

Social Milieu and Evolution of Logic, Epistemology, and History of Science. The Case of Marxism

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The impact of social factors upon the philosophical investigations in a broad sense is pretty evident. Nevertheless their impact upon the epistemology as a branch of philosophy, logic, and history of science as fields of research with noticeable philosophical content is not evident enough. We keen to claim this impact exist within some limits, though is not so overtly evident. Moreover in the case of Marxist it is of paradoxical nature. Marxism always puts the accent (even stresses) on the role of social and economic factors in the development, science development included. To large extent due to Marxism externalism emerged; the key idea of externalism may be expressed through the statement that namely social and economic reasons are the source of science/philosophy development. B.M. Hessen declared and did his best in 1931 to justify this statement through the example of classical mechanics emergence. Meanwhile social milieu of Marxist countries placed taboo on the externalist approach towards the epistemology, interpretation of logic, and history of science. All these fields of knowledge were evolved at Marxist era in the USSR and Eastern Europe – despite the spirit of Marxism -- within strict internalist borders (perhaps, it was the only chance for them to survive under the ideologized science phenomenon). We offer the explanation of this contradiction and trace the evolution of epistemology, interpretation of logic and history of science since early 1920's until the fall of communism. The fall of communism opened the road for externalist style research (though not Marxist) of epistemology and history of science. Social history of science becomes more and more fashionable in modern Russia.

Introduction

Marxism in XX century was an influential ideology and mode of thought. Many prominent Eastern and Western thinkers experienced its influence and charms. Later often they turned their faces and minds, and severely criticized its principles and implications. Nevertheless, Marxism proceeded to show its attractiveness. How can we impeach the degree of its influence if in the USSR and after World War II in the Central and Eastern Europe Marxism was adopted as State ideology until late 1980's and implanted by the force of the totalitarian power?

Due to old tradition Marxism considered to consist of the three parts: philosophy, political economy and so called scientific communism (the sort of political science based upon the number of Marxist dogma).

Interpretation of Marxism and its components during its hundred and a half years history and various geographic sites was different. Sometimes the adepts of Marxism debated over the problem (and even smashed each other heads) what to consider as authentic Marxism. Authentic comprehension of Marxism declared by dozens of its followers: say, by George V. Plekhanov and Vladimir I. Lenin in Russia, G. Lukacs, A. Gramsci, A. Camus, M. Foucault, etc. in Central and West Europe.

In early 1920's in Soviet literature dominated the position that any ideology is transmuted ideology, false self-consciousness and its highest form – philosophy – in its rational content already totally dissolved in science. Moreover, some Marxists claimed that the term "philosophy of Marxism" is non-logical and even 'harmful', and we need only pure science itself [Minin, 1922b, p. 194-195], that science oppositional to philosophy as well as to religion [Minin, 1922a, p. 122]. Named standpoint was pretty popular until late 1920's for "Marxism revealed the laws of social development and outcast philosophy from the sphere of social knowledge. At present moment philosophy finally lost its value" [Desktop encyclopedic dictionary, 1929, p. 607].

Some well-known Soviet Marxists (V.N. Sarab'yanov, I.I. Skvortsov-Stepanov, A.K. Timiryazev, L.I. Akselrod, A. Varjas) assumed that philosophy is not but mere summary of conclusions drawn from science. Laws of energy transmutation and conservation considered as universal and all conceivable material processes may be reduced to these laws. Dialectic

understanding of nature coincides with mechanical understanding, and all processes are converged to "energy transmutations which are under the scope of physics and chemistry" [Stepanov, 1924, p. 85].

Some Marxists treated the notions of 'dialectic' and 'historic' materialism as identical (as, say, Friedrich Engels did), the other the concept of 'historic' materialism used to denote Marxist sociology (Nikolai I. Bukharin).

Despite the lack of unity and various readings of Marxism its followers were confident that Marxist methodology opens radically novel and previously wondrous horizons in construction of new just and economically much more effective than capitalist society. New society might and ought to create new science while the old-style science will inevitably decline and setback. Such prescriptions shortened the distance between science and society, promoted the birth of so called ideologized science, and set a seal on the research in philosophy and history of science. Formal logic experienced from early socialist State special attitude for it considered to be a citadel of metaphysic (i.e. non-dialectic) thinking and, hence, automatically seized status of educational and/or scientific unit.

To what extent these prescriptions has an impact upon the character of theory of knowledge, analysis of science and its history?

Basic principles (axiomatics) of Marxist philosophy

To early-mid 1930's Marxist arrived at conclusion that within Marxism (which is "made from the undivided piece of steel") there exist Marxist-Leninist philosophy as relatively independent part. The lack of unity among Marxist on the number of key problems (like the relationship of philosophy toward science, ontology and epistemology, formal and so called dialectic logic, etc.) did not hampered uniform comprehension of cornerstone principles of this philosophy.

The core principle of Marxist philosophy from its beginning considered to be the principle of practice. This means that practical activity (i.e. material, sense-object, teleonomic activity) has more deep and profound nature than existence of certain objects-stuffs.

Principles of materialism, dialectics, historicity, etc. – all these principles borrowed through the materialistic conceptualization of Hegel's philosophy. Moreover terms and ideas, introduced by K. Marx primarily for analysis of society and its structure – social being and social consciousness, socio-economic formation, base and super-structure – inherited the spirit of Hegelian philosophy where the genus has evident priority toward the isolated element.

The history of social thought yields two rival approaches. The first approach is based on the primacy of the "whole (totality)" over the "sum of its parts." The second approach, on the contrary, emphasizes the "parts:" the success of the development of the "whole" is predicated on the development of the "sum of its parts." The first approach may be termed *social realism*; the second, *social nominalism*.

Social realism was represented by Hegel and Karl Marx. It judged that the development of a society and its parts (man, social groups, etc.) was determined by the whole – the Absolute Idea (Hegel) or class struggle (Marx). The practical result of the dialectal evolution of class-in-itself (or class-as-such) to class-for-itself was disdain for human life and dignity, in violence toward the person. The tragedy of the individual was seen to be justified by the bright future of the whole of mankind. Social utopianism may be seen to have been fed by the conceptual undertakings of social realism.

Social nominalism, represented, for example, by liberalism and its forerunners (John Locke, David Hume, Adam Smith, John S. Mill) judges that every person has rights. The freedom of the individual takes priority over the state. The state itself emerges as a result of a social contract: it provides for citizens' existence more comfortably and safely than would otherwise be possible.

Applicability of the principle of practice to society presupposes the standpoint of social realism. It meant absolute priority of economic factors upon the spiritual components of society,

moreover, it meant that the later determination of these components by economic processes, the direct dependence of super-structure by the base (the sort of "economism"). After K. Marx deceased at early 1890's his closest friend F. Engels did his best to soften this position. He noted that the base only ultimately economically determines intellectual ingredients, super-structure and social consciousness develop autonomously. Nevertheless, among Soviet neophytes of Marxist doctrine soon after October 1917 upheaval obviously dominated convictions in primitive economism style. Surely, it resulted in the manner the angle of examination of science and its history was selected.

Ideologized science phenomenon

Under ideologized science we understand the process of transformation of science typical for every totalitarian regime which has the goal of establishing of novel science, adjusted to mastering ideology, the attempts of rehandling of existing scientific achievements in order to make them congenial to this ideology. Dominant ideology depress objective content of science and unprejudiced quest for truth succumbs the selection of some statements due to mentioned ideology and first if all those which provide it continuous triumph.

Recognition of social nature of science presupposes that society and its functioning has some impact upon academic activity, the style of scientific reasoning, the form of scientific results representation, or the goals of scientific quest. Nevertheless, this recognition do not contradict the claim that science develop to large extent autonomously placing its springheads 'inside' the body of science. Totalitarian regime prevents autonomous flux of science for the totalitarian values, playing central role in State existence (class - in Marxism-Leninism; religious - in fundamental Islam; racial - in Nazism), suppress natural academic stances. Disbelief of new ideology adherents, pushing society toward revolutionary renewal, was shared in Russia not only by Marxists but, say, anarchists like Mikhail A. Bakunin or Peter A. Kropotkin who repel official, "State", bourgeois science of objective content. Their hostility toward the political pluralism generated the program of making novel - proletarian - science, capable of modernization of economics under the new business principles. New revolutionary society enchanted with the new ideology often doing its best to rebuild science according to new basic principles. Such attempts seldom happened to be successful. We can mention only psychological theory of Lev S. Vygotsky and Alexander R. Luria and relevant logic idea of I. Orlov (see: [Bazhanov, 2003]) based upon certain Marxist aspirations which occurred to be weighty contribution to science). Usually ideological press leads to the radical politicization of scientific community, pulling out those scholars who try to oppose appetence of neophytes and making so called repressive science. At the surface remain those scholars who architect research as direct embodiment of new ideology and promises immediate practical results or breakthrough in science (T. Lysenko phenomenon).

Forcing supreme authority of one person ('leader') in all spheres of politics and science, the faith in collective reason of the 'Party', dogmatization of Marxist ideology, the only 'scientific world-view', the strengthening of political purges in the USSR lead to ideologized science phenomenon, seethed almost all fields of knowledge - mathematics, physics, biology, chemistry, not speaking of the Humanities. Academic style of reasoning and argumentation gave up the place to the political accusations often with direct political implications, arrests, and even purges. Nazi Germany pursued and eliminated Jews; after the World War II the relay of anti-Semitism was caught up by the USSR and only the death of Joseph Stalin safe Soviet Jews from the large-scale purges.

Notable by-product of ideologized science phenomenon was the goal to establish blighty authorities in all fields of research and, hence, the struggle with cosmopolitanism.

Proponents of Soviet Marxism adopted the principle of "ideological correspondence": when bourgeoisie on the early stages of capitalist development played progressive role it produced progressive science (classical mechanics of Newton) but when capitalism begun to disintegrate bourgeoisie should be treated as reactionary class, and science of this period is

corroded by reactionary ideas and conceptions. Thus, theory of relativity and quantum mechanics are reflections of imperialist crisis and in reality pseudosciences.

Logic

Since autumn 1917, October upheaval, and to the late 1940 philosophical tradition in the USSR was crashed. The monolithic State ideology did not admit any standpoints which differed from the official one. Elementary logic was taught at Russia's schools before 1917 but the first steps toward the reconstruction of Secondary (school) education disabled logic from the school and University curriculums. For the Marxist ideology was based upon the dialectical, mainly Hegelian ideas, formal logic was treated as metaphysical heritage, alien to the revolutionary proletariat. A campaign against formal logic was launched in leading Communist Party ideological journal. Formal logic laws considered contradictory to dialectics, formal logic study petrified and zoolith, along with materialistic dialectics which show invalidity of formal logic standpoint. The law of contradiction ignores the fact that all sorts of evolvment presupposes contradiction; the law of excluded middle just inane. The accusation of ignoring Marxist dialectics become the most pervasive in the ideological discussions in 1930's (see: [Cavaliere, 1990], [Mathias, 1991]). Soviet government insisted on purely practical goals of higher education; thus even at Moscow State University all departments of humanities were abolished. Logic was not taught for a decades. 'The logic of terror did not leave any place for logic', as Alexander S. Karpenko described the situation in pre-War World II USSR [Karpenko, 2004, p. 63]. Logical investigations were conceivable only as purely mathematical; moreover, logic might survive under the mantle of mathematics in the milieu of orthodox Marxist-Leninist ideology.

Epistemology

In the USSR the term gnoseology ('theory of knowledge') used as synonym for epistemology. For decades its status as independent branch of philosophy was rejected. Usually Marxists claimed that materialistic dialectics is theory of knowledge and logic simultaneously. Materialistic dialectics covers nature, society and thought. Thus there is no need in special theory of knowledge (and logic as well). As Lenin put it: "We need not three words: logic, dialectics, and theory of knowledge are all about the same".

Only in 1960's some Moscovite philosophers (like P.V. Kopnin) began to treat theory of knowledge as distinct and self-valuable branch of philosophical discourse though their Leningrad colleagues until late 1970's firmly insisted that only ontology has its rights to independent status as philosophical unit.

Soviet style theory of knowledge was based upon orthodox Marxist principles and envisaged itself (after Lenin's works) as theory of reflection.

History of science

Formal logic was for a long period of time – from about 1920 until late 1940's -- almost banned in the USSR. Gnoseology at last became independent within Marxist philosophy and took the shape as theory of reflection. As really paradoxical may be described situation around the history of science in the USSR and former Soviet bloc countries.

Social realism, typical for Marxist philosophy, presupposed very definite conception of science development. After K. Marx who, as we well know, strictly due to the spirit of social realism declared that "man is the summation of all social relationships", and that economic base determines intellectual superstructure, social existence – social consciousness. Science in fact was dissolved in social and economic realities. The sources of science growth were placed beyond science itself – they were placed in economic or (at lesser degree) in culture. Not accidentally F. Engels even in respect of such theoretical field as philosophy judged that philosophers were pushed ahead not only the force of pure thinking, as they imagine, but mainly powerful evolution of economy and natural sciences.

Precisely the faith in determinacy of science as a whole, and particular discoveries by economic conditions was the salience of Soviet historians of science in 1920's. Precisely this conviction was embodied in concrete conception of history of science in the USSR, called *externalism*. According to externalism science have been grown due to socio-economic reasons, demands from the society (often Western tradition by *externalism* names certain conception of consciousness; at our work this notion has nothing to do with consciousness).

The concrete date of new conception of science is firmly fixed in the Annals of history.

On June 30 – July 4 of 1931 in London II International Congress of the History of Science took place. Soviet delegation included rather well-known scholars and public figures. It was headed by high-ranking communist officer Nikolai I. Bukharin, who by one vote was just elected to the Academy of Sciences of the USSR (due to the list approved by Central Committee of Communist Party). N. Bukharin was appointed as Director of Institute of History of Science and Technique. At various stages of his life he beared the most prestige position in Communist Party and State hierarchy. Delegation also included actual members of the Academy of Sciences, biologist Nikolai I. Vavilov, physicists Alexander F. Ioffe and Vladimir F. Mitkevich, Professor Boris M. Hessen (physicist and philosopher), Boris M. Zavadovsky (physiologist), Ernest Kol'man (mathematician and philosopher), Mikhail M. Rubinstein (psychologist).

B.M. Hessen presented at the Congress a paper "The Social and Economic Roots of Newton's Principia" where he put forward an idea that the birth of classical mechanics was entirely determined by capitalist evolvment, demands of new social class – bourgeoisie, who needed much more productive results of labor than that of feudal era. B. Hessen starts his paper with quotation from A. Whitehead who noticed that at the same year when G. Galileo died I. Newton has born, and amazed at what mankind might chose the path if these two great thinkers were not God's gifts to the human race? Hessen pursue the idea that concrete persons (Galileo, Newton, etc.) are not so important, as social and economic conditions pushed mankind toward the new inventions. "Newton, " Hessen claimed, "was the typical representative of the rising bourgeoisie, and in his philosophy he embodies the characterictic features of his class..." [Hessen, 1933, c. 38]. Until Hessen's paper Newton was treated as genius, and his creativity is indebted to his outstanding talent, which was given him by God.

Hessen persistently stresses that bourgeoisie needed science for the development of industry, and this science should "investigate material bodies and forms of forces we can find in Nature"; "being for certain time the most progressive class bourgeoisie demanded most progressive science" [Hessen, 1933, p. 23, 24]. Moreover he indicated "completely coincidence of physical content of this era, grown from the economic requirements with the content of "Principia" [Hessen, 1933, p. 31]. Development of industrial capitalism put in front of technique the problem of effective engine. Steam-engine was created, and in its turn the thermodynamics flourished. All these events has powerful impact upon the productive forces and, hence, upon science.

Hessen's ideas attracted attention of the Congress participants. As a matter of fact the novel direction of research, even novel paradigm in the field of history and philosophy of science was proposed. The paper was published in English (and Russian) and reprinted for several times. Analogous thoughts, typical for Marxists (practice is base for the theory, were announced by N. Bukharin in his paper "Theory and Practice from the Standpoint of Dialectical Materialism". N. Bukharin's attitude toward science was really shivery. He was confident that due to Soviet scientists the USSR will become "the greatest hotbed of World's science", that "in the USSR science plays noble role: it promotes the liberation of mankind from the shame of our epoch (he meant capitalism – V.B.)", and "science transforms into the friend and close ally of working class" [Bukharin, 1928, p. 6, 15, 16].

Hessen's ideas formed the basis of externalism which showed brilliant performance in the West. Let us just to mention works of J.D. Bernal, J.G. Crowther, R. Merton, J. Needham, E. Zilsel, etc.

Sarcasm of history resulted in the fact that in the USSR where Marxism played the role of State ideology and naturally presupposed externalism, and externalism forerunner lived, externalism happened to be impossible. All history of science studies in the USSR until early – mid 1980's – the moment when communist ideology began intensively decay – these studies were done in pure internalist tradition. History of science in the USSR was the history of science, so to speak, in the social vacuum. If socio-economic conditions were mentioned then only as factors rooted in capitalist order and disincentive its progress. We can judge that history and philosophy of science in the hotbed of communism and elsewhere on the East evolved strictly within the framework of positivism, a rabid enemy of communist ideology.

What is the reason of such – anomalous – state of affairs? Why neither communist historians of science, nor the communist State closely followed the purity of ideology of its citizens and did its best to plant Marxist dogma's everywhere it might, - why this State did not noticed that history of science do not obey and share another mode of thought and standards of reasoning ?

History of science under the ideological press form

Marxism naturally presupposed externalism but Marxism put impassable obstacle to the development of this trend in the history and philosophy of science in communist bloc States. The main reason is socio-political milieu within these State and accompanying ideologized science phenomenon.

B. Hessen was born in 1893 and was the classmate if Igor. E. Tamm, later talented Soviet physicist. In 1913-14 Hessen studied at physico-mathematical departments of Edinburgh University, then at the same department of Petrograd (former St. Petersburg) University. He joined communist party in 1919. In 1928 he graduated from so called Red Professor's Institute and on 1930 was appointed the director of Physics research institute at Moscow State University. He was the first Dean of Physics department at MSU. In 1934 Hessen was appointed the Deputy Director of Physics Institute of the Academy of Science's of the USSR. In August, 1936 he was arrested and in December shot down as 'people's foe'.

B. Hessen made some attempts to protect theory of relativity and quantum mechanics from assaults of 'mechanists'. Taking Newton as example he tried to show that any person my share incompatible features (being genius in physics Newton shared backward religious views). We should divide achievements of some scientists in physics from their non-scientific views. The later do not depreciate their inventions. Nevertheless, B. Hessen himself shared outdated views. Say, he published in first edition of Soviet encyclop(a)edia the paper 'Ether' where he insist on the existence of world's ether. Leading young Soviet phycisits (Landau, Gamow, Bronstein, etc.) sent him mockery by form and content telegram (where they asked for the articles like phlogistone and thermorode) [Sonin, 1994, p. 38-39].

In October of 1930 B. Hessen was castigated at All-Soviet conference on the state of affairs in Soviet philosophy. He was blamed as 'metaphysician' (i.e. enemy of dialectics) and 'idealist'. These accusations were the mostly tough from the point of view of ruling Marxist ideology.

There is some evidence that B. Hessen did his best to compose his paper for London congress in the spirit of crude, vulgar, orthodox Marxism, and he was keen to present his paper as response to his critics and the proof of his fealty to communist ideology and Marxist loyalty. Moreover, perhaps, E. Kol'man's role as participant of the London's congress was to overlook at B. Hessen in order to prove (or disprove) his ideological purity.

N. Bukharin was blamed for his 'anti-Marxist' views in late 1920's and despite his frequent trips to the West he do not became a defender. He was arrested in March 1938, sued for 'anti-Soviet Trotsky union' and after the conviction immediately shot down. The General Assembly of the Academy of Sciences of the USSR in May next year ousted him, being dead for almost half an year, from the Presidium of the Academy and devoid him from the academician merit.

After Bukharin's arrest the chief prosecutor of the USSR mentioned Institute of History of Natural Sciences and Technique where Bukharin occupied the position of Director as the 'hotbed of anti-Soviet conspiracy'. By the way, position of Director may be assessed as grim political exile. Institute was extinct. Only 2 of 8 members of Soviet delegation at London congress, lead by Bukharin, remained alive after Stalin's purges.

Institute of History of Natural Sciences and Technique was restored after World War II: the struggle with cosmopolitanism expected domestic scientific heroes and brands. Nevertheless, enduring memory about recent political repressions and dominance of the ideologized science with necessary native hero in every branch of World science forced to compose historical studies as internalist in their essence, as history of ideas without and beyond any socio-economic and political factors.

Soviet historians of science for decades were concentrated on narrow histories often filled with numerous technical details. Certainly, in many of these works some sentry dispatches to practice as real background of every theory may be found. Nevertheless, mentioned dispatches were trite and inane though they helped authors to feel safe for they went through all necessary ideological requirements. Actual socio-economic and political factors were untouched and unrevealed.

Moreover a lot of Soviet scholars, especially from the Universities, purposely abstained from writing papers and were extremely careful at their classes for not to give any extra chance for being accused with some ideological 'sin'.

After World War II ideological campaign in physics similar to one in biology (genetics) was planned. As we know Soviet genetics was virtually destroyed by 'people's academician' T. Lysenko. Genre of this campaign demanded public debates and public accusation of persons who took the path of 'revisionism' in science (namely in physics). This campaign might have take place even despite vital of the USSR atomic (nuclear) project. The only obstacle to the start of this campaign expressed by L. Beria, closest Stalin's comrade-in-arms, was the fear that physicists would babble out nuclear project secrets. It might be the only positive side of spy hypermania typical for the USSR.

10 years passed since Stalin's death to the moment when ideological science phenomenon in the USSR and former Soviet bloc decayed, and 30 years until first work done in externalism style emerged. Mean time they were written not in Marxist mindset. Socio-political milieu changed – philosophers and historians of science interests changed as well.

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