CULTURAL DETERMINANTS OF SCIENTIFIC KNOWLEDGE: LUDWIK FLECK AND STEFAN AMSTERDAMSKI

In my article I want to sketch two versions of the idea of cultural determinants of scientific knowledge. The plan of the presentation reads as follows: firstly I will outline the idea of cultural influence on scientific theories in general; next, I will characterize views of two Polish philosophers — Ludwik Fleck and Stefan Amsterdamski, and finally in the conclusion I will present some summing up remarks.

I

The idea of cultural influence on science — namely on scientific concepts, theories and scientific development — has been present in philosophy from the beginning although

for most of the time it has been on the margins of the main philosophical currents. In philosophy, and especially epistemology, the idea of the autonomous and rational cognitive subject was predominant. From this perspective the concept of non-cognitive factors influencing cognition process was treated in terms of epistemological obstacles.

In ancient philosophy the idea of cultural influence on cognition was first formulated in a positive form by Xenophanes, a Greek philosopher, theologian and a poet; and next by sophists, namely Protagoras and Gorgias. In their views we can see main consequences of this idea, especially anti-realism and relativism. And that relativism was the cause of Socratic and Platonian attacks on sophists and also was the source of the attempts to create some absolute standpoints in epistemology.

The question of the role of culture in human cognition arose again at the beginning of the modern era. In the works of Francis Bacon we can find very sophisticated analysis of some disturbances of our knowledge. These are called «idols» and are connected with some aspects of our cognitive condition: biological, individual, linguistic and cultural. They hardly influence our cognitive process and our knowledge of the external world. The role of philosophers is to create some methodology to help to avoid them. Bacon believed that his philosophy of science, especially his theory of induction, would deliver us from idols and finally we would possess true and objective knowledge. In fact, the main modern philosophers from Descartes to Husserl tried to find the ultimate foundations of that knowledge.

One of the crucial points for the idea of cultural influence on scientific knowledge was the critical philosophy of Immanuel Kant. As we know, Kant formulated a thesis that our cognition isn’t a passive registration stimuli from the external world but some active process in which, using our cognitive structures, we construct our world as the object of knowledge. Kant himself was not interested in examining the sources of these cognitive structures. He took his epistemological project as transcendental so he rejected all naturalistic problems such as the question of the genesis of these structure. But with time, there were many attempts to naturalize the transcendental philosophy formed, for example, by Jakob Friedrich Fries and Friedrich Lange. The most widely spread conception was the idea of evolutionary genesis of cognitive structures leading to some kind of «biologization» of Kantian epistemology (for example Konrad Lorenz, David Campbell and Gerhard Vollmer). That process of naturalization of transcendentalism lead in turn to treating human cognitive structures as rooted in culture or language. It opened the way to the notion that our cognition is less or more determined by cultural factors.

However, in the first half of the 20th century that idea was present only on the margins of the philosophy of science. The main current of that philosophy was dominated by logical positivism and analytical philosophy interested mainly in the context of justification, not the context of discovery. This position characterizes both neo-positivism of Rudolf Carnap and critical rationalism of Karl R. Popper. Only after the Second World War, with Willard Van Orman Quine, Thomas S. Kuhn, Robert Hanson, Michel Foucault, Stephen Toulmin, Paul K. Feyerabend, the idea of the important role of culture for development of science received a broader recognition. Now, at the beginning of the 21st century, that concept is so strong and omnipresent — especially in a sociological version — that one
can feel the shift of importance going to the other side and the research on the context of discovery often leads to ignoring the context of justification and its important role.

II

Polish philosophy of science in the 20th century had rather neo-positivistic and analytical form — like the Lvov-Warsaw School. However, there were some thinkers who broke this paradigm. I will try to present two of non-positivist Polish philosophers of science whose names are widely known in the world of philosophy. The first one is Ludwik Fleck. Fleck was a medical doctor and a biologist who was interested in some question of methodology and philosophy of science. In 1935 he published a book called *The Genesis and Development of a Scientific Fact* in which he presented his conception of evolution of scientific theories in connection of broad cultural and symbolic sphere. The book was ignored in Polish philosophical milieu interested rather in logical structure of science than its sociological and cultural background; one should notice that Fleck’s ideas wasn’t original and but was rather very similar to the views of such thinkers as Durkheim, Levy-Bruhl and French philosophers of science of first decades of XXth century. Let us try to look at the ideas presented in this book.

The starting point for Fleck’s analysis is the thesis on the necessary theoretical background of scientific experience. This thesis held by, for example, Pierre Duhem and Henri Poincaré, says that in scientific cognition there are no pure facts because every scientific fact is possible only on the ground of some system of thought or conceptual scheme. Scientific facts are incomprehensible without some previous theories, concepts and rules which could enable their interpretation and intersubjective verification. So Fleck says that a scientist doesn’t work in a theoretical vacuum and his mind is not a *tabula rasa*. A scientist always works and conducts experiments in the framework of some system of ideas. Fleck called this system a «thought style». He defined a thought style as «*directed perception, with corresponding mental and objective assimilation of what has been so perceived*. It is characterized by common features in the problems of interest to a thought collective, by the judgement which the thought collective consider evident, and by the methods which it applies as means of cognition».

It is important not to treat a thought style as an obstacle or disturbance in a cognitive process. On the contrary, the thought style must be seen as similar to the Kantian a priori necessary condition of every possible knowledge. The thought style is that kind of condition. Without the thought style — that is some conceptual scheme organizing experience — scientific practice would be impossible. But the thought style — in opposition to Kantian transcendental conditions — is not a priori structure but is created by some social or cultural group. This group of people connected by a shared thought style Fleck called a «thought collective». The thought style is therefore a feature of some collective consciousness similar to that postulated by Durkheim and close to concept of *mentalitā* introduced by Levy-Bruhl.

What is the function of a thought style? The thought style is some kind of a general convention or set of conventions and rules which makes scientific practice possible — this

CONVENTIUS

means theorisation and experimentation. These conventions and rules form a demarcation line between science and non-science (or pseudo-science), establish problems and questions, provide criteria for acceptance of hypothesis and establish methods of verification or falsification.

For Fleck science isn’t a non-prejudiced description of objective reality, independent and external facts because we never have an access to pure facts and a reality independent of every/any interpretation. Science is rather a process of constructing some models or images of the world on the basis of some collective rules whose genesis is social or cultural and whose nature is conventional.

That view leads to at least three serious consequences. The first one is anti-realism: the world described by science is not independent of cognitive subjects but is a creation of collective consciousness. Our scientific knowledge does not deal with the external world but only with a social or cultural construction. The second consequence is relativism: it is possible for many incommensurable thought styles or images of the world to exist and we do not have any independent and external criteria to choose. Traditional epistemic values like truth, rationality and objectivity are always «for someone», are always perspectival and contextual. The third consequence is instrumentalism: if our theories do not describe the real world we must treat them only as some tools which let us cope with the world and solve practical problems.

III

It is widely known that Fleck’s ideas had a strong impact on Kuhn’s conception of paradigms and scientific revolutions. It is also known that Kuhn’s ideas led to many problematic consequences as those presented above. There were many attempts to avoid those theoretical dangers undertaken by, for example, Imre Lakatos, Larry Laudan, Ian Hacking etc. One of those attempts is a concept proposed by a Polish chemist and a philosopher of science Stefan Amsterdamski. Amsterdamski developed his ideas in many books interacting especially with Popper, Kuhn and Feyerabend. The ultimate version of his philosophy of science can be found in Between History and Method published in 1983.

Amsterdamski’s intention was to avoid two extremities: on the one hand, the extremity of ahistorical and pure logical philosophy of science proposed by neopositivism and Popper’s critical rationalism — both focused on the context of justification — and on the other hand, the extremity of historical and social relativism implied by the ideas of Kuhn, Feyerabend and the strong programme in the sociology of knowledge — which focused only on the context of discovery. In opposition to Carnap and Popper, Amsterdamski claimed that philosophical analysis of science must take into account historical and cultural dimension of scientific progress. Simultaneously, in opposition to Kuhn, Feyerabend and the strong programme he stated that this historical and cultural perspective on science does not necessary lead to cognitive relativism and destruction of epistemic values like truth, objectivity and rationality.

The key concept in Amsterdamski’s analysis is «the ideal of science». At first glance it seemed very similar to popular terms like «paradigm», «conceptual scheme», «episteme»

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and Fleck’s «thought style» but it would be a mistake to confuse it with them. The ideal of science is something broader than a paradigm or a thought style. One ideal of science can contain many paradigms and many thought styles. The ideal of science is a very general structure — or superstructure — that creates a common background for many types of scientific activities. In doing that it becomes a condition of commensurability and congruence between various thought styles or paradigms. Those paradigms may seem very different or even incongruent only in microscale when we confront one with another. However, in a wider perspective, in macroscale and some kind of historical long duration we can see them as various emanations of different realization of the same fundamental ideal of science. The best example is the modern ideal of science in which a scientific activity is conceived as a synthesis of mathematisation and experimentation. This ideal of science creates a common ground for so different paradigms like classical, relativistic and quantum mechanics or different thought styles in chemistry and biology.

Amsterdamski indicates four main functions of the ideal of science: firstly, the ideal of science determines potential borders of a phenomenon called science, this means that it draws a demarcation line between science and non-science. Secondly, the ideal of science is a filter serving to separate interesting problems from non-interesting (scientific from non-scientific, rational from non-rational). Thirdly, the ideal of science outlines rules of acceptance of hypothesis, this means it determines methods of verification. Fourthly, the ideal of science implies some scientific ethos, an internal organization of scientists and social forms of scientific activity.

IV

Let us briefly summarize and appraise the two presented conceptions. It is not hard to see that the first and chronologically earlier one has strong anti-realistic or idealistic and relativistic consequences. Therefore, Fleck’s ideas became very popular in last decades of XXth century especially in sociological oriented philosophy of science. The theory of thought styles and thought collectives is often interpreted in the perspective of constructivism, contextualism and social determinism of knowledge. Generally speaking, these views state that all scientific knowledge (or human knowledge in general) is created in particular social-cultural conditions and changing historical circumstances. For this reason scientific world image is not a representation of external reality but only a human construction determined by historically relative and in some respects accidental interests of some culture, society or collective. In short, knowledge is merely expression or image of particular historical social structure and its internal relations.

This view has clearly Marxian origins and achieved popularity in our times due to the strong programme in the sociology of knowledge and postmodern thought. Social sciences generally accepted this view as self-evident and it has widely spread in our culture as a kind of truth of postmodern intellectual faith. But in fact this view is neither self-evident nor simple. On the general and trivial level social constructivism says nothing original or controversial. It only claims that our knowledge is created under the influence of some non-cognitive factors and our scientific theories are, in some aspects relative with respect to time and place. These statements are of course true and at the same time obvious and no one wants to polemicize with them.
But on the radical and consequent level social constructivism generates many problems and difficulties that demand deep and insightful philosophical reflection which is unfortunately absent in postmodern social sciences. First of all this theory is self-refuting. **If all knowledge is a construction determined by changing social interest, so also the statement about a construction being determined by social interests as a kind of knowledge is a construction determined by changing social interests.** This means that if **social** constructivism is true — it can be false (in other social conditions). Therefore, if we want to save that view from falsification, we cannot make it general — but in that situation it loses any predicative value (as e.g. statement says that some people are good and some are bad). This point is crucial and some of social constructivists seem to understand it but they do not have any idea how to avoid that antinomy. There is also one more difficulty with this view. If every scientific or cognitive concept is a construction determined by society or its interest or some social relations (of production, of power, of sex etc.), it leads to a conclusion that also these concepts («society», «interest» etc.) are constructions; and moreover that these social interests which determine our knowledge are also constructions. It poses one more question: how can some construction create some other constructions. This is of course another antinomic problem which social constructivists cannot solve. In fact they are constructivists but non-global and non-consequent because they are realists in reference to the society and its interests treating them as existing external and independent of their minds. In short, they are constructivists in reference to some class of objects but realists in reference to a different class. But on this level it is a trivial view which has a little cognitive value.

In conclusion we can say that Fleck’s theory and other similar standpoints undoubtedly show some important aspects of our knowledge — as, for example, an active role of a subject of cognition and its relation with social or cultural conditions — but in consequent and radical versions these theories are hard to defend and demand very sophisticated philosophical argumentation.

Amsterdamski’s conception is free from these difficulties but there are other reasons why it can be considered inadequate. As a kind of compromise between realism and anti-realistic constructivism, absolutism and relativism, it has too general form and it causes some trivial conclusions. Amsterdamski is trying to find certain invariants of human scientific cognition which would let him save such things as truth (as a correspondence), objectivity and rationality of scientific ideas. But the fault of his project is that these invariants have too general and too enigmatic character and can embrace very different kinds of human activity, not only cognitive. Amsterdamski’s ideal of science was supposed to include many different scientific paradigms but in consequence it became so broad that it could include every reflective human activity. It seems that a more promising interpretation can be found in some propositions of Hilary Putnam, especially in his internal realism which is being developed in Polish philosophy of science by a mathematician and philosopher Adam Grobler3.

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has been on margins of the main philosophical currents. This situation was changed in the modern era. The question of role of culture in human cognition we can find in the work of Francis Bacon (in his «theory of idols») and in critical philosophy of Kant. In my article I present two versions of the idea of cultural determinants of scientific knowledge formulated in Polish philosophy of science. The first was created by Ludwik Fleck — medical doctor and a biologist who published his famous book The Genesis and Development of a Scientific Fact in 1935. The second was proposed by a chemist and a philosopher Stefan Amsterdamski in his book Between History and Method published in 1983.

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ОБРАЗ СОВРЕМЕННОСТИ В РАБОТАХ РОССИЙСКИХ И ПОЛЬСКИХ ФИЛОСОФОВ

Существуют различные формы философского анализа общества, осуществляется попытка их соединения. Современный человек отказывается от стандартных форм жизни, это меньшая озабоченность доходами, и индивидуальной биографией, он выбирает не между товарами и злом, а между кактукой и драйвом. Даже для низших слоев населения на рынок вышли стиль, мобильность, дизайн. На поверхности жизнь кипит не только в супермаркетах, но и в музеях, выставочных залах, увеселительных заведениях, полных людей. Однако это не значит, что общественность та, что была раньше. Перед нами толпа, где каждый в одиночку бродит с собственной целью, не обращая внимания на окружающих. Современность должна найти способ сохранения и воспроизведения традиционных культурных механизмов в новых условиях и на основе новых технологий. Главный урок XX века — преодоление свойственного противоборствующим сторонам и идеологиям предположения о неизбежности кризисов, чрезвычайных ситуаций и революций. Это нужно, чтобы не судить прошлое и осознать, что современность позволяет жить лучше и действовать более гуманно.

История человечества может быть рассмотрена под углом поисков способов объединения все растущего количества людей. Где же сегодня можно узреть общественное пространство? Парадокс в том, что все говорят о социальном прогрессе, а социальное пространство деградирует. Люди уже не ищут единства ни с космосом, ни с обществом, не ориентируются на идею народа, государства или класса. На поверхности жизнь кипит, люди едут в транспорте, тесно прижатые друг к другу. Не только супермаркеты, но и музеи, выставочные залы, увеселительные заведения полны людей. Однако это не та публика, что была раньше. Перед нами толпа, где каждый одиноко бродит с собственной целью, не обращая внимания на других. Отсюда проблемы современных политиков, которые пытаются создать коллективы из предателей коллектива.

В античности, единство греческого полиса достигалось на основе речей, произносимых на агоре — рыночной площади. В Риме к этому добавились зрелища, объединяющие большие массы людей как зрителей кровавых боев гладиаторов. Христианство предложило миру новый союз членов божественной коммуны, сплоченной опытом греха, любви и прощения. Эпоха Просвещения положила начало книжному,