Laws of Invariance

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> *"Obscure notions, related solely to intuition, may not lead to absurd conclusions, but they cannot offer new and correct solutions; in any case, they are completely useless." - Noam Chomsky*

That of laws of invariance is an ancient discovery and, at the same time, a rather recent general theoretical arrangement. After all, the nature around us would not even be knowable without these laws, and therefore there would be no science. Any discourse on communism would be pure philosophical exercise, ideology not even disguised if it were not based on proven laws. Therefore, theoretical notions useful for understanding reality are indispensable, even and especially when they are not intuitive, since the only "natural" approach to problems could easily be reduced to chatter, when even it made sense from the point of view of language, as not only Chomsky notes. Gregory Bateson, for example, has shown that there are terrible paradoxes in the structures of human communication, the analysis of which easily allows one to unmask the emptiness of content. Giuseppe Peano, at mathematics conferences, used to analyze speeches given by great professors according to logic, showing that it is possible to talk for hours without saying anything. Bertrand Russell, his young contemporary, in turn, subjected Peano's speeches to the same analysis, agreeing that the mathematician methodically managed to be the most lucid and consequential of all.

The concept of invariance is not immediately intuitive but neither is it difficult to understand. Everyone knows that to calculate the area of a triangle one multiplies the base by the height by dividing by two, but perhaps not everyone has wondered why this applies to any type of triangle and why the formula has been made a universal tool for that particular problem. If we draw a circle with its orthogonal axes on a plane and then photograph it on the bias, we will have as a result a kind of ellipse: the original figure and the one derived will be objectively different, the axes will no longer be orthogonal and the centre will no longer be equidistant from every point on the circumference; but at the same time, in both figures, invariant properties will have been maintained. For example, the centre will continue to bisect the axes in equal half-axes; or, if we were to film with a camera a point in constant motion on the circumference, we would see it travel the original and perspective (different) lengths at identical times.

Leonardo, Dürer, Paolo Uccello, Piero della Francesca and other Renaissance artists, in discovering the laws of perspective unknowingly discovered the laws of invariance. In fact, to project three-dimensional reality onto a two-dimensional canvas, projective transformations are applied according

to those laws. A four-year-old child tries to do this by finding interesting gimmicks, but by the time he is eight years old, he is already able to learn perfectly what the laws of invariance are and to draw three-dimensional objects on a two-dimensional sheet of paper according to strict criteria.

Eight years and up anyone can understand that Marx investigated human society by applying to it laws of invariance that, a few years later, would also find accommodation in other scientific disciplines, first and foremost mathematics. Labour, Marx said, for example, is an invariant category; it exists in all human societies, but it gives rise to production according to projective transformations, this time not in space but in time, and the latter understood not as a gradual continuum but as a succession of social stages, of modes of production. The work of the Pithecanthropus is not the same as that of the modern worker. Not so much because the two activities are dissimilar, but because they belong to entirely different dimensions, no longer compatible. Labour distinguishes man from animal, but man will complete himself as such only when human activity is aimed at the needs of the whole species, including its environment, and not at those of someone, some class or impersonal Capital. The category "money" also has a long history and has passed, invariant and at the same time transformed, into successive modes of production: the legendary first gold coin of Croesus is certainly not Capital, but a physical modern pound of gold is exchange currency in the same capacity.

The laws we are talking about have a "reversible" application, that is, one can draw in perspective by copying a real closet, but one can also build a closet by copying from a perspective drawing on paper. So we can say that this capitalist society contains the drawing of the future one, just as the future one affects the drawing. Of course, the social process is more complex, and capitalism is not communism missing one dimension, while communism is not simply capitalism with an extra dimension, it is something else. But within certain limits, even the wooden closet is something else than the lines on the paper. Something of the design is in the real closet, just as the closet not yet built already affects the movement of the hand that draws it on paper without the designer thinking too much about the underlying laws. He is led by theory to be guided by the result in the realization of it. Science has this beauty: man discovers-invents theoretical tools that at some point begin to function on their own as true automatic machines of knowledge. Communism has this beautiful thing: it marches the same, even if men at certain moments do not notice that they are its instruments, just as they do not notice that they use the fruits of science every day. They will be called by this movement to deliver the final blow to the last capitalist barriers, organized in the only party fit for the purpose.

Returning to our future society, some might argue that it would not be much of an achievement to obtain a transformed projection of the present one, since such a transformation could be undertaken as a remaking of the present

form, thus as a re-form. But the very revolution brought about by the knowledge of invariants tells us that there is not just one kind of transformation; there are actually several groups or classes of transformations: it is not far-fetched that one would go from a more or less liberal, chaotic capitalism to a more rational, reformist, advanced type of capitalism, i.e., fascist, and this would be a transformation group of a certain type, let us call it a deformation; but we know that among the groups there are some with characteristics that are at first sight quite surprising: in them, the properties of forms are maintained as invariants even though they become qualitatively quite different. At the limit, to the point where any comparison with the original characteristics is completely arbitrary when the law that allows us to do so is not rigorously explained. Or, which is the same, completely arbitrary transformations on form do not allow their invariance to be destroyed. A sphere and a doughnut are not surfaces that can be transformed into each other according to deformation; only if they are split at some point in them can they be reconstructed into equivalent forms; by the reverse procedure, welding a quasi-doughnut or a split (punctured) sphere results in a qualitatively transformed surface. Therefore, the very laws of experienced qualitative transformation, already seen, in the transition from feudalism to capitalism, offer us the certainty that further transformation is possible. There is not only reformist deformation in history, there are above all revolutions that split and weld.

Thus, just as the work of the Pithecanthropus has nothing to do with that of the modern wage earner (the transition is obvious to anyone), the work of the man freed from the necessity of wages will have nothing to do with the shadow of his past (a transition that is a bit harder to digest instead, but only for social reasons). This applies to human society as a whole.

It should be obvious at this point that communism is not a utopia, that is, it does not envisage the mystical “creation” of new societies out of nothing: it describes the transformation of existing matter in its becoming to higher and higher levels of harmonious order. It is well known that Marx and Engels devoted their lives to relentlessly demolishing all conceptions imprinted with such mysticism due to the weight of the dominant ideology; it is less well known that a good part of this struggle consisted in verifying the simultaneous development of such demolition in all other branches of knowledge. Yet they wrote it down in no uncertain terms, working to make full use of the phenomenon, calling communism precisely the overall process of demolition which, starting from real life, came to blow up millennia of established beliefs.

The great frame of reference whose foundations were laid by Marx, Engels and thousands of other men dedicated to the immense work of demolishing the old in every field, is thus based on laws of invariance, the same laws without which, as we have seen, one could not even speak of science. Then it must be possible to find laws that unite the theory of communism and the other scientific

disciplines arbitrarily separated today, that invariance that allows us to treat phenomena of apparently different natures with universal criteria in the complexity of the world. We know that, for example, the formalizations underlying thermodynamic theory are virtually the same as those underlying information theory even though thermodynamics is classified in “physics” and information theory in “mathematics.”

It must also be possible, by the same criteria, to prove not only that communism is not an ideology, but that it is not even an “old” science: it must work just fine today for all those cases covered in the original scheme. If anything, critics must shoulder the burden, assuming they can, of proving that the original scheme no longer corresponds to today's capitalism. In physics, no one would dream of claiming that Galileo and Newton's scheme is “old”: Galilean relativity is so indestructible that it provided the basis for Einstein's, and Newtonian mechanics underlies everything that happens in the macroscopic world below the speed of light, which still seems like a lot to us.

Fifteen or so years ago, during a discussion on the dynamics of party formation, some know-it-alls let us know that a supposed theory of material forces in our struggle was the old Newtonian mechanism. Recently other “deep” thinkers have told us that our way of talking about science regarding Marxism does not take into account “very deep” meanings present in the “deepest” Marx, the one in Capital, not the one in the German Ideology (old wives' tale). More recently still, we have been criticized for our “mechanical” and “concretist” way of dealing with problems (and let us omit the opposing criticisms so as not to get off topic).

If these good people could even imagine the complexity of the “Newtonian mechanics” of a trivial moving bicycle with its many degrees of freedom, they would also address the problem of social molecules, thus that of complex systems that are difficult to formalize, in a less immediatist manner, in the sense of immediate movement of the tongue that generally takes place without much regard for the connection to the brain.

The bourgeoisie is a historically moribund class, and therefore its continued ideological lapse into the old dichotomies, good-evil, universal-particular, world-sub-world, physics-philosophy, is inevitable, just as its own science proves that they are outdated. Tragically, self-styled communists adopt that way of thinking so well, especially in the face of the extraordinary fact that the bourgeoisie itself is forced, for practical reasons due to the necessities of production, to capitulate ideologically before Marxism. If, therefore, we disregard the political needs of the bourgeoisie in its work of social preservation, whereby politicians and economists in this field continue to talk nonsense, we are faced with a real and deadly paradox: those who should be the reflection of tomorrow on today too often turn out to be a tired reflection of

what the bourgeoisie used to be and is not even anymore. Where it serves it, the bourgeoisie itself has long since swept away certain ways of philosophizing.

Our current has definitely retired philosophy since Hegel, with whom Marx still had to reckon. After that, and we are not saying this now, there is only one science and it already belongs to the future.

We often read bombastic and very revolutionary phrases that shake the world. Every now and then someone realizes that it is necessary to struggle against the phrase and proposes to do something "practical." However, succeeding in doing only what everyone else does, he applies the criterion to others and absolves himself. This cross-practice makes the "communist" milieu very homogeneous, and unfortunately, it will be so for a long time to come. The continuous call for the "liberation" of the proletariat and the "construction" of the party shows that one has completely forgotten something very important: "liberation" is a historical process and not an ideal act. It depends on the state of industry, the state of world trade, agriculture, the action of global Capital, on relations between men and especially between classes, where the development of the party depends on a typical dynamic which is that of complex systems.

Let us paraphrase from a classic text in this last paragraph. When one has a miserable conception of actual historical development, ideal developments, these transfigured and idle miseries that remedy the lack of adherence to the actual world with fixations of subjective importance, take over. On the contrary, for the practical materialist [so in the original, as opposed to the vulgar and metaphysical materialist], that is, for the communist, it is a matter of adhering to that which revolutionizes the existing world, of putting one's hand to the state of things he encounters, not to his own thoughts. And this state of affairs is already much more universal than any universal thought. In short, it is a matter of understanding that capitalism must be treated, in its becoming, according to the actual data, not according to the "concept of capitalism" as the German idealists used to say. The form of communication, from this point of view, is important and revealing, because language, not thought, is the actual and practical consciousness of humanity that must express itself, the only consciousness that exists for the individual and at the same time for other men. With the separation of mental processes from real ones, individual political consciousness can actually imagine itself to be something other than praxis, and can actually conceive of something without conceiving of anything real. In this way, individual political consciousness flies into the empyrean, detaches itself from the world and deludes itself that it can dictate to it its own watchwords. In contrast, communists see the general development of social productive force as the empirical presupposition for the existence of the new society.

Recommended texts.

Karl Marx, *"1857 Introduction" to For the Critique of Political Economy*, Editori Riuniti (at the paragraph on method a dissertation on invariants in the history of successive modes of production).

Richard Courant and Herbert Robbins, *What is Mathematics?* Boringhieri (at chapter IV there is a clear and accessible explanation of the mathematical concept of invariance with cross-references to the chapter on topology).

Claudio Procesi, *Invariant*, article in Einaudi Encyclopedia, vol. 7 (text difficult to read but with a very explanatory beginning).