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## 4 ways of dealing with Science and Marxism

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In this presentation I would like to discuss the intertwined and interdisciplinary research programmes we have to elaborate in order to re-calibrate our notion of “Scientific Socialism”. A notion, with which we claim to be socialist activists, who know why we do what we do, and how our policies are grounded in the real material world.

In order to change the world we have to understand its metabolism. As Karl Marx confirmed in *Capital*, humankind is a species capable of teleological -goal oriented - thinking. This means that humans don't follow the development of our natural environment unconsciously. The opposite is true; humans change our natural environment in an organised- but not necessarily responsible- way. Deliberately we build hydro-electrical power plants, in contradistinction to beavers who build dams by destiny, or so you wish genetic determination.

Science is considered to be a craft that allows us to interpret phenomena and drum up theories that enable us to cast experimental regularities into so-called laws.

Laws are expressions of continuity and forecasting: same things will happen in same situations.

Some laws are only valid in narrow situations, other have a more generic power and reach. So, the question is: how contingent are laws in their historical, social and epistemological context? So-called natural laws are manmade: we define the semantic notions like force, mass, charge, etc., which are the parameters of these laws. In the course of history the definitions of those notions change, such as the relatively late distinction in history between force, power, and energy. Natural laws are empirical laws framed in mathematical language. Since mathematics is a strictly human abstraction, a formal language able to express things unambiguously, we can speak of a mathematical truth, which in essence is a tautology. Now, as abstract models are increasingly able to describe and predict physical phenomena, we take natural laws, written in mathematical terms, as true laws as long as we see no contradiction with the phenomena. In case we do, we adjust or change the law, or come with completely novel approaches, such as, in physics, relativity theory and quantum mechanics. Both are successors of classical mechanics, but -and this is important - ontologically based on different notions of space and time. Mathematical truths are “Diamonds Forever”; physical truths are flying targets of human understanding.

Conscious political action demands, on the one hand, a dream for a better world, and on the other hand an understanding of why we are here, in this situation, and doing what we do. A

sincere goal-oriented policy demands an understanding of how we can bend the course of history into a wanted direction.

In that sense, and against the utopians, Engels and Marx coined the term scientific socialism. Hence, the next pressing question is what kind of science and what kinds of scientific methods do we apply in order to formulate a conscientious socialist policy.

The 19<sup>th</sup> century is known for its explosion of new theories and methods in many fields, such as mathematics, chemistry, physics, biology, geology, and so on.

In all these endeavours it turned out that the methods of physics and the application of abstract mathematics were incredibly successful. At the end of the 19<sup>th</sup> C. it was even thought that the field of physics was almost finished and that we “only” have to transfer the methods learned in this field to other research fields such as sociology, psychology, or medicine. This last idea did not wither away by the crisis in physics in the beginning of the 20<sup>th</sup> C., with the shocking realisation that classical mechanics had to be replaced by General Relativity Theory as well as Quantum Mechanics and that those two off springs don't match. This mismatch and the hope for unification of GRT and QM is still one of the big issues.

Nevertheless, the idea that physical methods and statistics are the Holy Grail is still ideologically hegemonic. In fields like psychiatry, medicine, pedagogy, sociology and even history; data grinding, counting, averaging and modelling are now compulsory research aspects, in the neo-liberal drive for valorisation of research. Also new endeavours like nonlinear dynamics, chaos theory and non-equilibrium thermodynamics are frequently seen as possible ways to transcend simple models from the natural sciences to sociology, economy, and the humanities.

However, it is still an open question why and, if so, how, social investigations need or don't need, next to these tools, their own methods and ways of enquiring our social habitat. How do we even dare to think that every field of human investigation demands the same methodology, independently of the different cognitive and mental load?

Presently, the - and being in Anglo-Saxon London, I have to say- idolatry of formula fetishism rules the intellectual waves.

How to counter this trend, as it clearly doesn't bring us further in emancipatory struggles?

In order to re-calibrate our notion of “Scientific Socialism”, I would like to suggest the following intertwined and interdisciplinary research programmes. Programmes that are not firmly on the academic research agenda, nor part of the short term goals of political organisations.

#### *1) The historical question.*

The deeper understanding of how, and to what extent new scientific and technological thinking is a function of the development of the social-economic structure.

For Engels and Marx the historical approach is central to their analysis of the economic and power structures leading to the modern capitalist mode of production. Their successful work leads to the notions of class, and the ontological role of creative human labour. However, their results -I don't say yet their methods- are not of the ‘one size fits all’ kind. The discussions on the Asiatic way of production, the idea of permanent revolution against the social-democratic theory of fixed stages of societal development, as well as the analysis of the disappearance of whole -scientifically advanced - cultures such as the Hellenistic are still

on the table<sup>1</sup>.

In this historical track we also have to analyse the birth of Marxism itself as a 19<sup>th</sup> C. programme, as well as its possible necessary adjustments given the dynamics of the last 150 years. A theory that is grounded in an historical approach cannot be immune for historical developments. An obvious aspect is the deeper knowledge of labour relations, surplus value, and the notion of class.

## 2) *The historical approach conflates with the sociology of science.*

Sociology of science is the field in which we study the dynamics of research as a result and as driving force in a particular socio-economic structure. Which technologies are typical for which social formation is a central question.

A new social-economic order, e.g. socialism, “will” almost compulsory brings new ways of thinking and directions of research. Starting with Grossman and Hessen<sup>2</sup> in the 1930<sup>th</sup> we have seen the turbulent development of the sociology of science as a field, in the UK exemplified by the Bernalists and in the last quarter of the 20<sup>th</sup> c. with the Edinburgh strong programme.

This tier can be spilt into the following aspects:

2.1) the interplay of economic development and the birth of new technologies, like the spinning Jenny, the steam engine, the electro-motor and most recently nano-technology. How does the economy - surplus appropriation - induces needs for new knowledge and at the same time how is new knowledge quickly assimilated into the hegemonic power structures (e.g. internet).

2.2) the role and function of science, in particular natural sciences, in the development of society and power structures. Although in the old days of Bernal<sup>3</sup> “big science” was mostly chemistry and physics, in our time also medicine, psychology economy and sociology know massive research enterprises.

In the same category fits the discussion on the role of the researchers and related personnel as workers and their need to organise. This dovetails with the classical discussion on productive and unproductive labour and the creation of value in the economic process.

Within these developing socio-economic structures we are also dealing with coherent or closed intellectual circles that can play a crucial role in formulating and/or accepting new theories. This type of research has been started by Thomas Kuhn<sup>4</sup> and Ludwik Fleck<sup>5</sup>.

2.3) the contingency of the above-mentioned issues.

In many a work it looks as if the development from perceived Ur-communism to capitalism and on to socialism is a logical chain. Stalinists like Bernal<sup>6</sup>, idiosyncratic thinkers like Bogdanov<sup>7</sup>, and communists like Sohn-Rethel<sup>8</sup>, not to mention the innumerable introductions and pedagogical books on Marxism, all share the almost religious belief in a natural development of society in stages, leading to the necessary and almost unavoidable political

<sup>1</sup> Lucio Russo: *The forgotten revolution. How science was born in 300BC and why it had to be reborn*, Springer, 2004.

<sup>2</sup> See, e.g.: Gideon Freudenthal and Peter McLaughlin, *The social and Economic Roots of the Scientific Revolution, Texts by Boris Hessen and Henryk Grossman*, Springer, 2009

<sup>3</sup> J. D. Bernal, *The social Function of Science*, George Routledge & Sons Ltd., 1939.

<sup>4</sup> Thomas Kuhn, *The structure of scientific revolutions, Second edition*, Chicago UP, 1962; first published as part of the neo-positivist journal ‘International Encyclopedia of Unified Science’.

<sup>5</sup> Ludwik Fleck, *Genesis and development of a scientific fact*, Chicago UP, 1979. German edition 1935.

<sup>6</sup> J. D. Bernal, *Science in History*, C.A. Watts, 1964.

<sup>7</sup> A. A. Bogdanov, *The Philosophy of living Experience*, Brill 2016. First Russian edition 1923.

<sup>8</sup> Alfred Sohn-Rethel, *Intellectual and manual labour*, The Macmillan Press, 1978. First German edition 1970.

revolution by the working class. The strong Eurocentric, and hence limited, roots of these anthropological exercises are now accepted as liabilities, but certainly not yet fully challenged and analysed.

Obviously such a tradition is firmly rooted in 19<sup>th</sup> century mechanical thinking. The core idea is that the division of labour is going hand in hand with the development of technology. New technology is incubated in the old social structure, but in-itself is the detonator of social change to the emerging power of a new dominant class. This “cakewalk” goes on until it reaches a culmination point in which the proletariat emancipates all humankind and in a kind of transcending transforms society into a new form of perceived (but never proven to have existed) Ur-communism, now with unlimited resources, and hence peace and prosperity on earth. Or Mars, as Bogdanov projected the future in his Sci-Fi novel *Red Star*<sup>9</sup>. Unfortunately most of these studies are coarse grain, and more than often serve as inductive proof by example. In particular, it is very difficult to prove that the present new theories from Biology, via Chemistry to Cosmology, are the philosophical exponents of monopoly or finance capital.

### 3) Subsequently we have the question of method.

The aim to ground emancipatory theory in real world experience, and therewith making it a realist theory, often drowns into a mix up of experimental phenomena and the use of phenomena as metaphorical proof and justification. Although the use of the metaphor in science is a well-known topic, a deeper study of the role of the example and the metaphor is badly needed<sup>10</sup>. Not only in strict science studies, but almost all political tracts, resolutions, and pamphlets have the tendency to prove neo-liberalism’s evil by means of lists of moral observations. Though, the neo-liberals don’t see any evil themselves in their policy, e.g. in the Middle East.<sup>11</sup> Also our socialist use of metaphors is up for analysis.

A central nagging problem is the question of monism. It is an obvious fact that nature, including mankind, is a whole, interrelated, system. We are part of nature and as a living species we adjust to natural changes, partly involuntarily induced by our very existence by evolution, and, contrary to our fellow species, consciously by human labour. In the three monotheistic religions, nature is seen as a given by some extra-natural power to humankind to exploit, use and garden. In the ecology discussions it is well understood that the ‘resource’ nature is part and parcel of humankind herself and suicide by demolishing our habitat is more hurting humankind than nature. After all, even we if we adopt or not, a pantheistic view that the creator – Mr. God – can be equated with nature, evolution can start over again next time with possibly completely novel thinking creatures as outcome.

So, to what extent are we, simple results of haphazard evolution, able to define a monist theory that encompasses, nature and humankind, including cognition?

This brings us to the classical problem of reflection: to what extent does our knowledge reflect reality? Here various solutions can be probed. The easiest and most arrogant one is the idea of verisimilitude, the idea that on our meandering path to the top we slowly, asymptotically, reach an encompassing understanding of the world. This end point, obviously

<sup>9</sup> A. A. Bogdanov, *Red Star*, Indiana UP, 1984, Russian edition, 1908.

<sup>10</sup> See the works of Mary Hesse such as *Models and Analogies in Science*, Sheed and Ward, 1966, and more recently Michael A. Arbib and Mary B. Hesse, *The construction of reality*, Cambridge UP, 1986, and the many works of the various schools of sociology of science.

<sup>11</sup> See e.g., George Lakoff and Mark Johnson, *Metaphors we live by*, Univ. Chicago Press, 1980, and George Lakoff, *Moral Politics: How Liberals and Conservatives Think*, Univ. Chicago Press, 2002.

the top and not the plane of understanding, suggests that we as humans, because we are part of nature (or made as lookalikes of a certain deity) ‘must’ be able to reach such an introspection that we understand ourselves and therewith nature.

A more modest, and historical, approach would be the realisation that the evolution gave us sufficient baggage to survive other creatures and that we slowly develop and change our species by culture and epi-genetic modification, that is to say slowly adapting to new situations, in co-evolution with other species. This means that we always experience only part of the world and are only able to interpret part of reality.

In both cases we are confronted with Kant’s pertinent question of how we, methodologically, reach an understanding of what is ‘out there’. In Kant’s approach we are dealing with a reality ‘out there’ with he considers a ‘thing-in-itself’, something that is, but not knowable to us. The problem is that all semantic notions are human made, and hence the very notion and content of the ‘thing-in-itself’ will change in time. The ‘thing-in-itself’ is more a moving target than a sitting duck.

We are left over with methodology, and here we reach the point of the so-called scientific method and the primacy of mathematical methods in physics, and increasingly in other fields. Methods that force us to rename ‘things’. We don’t speak any more of matter but deal with mass and introduce - to save the phenomena - the concept of matter fields: not an easily understandable materialistic notion.

Mathematical modelling is an exceptional versatile method that allows you to look at your mobile phones to see if I’m already at the end of my talk, and phones are real material objects and so are you and I.

The pressing question hence is, to what extent are these formal models able to encompass social situations? In the fight against obscurantism, the founding fathers and their heirs embraced the scientific methods in every field. Trotsky in his ‘Dialectics and the immutability of the syllogism’<sup>12</sup> is touching the point that mathematical and formal logical statements are “an instrument of our consciousness in the process of its adaptation to nature and the growing knowledge of nature”. Indeed it is; but the interesting issue is that human intellectual labour is able to go beyond traditional forms of logic and invents all kinds of so-called modal logics. Forms of logic waiting for applications.

Hence, the strife for unification of method and final monism is an illusion.

As a last point I then mention.

#### 4) *Dialectics.*

The essence of history and development is the notion of motion that is to say change in all its aspects. We wrestle with the fact that motion is - in our level of intellectual development - always relates to stasis and external measures. This is exactly why Kant, correctly for that time being, states that we cannot do without the notions of space and time.

With the recent discovery of gravitational waves, we are back to the question “what is space-time?”, as we call it today. The popular explanation of the measured phenomena as a ‘ripple in the fabric of space-time’ gives the feeling of comfort, but is an empty phrase as we have not the slightest idea what space-time other than an abstract concept is, and certainly a synthetic fabric.

So, dialectics as an approach for interpreting -fixed, operational - concepts is a way to go

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<sup>12</sup> L.D. Trotsky, *Writings of Leon Trotsky*, Pathfinder Press, 1973.

beyond the present understanding and reach more encompassing, or so you like deeper, knowledge.

Engels tried to play with the dialectics of nature as he envisioned -the then modern - scientific developments. Quite easily he could frame scientific results in a matrix of interpenetrating antagonistic notions and forces, a simplified system that illustrates more than that it predicts. Casting natural phenomena in a dialectical form doesn't say yet anything about possible superior new knowledge, as the Stalinist tradition hoped for.

In a most important essay Oskar Negt <sup>13</sup> explains the glorification of Engels and the canonisation of Soviet's Diamat in terms of an "authority science" (Legitimationswissenschaft). Because mathematics knows by nature provable results, natural laws phrased in mathematical language become truisms and because natural laws are dialectical (as Engels suggested), together with the monist idea that one world needs one method (in German you might say: Gesamtkunstwerk), the post-revolutionary proletarian Soviet state is the dialectical, and hence true, expression of history. Diamat became a phantom in-itself.

Dialectics, taken seriously, means to entertain the discussion on the roots of "living experience" and activity in dealing with the perceived fixity of semantic notions and the great difficulty to understand motion without harking back to stasis. Applying a method is ever an approximate tool. Human labour and consequently intelligence is a mutually empowering agent for change and consequently our understanding of this non-linear, multi-causal process demands a critical, that is to say constructive, study of dialectics.

Amen

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<sup>13</sup> Oskar Negt, *Nikolai Bucharin/Abram Deborin, Kontroversen über dialektischen und mechanistischen Materialismus, Einleitung von Oskar Negt*, Surkamp 1974.