is how thought-styles are formed and how thought-collectives function. Ideas pass from one person to another and produce slightly different associations. In Fleck's opinion, one can never speak of an absolute understanding of an idea. After a few exchanges about the interpretation of a given phenomenon, almost nothing remains of the original idea. Given this flux, what then is the

understanding that is kept in circulation? By exchanging ideas within a community, key subjects are improved, changed, reinforced, simplified, ultimately influencing the formulation of concepts, customs and habits within a community. When, after several rounds of exchange, the altered ideas return to their 'originator', who is, per se, changed by the pulsations of the process of exchanging thoughts, that 'originator' might perceive the newly made ideas as their own, that is, containing nothing more than the initial idea did. The key specific of a thought-collective is that we see with our own eyes, but perceive through the lenses of the community we belong to. We know whether we are able to see what it is to be collectively acceptable (Fleck, 1981: 42).

Some thought-collectives last only a short time, but those with an organization and structure able to last for several generations often resemble religious movements, and consolidate authority and influence in a similar fashion to 'national traditions'. Long-lasting thought-collectives are intertwined with the institutions through which they induct younger generations, by virtue of an educational system and rituals following the induction of new members into a community. When a thought-collective grows large, it definitely becomes a more widely-extended and sophisticated system. It consists of a small circle of experts (an esoteric circle) from which, in part, knowledge originates; and a group of scientists in a wider circle (an exoteric circle) who are under the influence of the group's style of thinking, but do not play an active role in formulating and changing this. The central figures, or members of esoteric circles within scientific communities, are equivalent to preachers to whom others extend trust. It is interesting that Fleck argues that popular and textbook science, always slightly simplified and seemingly convincing and well based, reinforces belief in the objectivity within the scientific community. Hence, it functions as a loop: the scientists preach to the broadest public possible, who in turn consider their statements as relevant and express respect for them, and in turn the scientists see public desire as overlapping with their own work. Within the inner structure of a thought-collective, Fleck distinguishes the following subgroups: 1) the group preceding the thought-style, working practically on a given problem (the vanguard); 2) the official community; and 3) the stragglers (Weissmann, 2002: 110–11; Škorić, 2010: 350).

Highlighting the characteristics of a thought-collective allows further discussion of the basis for it. First, solidarity develops within members of a thought-collective, a mother scientific group, comprising colleagues. The group develops disdain for the members of other thought-collectives. They are strangers, believing in other gods, using unfamiliar words and unreliable concepts. According to Fleck, emotions play a large role in the function of scientific communities. In a researcher, they often inspire

dedication through participation in a given mission and accentuating the significance of initiation into the research circle. It is possible to distinguish democratic thought-collectives (the most common interpretation of the character of the scientific community), in which every member is encouraged to study and advance, from dogmatic collectives, which develop dogmatic ways of thinking, basing rules of conduct on some mythical figure/founder/saviour from the distant past. Everyday life in the latter type of community has a reinforced, ceremonial character and access to esoteric circles is well guarded. Within these circles there is no room for fundamentally new ideas – only a more precise following of existing principles. A thought-collective is more likely to succeed when research is conducted under explicit social pressure; that is, if researchers work long enough on a certain problem and receive sufficient material support (Fleck, 1981: 98–115).

Fleck opened *Genesis and Development of a Scientific Fact* in 1935 with the questions what is a scientific fact? How is it created and developed? In his view, the sanctification of facts by itself produces an extreme passivity in the scientific community, as the reality of facts is regarded as completely independent of the scientists establishing them. Questioning this should not induce scepticism, but rather revive the dependency of cognition on the thought-collective. Through understanding this relationship, it is possible to understand when and how facts change (Fleck, 1981: xxvii–viii). Once a thought-collective is established, the scientific observations that stem from it become strictly defined by the collective's limitation to the boundaries set within its established viewpoints. The thought-collective therefore actively resists all contradictions of its established world view, through several distinct phases:

1 Contradicting the system is incomprehensible.
2 Tending to ignore anything that does not fit within the system.
3 If any aberrations are then noticed, they either remain a secret, or obvious efforts are made to explain them in such a way as to bring them within the system in a particular way.
4 Despite any justification for contradicting standpoints, the individual starts noticing, describing and illustrating those circumstances that fit closest to current understandings, to participate in the meaning within the terms accepted by the thought-collective (Fleck, 1981: 27).

Perceiving a new fact is not possible unless a scientific community changes its thought-style, or at the very least a change is indicated. In the process of changing, small transformations, misunderstandings and mutations of ideas occur in which constant interactions play important

roles. It is impossible to learn and adopt something radical in a simple and swift way. In addition, the triggers for change can come from completely unexpected directions, such as from proto-ideas (Škorić, 2010: 344–5).

The concept of proto-ideas enables us to understand trans-generational processes, the development of ideas on the vertical scale of the heritage of a discipline, such as archaeology in Serbia. Fleck regards proto-ideas as rudiments of contemporary theories, indicating that facts are always established step-by-step, starting as unclear proto-ideas which are neither correct nor incorrect. Considering that the task of epistemology is precisely to discover this transformation of ideas over time, he emphasised the significance of understanding proto-ideas, pointing out specifically that the detection of irrational elements in obsolete explanations could help scientists to better contextualise their own scientific knowledge (Rotenstreich, 1986: 161–76).

According to Fleck, proto-ideas constitute a significant part of our socio-cultural heritage and, at certain moments, present the thought-collective in the process of cognition. Conversely, he accepts no thesis about scientific knowledge being cumulative; rather, science is a continuous change of thought-styles that develop over time, are sociologically conditioned and interact mutually. The dynamics of this structure generates the development of science but development can be taken as neither progressive nor evolving. New knowledge ensues and old knowledge is lost, not through progress but through certain problems losing relevance to a thought-style. Unlike Kuhn, Fleck does not speak of revolutions (Brorson and Andersen, 2001: 123). Fleck notes that scientists are not aware of changes. Certain ideas have a longer lifespan because they present inspiration to newer thought-styles then are reinterpreted in accordance with changes in a thought-style (Škorić, 2010: 346).

Archaeological communities (think) as thought-collectives

There is a general consensus that delays occur in the adoption in peripheral environments (such as Serbia) of archaeological concepts originating in Western European. This would imply (falsely) that in general the development of archaeology follows the same uniform, unilineal sequence of paradigms: culture-historical, processual and post-processual (Babić, 2014; 2015; Palavestra and Babić, 2016: 317). However, the concept of paradigm and paradigm shift is not applicable to Serbian archaeology as far as Kuhn is concerned, since it is too unwieldy to apply in all aspects on the local level (Kuhn, 1970). As a consequence, to constitute a first step into research of the history of ideas in archaeology, it is necessary to

find an approach adequate to understanding the sociology of knowledge production and archaeological epistemology. In this sense, I will focus on the cultural history approach in Serbian archaeology, and discuss how it overcame its dogmatic character in the archaeological community. In order to comprehend this shift within Serbian archaeology, it will be necessary to adopt Fleck's concept of the thought-collective as a novel tool in the understanding of networks of communication and the production of knowledge within archaeology. However, his concepts have demonstrated their limited scope for understanding trans-generational knowledge transfer, which necessitates further examination and reflection upon these theories, to adapt them to be more applicable.

To improve Fleck's definition of the thought-collective, it must be developed further, to be utilised as a tool through the creation of a research programme for this specific case study – which will be based on four distinct steps. The first and foremost is Fleck's understanding of how a thought-collective works (Fleck, 1981), presenting a unit for studying a horizontal cross-section of the history of archaeology. Secondly, to connect different generations of archaeologists, it is necessary to strengthen Fleck's thought-collective through the prism of Karl Mannheim's concept of 'generation'. Mannheim asserted that a generation is determined by the similarity of a social location, primarily through his understanding of how generational experience is 'stratified'. He examined how knowledge is transferred between 'generations', how the hierarchy of research questions is forgotten by later generations, how different groups (thought-collectives) establish themselves within a single generation and the precursors of the generational style. Mannheim's ideas serve to connect the horizontal cross-sections of the history of ideas in archaeology (Mannheim, 1952). Metaphorically speaking, when Fleck's and Mannheim's ideas are combined, a horizontal and a vertical axis are achieved. However, even this graphic representation does not embrace the full complexity of the transfer of ideas occurring in Serbian archaeology.

The third step in the creation of an applicable research programme is to include the actor-network theory of Bruno Latour, who views the production of scientific knowledge as occurring via relations within a network. From this point of view, the intrigues, dialogues, agreements and disagreements, as well as both formal and informal discussions within the scientific community, can be visualised as a comprehensive unit to be analysed. Although ANT utilises a wide vocabulary in order to surmount such a complex issue, its vocabulary is frequently misused and misunderstood in its application. As to avoid this pitfall, this case study has disregarded Latour's expansive *œuvre* in favour of concentrating on his early work, particularly the birth of social constructivism

in the post-Kuhnian philosophy of science. Latour's initial approach, demonstrating that scientific 'facts' are not an out-there 'substance but fabrications' emerging from social interactions, is crucial in understanding the microstructure of academic networks (Latour, 2005).

Last, but not least, are the points of intersection; that is, strongly networked knots within a network or authorities within a scientific community. In the field of archaeology, Tera Pruitt addressed this issue on a Foucauldian basis in her doctoral dissertation *Authority and the production of knowledge in archaeology* (Pruitt, 2011).

Introduction of culture-historical approach into Serbian archaeology

Let us therefore look more closely at one particular example of Serbian archaeology. During the first half of the twentieth century the discipline was predominantly marked by the ideological domination of a single authority who actively suppressed scientific debate, but also the development of new scientists stemming from emerging generations and dissenting interpretations of the past. This authority was Miloje M. Vasić, a classical archaeologist educated in Berlin and Munich in the late nineteenth century (Palavestra, 2012; 2013). He defended his PhD under the supervision of Adolf Furtwängler, the so called 'Linnaeus of classical archaeology' (Hansson, 2008: 19–23; and 2014) who has been described as described as 'more feared than loved' (see chapter 7). Yet Furtwängler's influence would bring fruitful results: Vasić was to become the ultimate archaeological authority in Serbia, resulting in an era of his absolute domination over the discipline in Serbia which lasted throughout the first half of the twentieth century.

Starting in 1908, Vasić began to systematically excavate Vinča, a multi-layered, prehistoric archaeological site of great importance on the shores of the Danube near the Serbian capital of Belgrade. The excavations were occasionally interrupted by war over the following decades. From the first reports of the excavation, Vasić began to interpret certain evidence as culturally influenced. In his opinion, these influences had spread north-east from the Aegean region, and Vinča was proof of this. To him, the site dated from the Bronze Age and had been settled by Aegeans along with autochthonous locals. Ultimately, in 1934, Vasić came to alter his interpretation, concluding that Vinča had been an Ionian colony on the Danube dating from the sixth century BCE. He staunchly defended this faulty thesis until his death in 1956, even in the face of overwhelming archaeological discoveries and interpretations that solidly proved the falsehood and unsustainability of his theories (Palavestra and Milosavljević, 2015: 322).

After the Second World War, and then Vasić's death, the establishment of working interrelationships between Serbian and other Yugoslav archaeologies led democratic tendencies to develop within collectives (Novaković, 2011; Milosavljević, 2015). It was only after the war that his interpretation began to be criticised by some of his students, who included Josip Korošec, Milutin Garašanin, Draga Garašanin, Alojz Benac and Vladimir Milojčić. This period has been called by the present Serbian archaeological community a paradigm shift, in which a cultural history approach in Serbian archaeology became established following the recognition of Vinča as a Neolithic site (as it is), not a supposed Ionian colony. The shift by itself was not the driving force behind the change, but rather its catalyst (Palavestra and Babić, 2016: 324).

The work of Gordon Childe was well known to Vasić even prior to the 1920s, so much so that Childe had come to Vinča officially in 1926 to speak with Vasić. Childe reportedly considered Serbia to be one of the most significant areas for improving Europe's understanding of prehistory (Nikolić and Vuković, 2008: 39–86). It must therefore be asked why, in light of this familiarity, a cultural-historical approach already systematically established outside Serbia had to wait another thirty-odd years to be introduced into Serbian practice.[3] Put more bluntly, what must already be established before new thinking can emerge, let alone its application within a knowledge community?

Gordon Childe and C. Daryll Ford, his friend from Cartwright Gardens who later became professor of anthropology, travelled together for six weeks throughout Yugoslavia, Romania and Hungary in 1926, gathering new data. Special attention was focused on personally checking the stratigraphy of sites such as Vinča when Childe visited Vasić's excavations near Belgrade. During that period, *The Dawn of European Civilisation* was printed. By the September of that year, *The Danube in Prehistory* had been finished, in which the Vinča site was recognised as key for the study of European prehistory and the Danube as an extensive natural highway across the European continent, the principal route along which civilisation had been diffused from the Near East. The justification for Childe's chronology was his synchronising of Vinča I with Troy II, based upon his economic perspective, which he would go on to use for the remainder of his life, helping him change the face of European archaeology (Trigger, 1980: 56–60; Green, 1981: 55–6).[4] Vasić was impressed by *The Danube in Prehistory*, mostly because of the Aegean-Danubian parallels cited in it. His only point of contention was the dating of the Vinča site. What is most pertinent is that mechanisms of cultural change were to be found both in Childe's and Vasić's work, for all that the latter's ideas about Aegean influences predate those of the former (Palavestra and Babić, 2016).

Compared to the state of Serbian archaeology under Vasić's domination before the Second World War, the second half of the twentieth century began with a greater number of once-marginal figures and young people being included within the archaeological community. Such a change was possible owing to the role that Miodrad Grbić played, educating young colleagues and establishing international contacts, which allowed continual access to new information in the field. He held the post of part-time director in the Serbian Ministry of Education under German-occupied administration during the Second World War. As a consequence, he initiated a controversial two-year course at the National Museum of Serbia, by means of which he educated young college students on archaeology, the history of art and museology, showing a great number of them approaches that differed from Vasić's. As Lidija Ham-Milovanović has pointed out, '[i]t was a unique opportunity for new generations growing up at the time of the occupation because Belgrade University was closed and did not enrol new students' (Ham-Milovanović, 2009: 121–2). A wide spectrum of topics had occupied the attention of archaeologists in Serbia before the Second World War, and the interpretations found in the works of Miodrag Grbić were among them, alongside Vasić's standpoint. Grbić's interpretations are of extreme importance owing to the eventual role that the course, organised under his guidance, would play in the history of Serbian archaeology (Bandović, 2014: 629–48). However, like many others, Grbić was socially marginalised after the war because he had refused to distance himself from any form of cooperation with the German-led administration. The thought-collective headed by Milutin Gašanin introduced the cultural history approach to Serbia after the Second World War.

While the pre-war generation of Vasić's students established a community after the war which could be called a thought-collective, the core consisted of pupils who attended Grbić's course and emerged as a collective of resistance to the ideas of Vasić. The majority were students who had begun their studies of the classics with archaeology at the Faculty of Philosophy of the University of Belgrade in the 1930s. Aleksandar Palavestra has described this group of Vasić's students and Grbić's co-workers, comprising Josip Korošec, Alojz Benac, Milutin Garašanin and Draga Aranđelović-Garašanin, as a Fleckian thought-collective (Palavestra, 2013: 685). The oldest among them, Josip Korošec, left for his doctoral studies in Prague, where he earned his degree under Lubor Niederle at Charles University in 1939. Undergraduates who studied in Belgrade before the outbreak of war were later to complete their doctorates at the newly founded Department of Archaeology at the University of Ljubljana (Slovenia), headed by its founder, the same Josip Korošec (Milosavljević, 2015: 172–80).

Milutin Garašanin was one of these students. He sought to complete his doctoral studies under Korošec as he had a severe disagreement with Vasić over the dating of Vinča. This was a clear sign for Garašanin that doctoral work on a Neolithic topic could not be defended in Belgrade, owing to current academic biases (Babić and Tomović, 1996: 20).

Following the example set by Grbić and armed with the doctorate obtained from Niederle, the independent position of Korošec therefore made it possible for an entire generation to escape from Vasić's shadow. Miodrag Grbić had also defended his doctoral dissertation 'Pre-Roman bronze dishes in the region of Czechoslovakia' under the supervision of Lubor Niederle, but he had done so in 1925 (Gačić, 2005). In any case, no further anecdotes are needed about the fraying of relationships within the archaeological community during this period, but it is in such a context that the flow of knowledge transfer is determined alongside the disciplinary continuum. If such problems are examined with a view to identifying Mannheim's generations in the sociology of science, it is useful to note that the term 'generation' does not refer to a specific social group. Mannheim compares the term 'generation' to 'class'; he states that the force binding the members of a generation is the same as that binding a class – shared social location. Mannheim also states that the members of a generation share a layering of experience in social life, though not all members of a generation may experience the same events even when they live contemporaneously with one another. Subsequent experiences are usually assigned meaning based upon the first set, either in confirmation or as a negation of those first experiences – from this starting point any two alternating generations can have completely different primary orientations (Mannheim, 1952).

For instance, Milutin Garašanin, a key representative of Serbian archaeology after the Second World War, belonged to a generation which could complete its undergraduate studies under Vasić, the museum course under the guidance of Grbić and the first intertwining excavation of Yugoslav archaeology in Ptuj. He lived through the same formative layering as other students of his generation. Vasić, however, was of another generation, and perceived new developments at the end of his career as contrary to his 'stratification' of experience, as he defined them within his own generation's thought-style (Novaković, 2011: 396–8). As Aleksandar Palavestra and Staša Babić summarise:

> Thus the concept of culture groups, around which the culture-historical paradigm is mainly built, entered Serbian archaeology indirectly and from various directions, and was not understood in the same way by the archaeologists of successive generations, Miloje Vasić, Miodrag Grbić and Milutin Garašanin. Though modestly present in Serbia in the 1930s,

the paradigm came to be dominant only in the years after World War II (Palavestra and Babić, 2016: 324).

Tracking the thought-collective

The history of the discipline of archaeology is generally presented as an uninterrupted chain of key authorities and their ideas; yet great archaeologists and great discoveries have not been uncontroversial. The development of the archaeological community in Serbia, for instance, can be analysed by reference to the critiques and reviews published in professional journals, the content of which may be seen as casual and unimportant reading material; but it is, in fact, important in analysing what science contains. However, such material provides succinct views of what is considered important in a given context. Most commonly, reviews retell a book or a journal article, although occasionally the authors of a review sharply criticise or explicitly stress the significance of a particular publication. The points at which the reviews leave the tracks of unvaried summarising are often important indicators for contextualising ideas that are crucial for the thought-collective. Such points in the text either represent an underpinning to the research path or set boundaries between 'good science' and tangential diversion. Following Latour's actor-network theory, the importance of networks as social connections (Latour, 2005), as well as structures that support and propagate facts and archaeological theories, comes to light. Through examining communication networks among archaeologists (or thought-collectives, in Fleck's terms) – their emergence, support mechanisms and what disrupts them – it is possible to gain a richer understanding of how theories travel. Furthermore, archaeological methods and conventions, clearly visible in reviews which produce data in a particular context, do not stand alone. They need to be supported by a network of recognised authorities, hence the need for publication and scholarly exchanges.

The question that must be then posed is what network was central to the effort of establishing a cultural history approach within Serbian archaeology inside the newly formed Yugoslavia of the time. To wit, what narrative strategies were used to achieve that goal? Also, how did archaeological networks and citation practices function in this particular context?

To answer these questions, a critical analysis of discourse found in reviews from the prominent Serbian archaeological journal *Starinar* (*The Antiquarian*) from the years 1950 to 1960 will be carried out in order to better understand the changes experienced in the archaeological community of that time.

In the first issue of the new series of *Starinar* (1950), Garašanin

reviews the fourth edition of *The Dawn of European Civilisation* from 1947, a quarter of a century after the first edition. He considers that the basic concept of the book, guiding the author in the treatment of material culture, is different from the common understandings of prehistory in Europe. Nonetheless, Garašanin deems this approach more realistic and more acceptable, as it is based on the social-economic foundations of prehistoric society. Certainly, he is more interested in how Childe's attitude towards the question of Vinča culture has changed in this book, from that expressed in *The Danube in Prehistory* (Garašanin, 1950: 257).

In *Starinar* III–IV (1955), a review written by Vasić of *The Dawn of European Civilisation* appears, but of the French edition of the book published in 1949. Vasić's criticism is sharp and foremost refers to Childe's understanding of Vinča. Vasić states that the book is a compilation, completely in need of a rework (Vasić, 1955: 233). Opposing Vasić's position, in *Starinar* (1959) Garašanin once again reviewed the sixth, updated edition of *The Dawn of European Civilisation*, published in 1957. He stated that Childe's work is regarded as a classic for prehistorians (Garašanin, 1959a: 392–3). In the same issue, Garašanin writes an obituary of Childe. He notes that Gordon Childe was tireless at his work, especially in persistently following new research and studies. It seems that the famed archaeologist would be seen as an antithesis to Vasić, since 'he had always and gladly accepted discussion, possible objections and remarks, ready to openly admit fallacy and accept corrections concerning their legitimacy' (Garašanin, 1959b: 446).

It bears repeating that attitudes towards Childe's work can be viewed as an indicator of the general direction in which archaeology flowed within the post-war generation of archaeologists in Serbia, as headed by Garašanin. In a certain sense, Childe superseded the negative experience that Vasić represented. In the local application of general trends in archaeology, the Serbian cultural history approach formulated after the Second World War was substantially linked to Central European archaeologists such as Gero von Merhart or Richard Pittioni (Novaković, 2012, 151–71), as well as the 'late' Childe – that is to say, his understanding of the culture implemented in Yugoslavian/Serbian archaeology after the Second World War could be compared to those who pointed up changes in material culture which do not necessarily demonstrate change in ethnicity (Novaković, 2011: 440–50; Raczkowski, 2011: 201). This 'late' version of Childe's thinking began in the 1930s, when he overtly discarded the connection between race/ethnicity and archaeological culture based on ideas borrowed from Soviet archaeology (Patterson and Orser, 2004: 9). However, when the main weapon of the cultural-historical school of thought was questioned in the West after the Second World War, Gordon Childe also simultaneously became a landmark and a

yardstick for the systematic scientific approach in Serbian archaeology (Babić, 2014: 286–7).

Visualising the thought-collective

The example of Serbian archaeology has hereto been drawn upon to demonstrate the experimental use of Fleck's concepts of thought-collectives and thought-style. This chapter discusses a Fleckian theoretical background for the history of archaeology in Serbia based on empirical data consisting of various texts, as well as relations between citations that are used to track a thought-collective in a clearer, more visual manner. To this end, the following section will delve more deeply into the development of this methodology, seeking to represent a thought-collective visually by mapping the function of relation networks. The purpose of this methodology has been to apply Fleck's ideas to the history of archaeology proper.

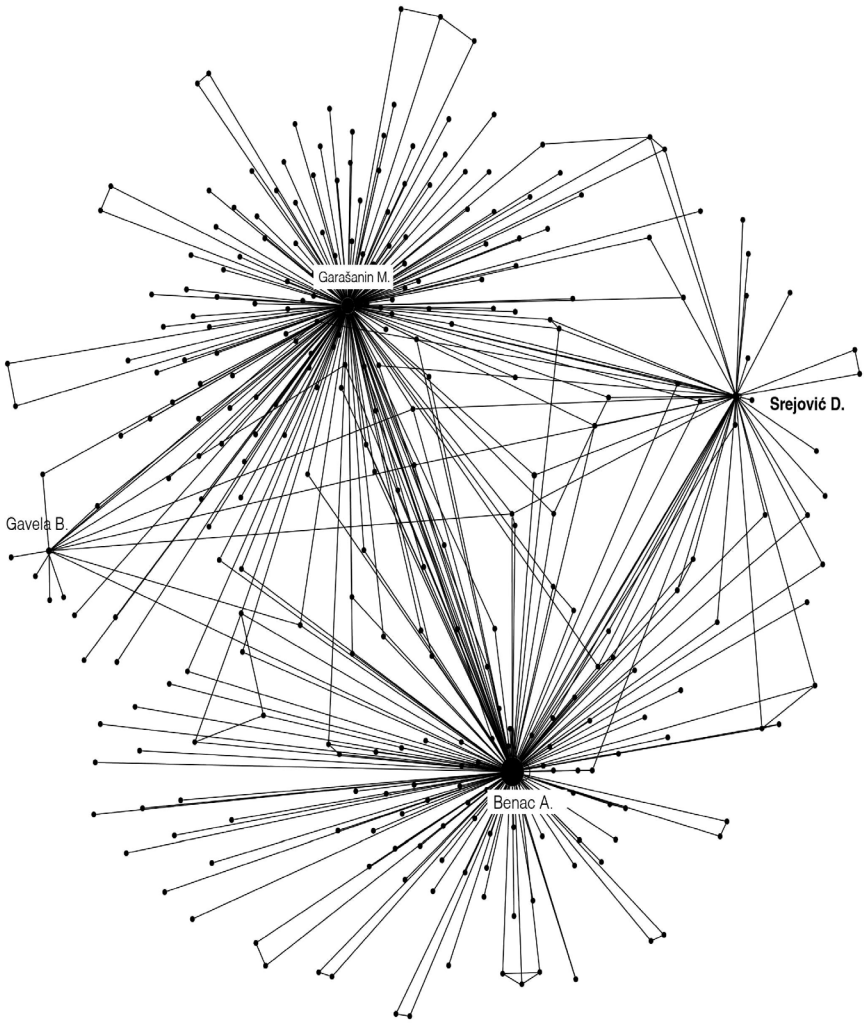
Social network analyses have proven to be useful as a formal concept when applied critically to trace the domestication and adaptation of ideas, methods, and techniques by thought-collectives. Network analysis is not a single, homogeneous method, but rather incorporates every formal technique that visualises or analyses the interaction between nodes. According to Tom Brughmans, a formal network is a set of nodes as well as the ties connecting them (Brughmans, 2013; 2014). A citation network analysis is a useful approach to explore general trends in academic influence; co-citation networks are a fruitful indicator, in particular of clusters of papers that deal with related topics. By carrying out a citation network analysis (Waingart, 2015: 201–13), the connections made by co-citations among key authors in Serbian archaeology during the second half of the twentieth century can be shown, from which highly indicative results are obtained. Of course, citation analyses have abundant methodological issues, particularly when this technique is applied in this primarily quantitative form. Whatever the issue, citation is a process in which the author creates private symbols for certain ideas that they use by citing a text. Private symbols easily become 'standard symbols' for a particular group of researchers (in the frame of an 'invisible college') (Díaz-Andreu, 2008: 126–7). Often, citation not only refers to the author being cited, but, for a certain thought-collective, links that author to a referent representative. Since citation depends not only on the object of a work but also on the individual who is citing and the social context within which they are working, it is therefore necessary to keep context constantly in mind (Škorić, 2010: 266–75).

The question of the 'Illyrian' or Palaeo-Balkan past was one among a number of common topics for archaeologists in the former Yugoslavia,

primarily within the thought-collective headed by Milutin Garašanin (Džino, 2014; Babić, 2014; Mihajlović, 2014). This topic has been selected for analysis because the 'Illyrian' or Palaeo-Balkan past is a matter of identity for Yugoslav and post-Yugoslav archaeologies (Gori, 2014: 300). It serves as both an apt example and a rich source of sampling for such an analysis. A co-citation network is helpful when needing to gain both a clearer picture of the discussion carried per se within a field and better insight into how the topics of disciplinary conversation interconnect or fail to do so. Since the use of history and archaeology is susceptible to the self-interpretation triggered by terror of the *Zeitgeist* in academia, examining the interaction of a collective whole of inter-citation helps to access the core of thought relevant to a given period. One could say that thought-collectives are detected inductively using this technique and, as it is in essence descriptive, it works better as a tool to help clarify ideas about the field than to prove or disprove hypotheses. It is important to bear in mind the object of representation within this approach: co-citation networks generated from limited, selective material. By necessity, this underscores the fact that it does not provide a complete picture of the field; rather, co-citation analysis is an apt method for identifying who was most influential in Serbian/Yugoslav archaeology (during a particular period) (Gmür, 2006; Waingart, 2015).

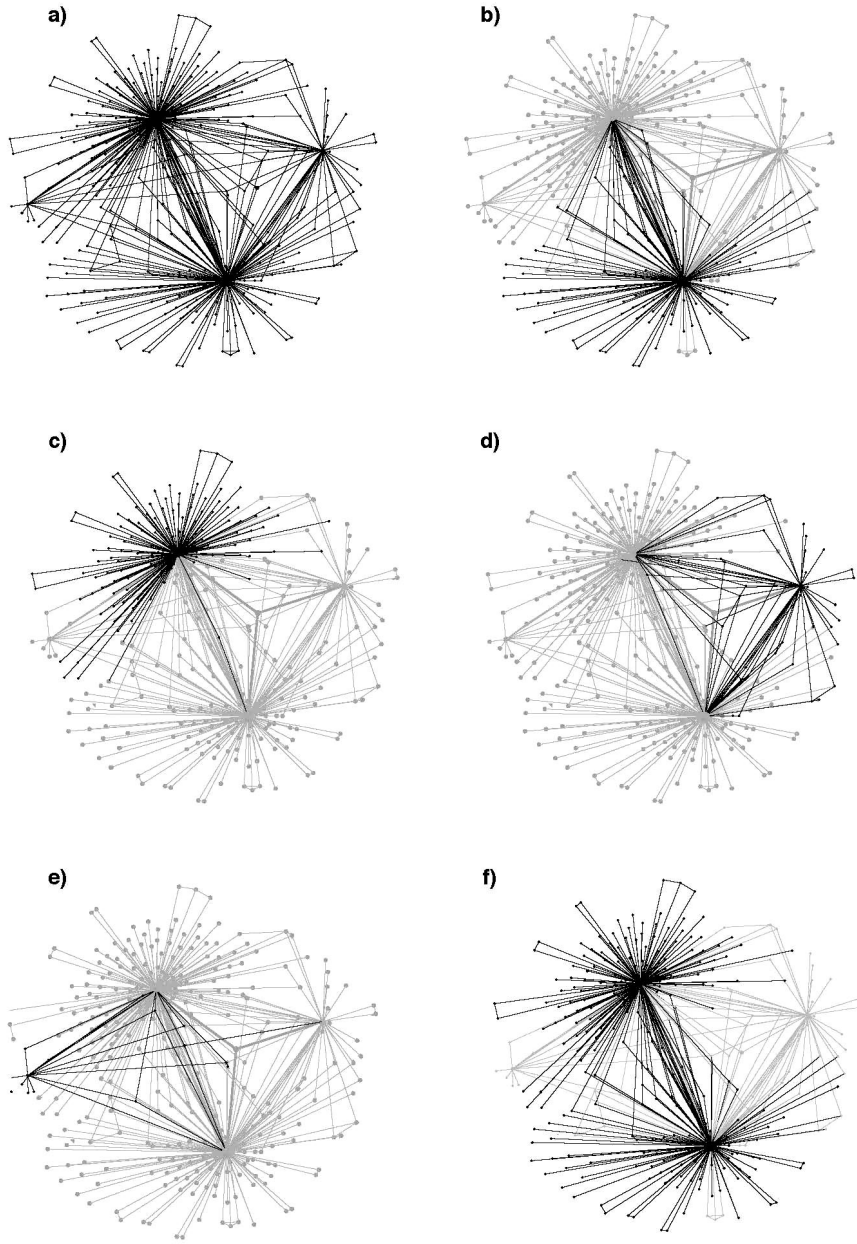
I have selected seven of the most prominent texts (according to how often they were used for teaching) on 'Palaeo-Balkan tribes' published between 1950 and 1990. The scientific texts in this sample were written by four archaeologists: Milutin Garašanin (1964 and 1988), Alojz Benac (1964 and 1987), Dragoslav Srejović (1973 and 1979) and Branko Gavela (1971). The visualisation of the co-citation network was prepared using the Gephi platform, designed for visual representation in research into networks and complex systems (https://gephi.github.io, visited 13/05/15). The resulting network comprises 297 nodes and 414 edges (Figure 1.1). The analysis processed 1,118 ties, which presents a modest span of research though still relevant for visualisation.[5]

Based on this sample, the conclusion is that Garašanin was the most intertwined or central figure in the thought-collective to which he belonged (Figure 1.2 (a)). Moreover, a key connection lies between Garašanin and Benac (Figure 1.2 (b, c, f)). The number of elements of bibliographic coupling for these two authors is highly significant (Figure 1.2 (f)). What is most salient is the weak intertwining of Srejović (Figure 1.2 (d)), who was one of the most important figures in Serbian archaeology during the second half of the twentieth century owing to his great discovery of Lepenski Vir (Novaković, 2011: 397–8). One plausible reason would be that he was central to another thought-collective,



1.1 Network of co-citations of scientific texts by the archaeologists Milutin Garašanin, Alojz Benac, Dragoslav Srejović, and Branko Gavela. Copyright © Monika Milosavljević. All rights reserved and permission to use the figure must be obtained from the copyright holder.

which was opposed to introducing a culture-historical approach into Serbian archaeology. Despite their disagreement, changes in Serbian archaeology during the 1950s occurred as a consequence of communal agency among Yugoslav archaeologists, headed by a thought-collective constituted by Josip Korošec from Ljubljana, Alojz Benac from Sarajevo and Milutin Garašanin from Belgrade as well as their local networks of archaeologists.



1.2 a) Network of co-citations; b) Alojz Benac's influence in the network; c) Milutin Garašanin most intertwined in the network; d) weak intertwining of Dragoslav Srejović; e) Branko Gavela's influence in the network; f) a key connection between Milutin Garašanin and Alojz Benac. Copyright © Monika Milosavljević. All rights reserved and permission to use the figure must be obtained from the copyright holder.

If the history of archaeology is relevant to science, it is essential for it to develop its own theories and methodologies. This fact becomes clearer when Kuhn's approach is considered: it is far too simplistic to encompass the complexities of academia and academic research (Kuhn, 1970: 10–22). To counteract Kuhn, this chapter has undertaken a critical application of the theories of Ludwik Fleck on knowledge production to explain how a cultural history approach was introduced and thrived in the field of Serbian archaeology. Through a co-citation network analysis Fleck's concept of the thought-collective and the ways it functions has been demonstrated here to be germane, principally because no revolution took place, but rather a change in thought. The process of change examined was protracted and occurred under complex mitigating circumstances; and it is highly significant that the strain which thought-collectives underwent led them in a single direction. As a way to analyse the consolidation of new knowledge within the collective, it has been extremely important to be able to select an adequate sample that reflects already established and accepted forms of knowledge taught within the collective. However, to better gain insight into the actual changes within the collective as they interacted with one another, this chapter has shown that network and co-citation analyses serve well in establishing patterns within such changes.

Notes

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2 The Vienna Circle was a group of philosophers who met regularly in the 1920s and 1930s at the University of Vienna, chaired by Moritz Schlick. The group was highly active in advocating new philosophical and epistemological ideas in the field of logical positivism.

3 It should also be noted that Childe's works were readily available in the library of the Faculty of Philosophy in Belgrade, and that Vasić had recommended them to his students. As a curiosity, on one page of Vasić's copy of *The Danube in Prehistory* there are seventeen exclamation marks!

4 Childe recognised the presence of the *spondylus* shells in the Vinča I stratum and interpreted them as evidence of Neolithic trade, possibly in return for cinnabar ore. As this was not Childe's original interpretation, it very well could have been prompted by something Vasić had noted during the former's visit in the summer 1926 (Trigger, 1980: 59; Palavestra, 2013: 700–701).

5 Automated citation indexing has changed the way that citation analysis research is carried out, allowing data to be analysed for large-scale patterns; unfortunately, this was not possible within the scope of research for this chapter. Consequently, bibliographies have been extracted manually.