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# IDEALIZATION I: GENERAL PROBLEMS

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## ABSTRACTION AND IDEALIZATION IN MARX AND HEGEL

### 1. Foreword

Although a traditional subject in Marx studies, the relationship between Marx and Hegel has seldom been dealt with in relation to the idealizational conception of science (ICS). So little weight has been given to Marx and Engels' well-known claim on the close link existing between their method of inquiry, especially in research into the economic and social structure of capitalistic society, and Hegel's *Logic*.

This seems to happen every time an interpretation of Marx's method tries to show its congruence with scientific method and maintains methodological unity between natural and human sciences.

In order to point out Marx's "moral Galileism", the Italian philosopher Galvano della Volpe and his school have shown undoubted philological skill and theoretical consequence in their insistence on the fact that Marx, the scientist, was completely unaffected by Hegel, except perhaps for his innocuous "flirting" with Hegel's way of expressing himself [cf. della Volpe, 1969]. Likewise, Louis Althusser emphasized his views on the Marxist epistemological revolution by rejecting any possible influence by Hegel, thus clearly separating the young Marx, still deeply involved in speculative philosophy, from the mature Marx, the complete scientist, and then wondering, without being able to find a satisfactory answer, where Marx got the method of analysis he claims to have only applied to political economy [cf. Althusser, 1965, pp. 50-53].

Any claim as to the scientific nature and methodological modernity of Marx's work seems to have a twofold effect: firstly, a distinction between his mature and juvenile works, and secondly, emphasis on the contrast between Marx and Hegel, often linked to the former distinction in that it attaches a greater degree of speculativeness and Hegelianism to the juvenile works (as in the case of Althusser)<sup>1</sup>.



Of course such interpretations have to neglect or underestimate<sup>2</sup> the various references made by Marx, the mature scientist, to Hegel's "method" and the latter's influence on his method of scientific inquiry, especially after he had read Hegel's *Logic*. Otherwise, they limit the influence to trivial, obvious truisms like the "sense of the becoming of history" or the "interrelation of parts" and so on, reinterpreting his dialectic in a naturalistic sense as expressing the general laws of matter (the stand taken by *Diamat*).

One wonders whether it is not possible to reinterpret the meaning of Marx's Hegelianism in such a way as to avoid these results. Particularly is it not possible to use the methodological instruments of the idealizational conception of science<sup>3</sup> to throw more light on the subject and open up a discussion which up to now has been neglected? After all, the attempt is consistent with Marx's own indications — human anatomy is the basis on which we can explain the anatomy of the monkey. In other words, it is only by having more advanced methodological instruments at our disposal that we can understand and explain all the implicit and hermetic methodological insights to be found in Marx's works, especially as far as their presumed derivation from Hegel is concerned. Of course it is not a case of wanting to settle all the various aspects of the Marx-Hegel relationship, like those concerning questions of merit such as the concept of history or of the human being, the problem of alienation and so on, but rather of analyzing a limited but methodologically crucial concept for Marx's view of science: abstraction.

To do this we must first of all a brief outline of the traditional empiricist view of abstraction, so as to gain a better understanding of Marx's criticism both of empiricism and its concept of abstraction and of Hegel, which resulted in his later re-assessment of Hegel's *Logic*. Finally, in the light of idealizational methodology, we will try to point out the exact significance of Marx's so-called inversion of Hegel's dialectics.

## 2. The empiricist tradition

The first to observe a close link between the process of abstraction and the logical function of language, Locke states that abstraction is that faculty by means of which the mind turns particular ideas into general ones, the function thanks to which

(...) ideas, taken from particular beings, become general representatives of all of the same kind, and their names general names, applicable to whatever exists conformable to such abstract ideas. Such precise naked appearances in the mind, without considering how, whence, or with what others they came there, the understanding lays up (with names commonly annexed to them) as the standard to rank real existences into sorts, as they agree with the patterns, and to denominate them accordingly. Thus the same colour being observed today in chalk or snow, which the mind yesterday received from milk, it considers that appearance alone makes it a representative of all of that kind; and having given it the name whiteness, it by that sound signifies the same quality, wheresoever to be imagined or met with: and thus universals, whether ideas or terms, are made [Locke, 1690, I, pp. 148-149].

Later, when dealing with the problem of the formation of general terms Locke states that all existing things are particular and it would be impossible to have a name for each of them, so words become general when they are signs of general ideas and

ideas become general by separating from them the circumstances of time, and place, and any other ideas, that may determine them to this or that particular existence [id., II, p. 168].

By abstracting in this way ideas can represent several individual things. According to Locke, this activity on the part of the understanding can be understood by detecting its genetic mechanism, for instance by seeing how children form their first notions and arrive at the general idea corresponding to the word "man" through the idea of a concrete nurse or mother. Just as they reach the name and general ideal of "man", they proceed in order to arrive at other more general notions:

For observing the several things that differ from their idea of man, and cannot therefore be comprehended under that name, have yet certain qualities wherein they agree with man, by retaining only those qualities, and uniting them into one idea, they have again another and more general idea; to which having given a name, they make a term of a more comprehensive extension: which new idea is made, *not by any new addition*, but only, as before, by *leaving out the shape, and some other properties* signified by the name man, and retaining only a body, with life, sense, and spontaneous motion, comprehended under the name animal [id., II, p. 169; my italics].



Significant here is Locke's stress on the fact that in the operation of abstraction nothing is added to complex ideas — the general idea is only obtained by "subtraction" of properties, that is, each time we deal with "general natures or notions", the basic operation consists

in the leaving out something that is peculiar to each individual, and retaining so much of those particular complex ideas of several particular existences as they are found to agree in (...) [id., II, p. 170].

In a consistently nominalistic view, words "stand for" things — the semantic referent of language is, in the last analysis, formed by a whole of individual bodies, and the general or universal, referred to in general terms, does not belong to the real existence of things, but is an invention or "creature" of the intellect [cf. id., II, p. 172], since the same things "are all of them particular in their existence" [ibid.]. However, although the universal is a fictitious construction of our intellect, it would be wrong to think it is merely arbitrary, as abstract ideas have their "fundamentum in re", precisely in similarity between things, and so:

(...) the sorting of them under names is the workmanship of the understanding, taking occasion from the similitude it observes amongst them to make abstract general ideas, and set them up in the mind, with names annexed to them as patterns or forms (...) [id., II, p. 179].

Hence Locke's anti-essentialism, according to which there only exists a nominal essence and not a "real" one, which "comes to be nothing but that abstract idea which the general or sortal (...) name stands for" [id., II, p. 182]<sup>4</sup>.

But it is significant that even those who oppose Locke's ideas still move in the same conceptual background. When, for instance, Berkeley criticizes the possibility of forming abstract ideas, he maintains that each idea is always particular and so:

(...) a word becomes general by being made the sign, not of an abstract general idea, but of several particular ideas, any one of which it indifferently suggests to the mind [Berkeley, 1710, p. 31].

This denial of the existence of abstract ideas does not mean that "general ideas" do not exist — they are just particular ideas used "to

represent or stand for all other particular ideas of the same sort" [id., p. 32]. This ineliminable function of general ideas leads to the erroneous conclusion that there exist "abstract general ideas" which constitute a sort of intermediary between words and ideas.

This criticism of Locke's views is not completely inconsistent — if abstraction is seen as a progressive "subtraction" of properties (which for Berkeley is the only way of seeing it), one could fall into the absurd situation of supposing that it is possible to have, for instance, an idea of a triangle, that is "*neither oblique, nor rectangle, equilateral, equierural, nor scalenon, but all and none of these at once*" [id., p. 33]. This, of course, is in complete contrast with what the mathematician does when he demonstrates a theorem: he has that universal idea of a triangle but not in the sense that he forms an idea of a triangle that is neither equilateral or scalene, etc. The triangle he has in mind, whatever kind it is, "equally stands for and represents all rectilinear triangles whatsoever, and is in that *universal*" [id., p. 34]. So we do not have a name "standing for" an abstract idea which "stands for" things but simply a particular idea which "stands for" other particular ideas. Berkeley's representative nominalism according to which the only things which exist are particular ideas, anticipates the economic view of science typical of empiriocriticism.

The same view is shared by Hume, who applied the instruments of empirical analysis to the criticism of the idea of cause and the inductive process, and it is well known how important Hume's position is to understand many contemporary epistemological trends, above all Popper's methodology.

It is even more interesting to analyze the position of J. S. Mill as Marx harshly criticized his method of inquiry, seeing it as typical of the way of proceeding of "vulgar" economy. If one analyzes the concept of abstraction in Mill's main work *System of logic*, it is clear that for him the abstraction through which general concepts are formed, is mere generalization:

(...) when we form a set of phenomena into a class, that is, when we compare them with one another to ascertain in what they agree, some general conception is implied in this mental operation [Mill, 1843, p. 650].

The general concept thus reached is the result of such comparison and is, therefore, obtained by abstraction from single things, as the following example illustrates:



When we compare several objects and find them to agree in being white, or when we compare the various species of ruminating animals and find them to agree in being cloven-footed, we have just as much a general conception in our minds as Kepler had in his: we have the conception of "a white thing" or the conception of "a cloven-footed animal" [id., p. 651].

It is important to note that according to Mill:

The conception is a conception of something; and that which it is a conception of, is the facts, and might, under some supposable circumstances, or by some supposable extension of the faculties which we actually possess, have been detected in them [id., p. 651].

It is, in effect, a *realistic* concept; hence scientific laws cannot make use of "ideal" concepts, those "idealizational laws" which, according to the idealizational approach to science, are typical to mature science and are first used by Marx in the socio-economic field. Obviously, ideal concepts like "rigid body", "perfect flat surface", "perfect gas" etc., of which science is full, do not describe existing objects: the ideal objects *do not exist in facts* and however hard we look, we will never see a material point or a perfect gas as we would find a "cloven-footed animal"<sup>5</sup>.

Mill clearly continues with the view of abstraction which has been seen to be typical of classical empiricism and the first formulation of which we can find in Aristotle's criticism of Plato's ideal entities and his formulation of the concept of abstraction<sup>6</sup>. Aristotle maintains that through abstraction one can isolate a property which is common to various objects. So, the concept "does not oppose the sensible reality as something extraneous, but constitutes a portion of that reality, a summary of what is directly observed in it" [Cassirer, 1910, p. 12; my italics]. This procedure obviously leads to the useless, empty Aristotelian concept of substance, which is absolutely fruitless from a scientific point of view — a purely "abstract universality" and not that "concrete universality" which Marx, as we shall see later, arrives at by means of a completely different concept of abstraction<sup>7</sup>.

### 3. Abstraction in Marx before his re-discovery of hegelian logic

Before going on to analyze Hegel's concept of abstraction and show how it breaks with the empiricist tradition outlined above, it is neces-

sary to see how Marx conceives of abstraction during the first stage of his intellectual development, that is, before he re-discovered Hegel's *Logic*. This is the only way to appreciate adequately Hegel's "break" and his influence on the way Marx had previously conceptualized the relationship between the empirical and the concept.

First of all, we must point out that there are two main meanings to which Marx refers when he makes use of the term "abstraction": firstly, it is seen in a prevalently negative way and so used to criticize because it is "abstract" — speculative philosophy and particularly Hegelian idealism. Another meaning is given when Marx himself uses the term "abstraction" for his own purposes, no longer in a negative sense but to describe both his own method of inquiry and scientific procedure in general. There is a certain connection between these two meanings: what Marx criticizes at one stage of his intellectual development as "abstract" is later indicated as the wrong scientific method, while the term "abstract", in statements such as "abstract science" and "abstract procedure", is used for what according to Marx is the right method for investigating economic, and for that matter physical and natural, phenomena. So, the former meaning is none other than a negative expression of the latter concept of abstraction which belongs to his mature thought and, even though elliptically and sometimes not very clearly (an attempt will be made further on to explain the reason for this), is taken to be an indispensable instrument for any scientific inquiry. Central to this evolution in Marx's thought is his relationship with the philosophy of Hegel, from his early radical criticism to his subsequent re-evaluation (especially of Hegel's *Logic*) when he was writing the *Capital*.

In the young Marx we can find criticism of the process of abstraction by which Hegel reaches his idea of the State. In his *Critique of Hegel's "Philosophy of Right"*, Marx attacks Hegel's transposition according to which what is real, the real basis for the existence of the state, becomes the product of its internal development [cf. Marx, 1843, p. 9]. In Marx's terms the state is the "abstract" in which the real conflicts of society are transposed and unified in a fictitious body which, in Hegel's concept, assumes an autonomous and independent reality<sup>8</sup>.

It is clear that Marx's negative interpretation of the term "abstraction" depends on its creating a fictitious entity which becomes the subject of single real manifestations that are abandoned to their empirical nature and so cannot be "explained".



On the other hand, Marx opposes any "empirical" solution consisting of the passive description and ordering of facts, as he believes that a distinction can be made between the "existence" and "essence" of each fact and that the task of philosophical elaboration is to grasp the laws which govern the evolution of the latter. This plan evidently remains in its embryo state as a simple criticism of Hegel and his uncritical assumption of experience of which he neglects to give a real explanation in favour of an abstract and flimsy one. Nevertheless, Marx's remark concerning the difference between "empirical truth" and "philosophical truth" shows that even if the empirical is used to polemicize against Hegel's "speculative", it is evident that the empirical in Marx is not the same as that of empirical philosophy but only as a starting point for a "philosophical" (that is, *scientific*, to use the terminology of the mature Marx) elaboration aiming at understanding the "essence" of its specific nature, not imposed from the outside and so transcending it (this, in fact, is the main defect of Hegel's speculative thought). In his criticism of Hegel's "speculative abstraction" we can already notice the theoretical bases for Marx's later concept of science.

So we find evidence of two targets for Marx's criticism: on the one hand Hegelian abstraction on account of its speculative nature; and on the other the empiricists' view which does not distinguish between "essence" and "appearance" and so conceives of abstraction as mere generalization and ordering of empirical facts. At this stage of his intellectual development Marx devotes greater attention to the former, according to the need to combat the speculative philosophy which dominated German philosophy at that time. When, on the other hand, Hegel was considered to be "a dead dog", Marx's criticism was mainly directed against "vulgar" economy and "the English method", but by then he had already re-discovered Hegelian logic and used it polemically against empiricism.

So, in his *Manuscripts*, Marx criticizes abstract thought as being empty, lacking in content and at the same time valid for all determinations:

As a result [of abstraction] there are general abstract forms of abstraction pertaining to every content and on that account indifferent to, and, consequently, valid for, all content — the thought-forms or logical categories torn from *real* mind and from *real* nature [Marx, 1844a, p. 189].

The typical abstraction of alienated thought<sup>9</sup> is represented by abstraction through elimination of particulars leading to an abstract generality which, as such, concerns nothing real and can surreptitiously be filled by experience: this is the "uncritical positivism" of Hegel, the prelude to a purely philosophical restoration of experience.

Marx moves along the same lines also in his subsequent works. In the *Holy family*, in the famous passage about "fruit", Marx reveals the "mystery of speculative construction" [cf. Marx, 1844b, pp. 62-66] and in his next work, *The German ideology*, beside remarks consistent with preceding ones [cf. Marx, 1846, pp. 38-39], presents significant polemic attacks against "abstract empiricists", setting up a return to the "empirical fact" as the supreme instance in which all "profound" philosophical problems are solved [cf. id., p. 16]. Whereas in his *Critique ...* Marx had distinguished between the "empirical fact" and "philosophical truth", now the empirical constantly and polemically appears each time he wants to fight against speculative philosophy (in this case, that of young Hegelian philosophers).

Nevertheless, this "empiricism" on the part of Marx is different from that of English and French philosophers, who were also "abstract" [cf. Marx, 1846, p. 14], and it is significant that Marx uses the words "logical artifice" in order to characterize the way in which the process of abstraction is normally conceived of by empiricists, that is, a process that consists of extracting one case from a representation, from a concept having many particular items, regarding it as the only exclusive one, and putting it in the place of the concept as its exclusive determination [cf. Marx, 1846, p. 253]. Here Marx combines his attack against idealistic abstraction with that against empirical abstraction. Whereas he criticizes the former's metaphysical, hypostatizing aspect, his target in the latter is its vagueness and the sterility of the concepts it leads to (e.g., that of "human nature").

Similarly, in *The poverty of philosophy* (which marks his greatest departure from Hegel), Marx stresses the value of experience as opposed to speculation and criticizes once again — this time making no concessions to his opponent — a method which through progressive abstractions reaches the ultimate abstraction and ends up by creating proper logical categories [cf. Marx, 1847, pp. 115-116]. This way of proceeding, however, is not only typical of Hegel and the idealists, but also of all those metaphysicians (by implication Descartes and Hobbes) who thought it possible to reach the inner essence of things by ideally split-



ting them up into simple entities (the classical procedure of empiricism: see above). They "s'imaginent faire de l'analyse" and "à mesure qu'ils se détachent de plus en plus des objets s'imaginés s'en approcher au point de les pénétrer" [id., p. 116].

This brings us closer to what we defined above as the second meaning of Marx's concept of abstraction, to be found in his mature works, after what has been called the "epistemological break", when Marx criticizes classical economy [cf. Vadée, 1974, pp. 82-85] and at the same time builds up his concept of science, first in the 1857 *Introduction to the critique of political economy* and then in *The Capital*. This, however does not mean that he abandoned his criticism of speculative philosophy and its "abstract" proceedings; but in this phase Marx distinguishes in Hegel between a "rational kernel" and a "mystical shell", and re-discovers the importance of Hegel's *Logic* (putting aside his juvenile enthusiasm for *Phenomenology of spirit*). In fact, he wrote to Engels that reading Hegel's *Logic* was very useful to him when working on *The Capital* and he intended to make a short synthesis of it to make available to common intellects the rational side of the method that Hegel discovered but in the meantime mystified [cf. Marx to Engels, 1858, 1.14]. What is the meaning of this rediscovery of Hegel's *Logic* and the fact that Marx now explicitly speaks of his own method as being that of "advancing from the abstract to the concrete" [Marx, 1847, p. 40]?

Evidently Marx has now a clear view of the difference between legitimate, scientific abstraction, though which it is possible to build up a theory having authentic cognitive value, and which is often used in his mature works, and illegitimate speculative abstraction which produces hypostases or generic "abstractly empty" concepts and is thus fruitless from a scientific point of view (this is the abstraction he criticizes in works up to *The poverty of philosophy*). The passages in which Marx speaks of abstraction as an indispensable tool for scientific inquiry have been widely dealt with in literature. It would seem, therefore, more worthwhile to pass over an analysis of this point and go on to analyze the positive significance Hegel's concept of abstraction assumed for Marx from a certain moment onwards.

So far we have seen that on the one hand Marx criticizes abstraction of a speculative nature, typical of Hegel, and on the other he rejects the classical empiricist concept of abstraction. In this difficult passage between the Scylla of Hegelian speculativeness and the Charybdis of

sterile English empiricism (typical of "vulgar" economy) Marx worked out his own idea of science and his own concept of abstraction. He did not, however, possess conceptual tools with which to express himself adequately. These instruments were to be provided by his rediscovery of Hegel's *Logic*, but first it had to be deprived of its "mystical shell".

#### 4. The Hegelian legacy

If we now turn to a consideration of Hegel's treatment of abstraction, we can understand Marx's enthusiasm for Hegel's *Logic*. Here we find a complete reversal of the traditional empiricist way of considering the relationship between abstract and concrete. In the introductory remarks to the section devoted to the "doctrine of concept". Hegel criticizes the ordinary idea of the relationship between concept and empirical matter (or "the manifold of the intuition and representation") that considers the intellect as an empty container which, on the one hand, in contact with the empirical world, acquires reality by obtaining contents and on the other works on reality through abstraction, elevating it to universality. This abstraction is an operation which "neglects" the content acquired as being useless for the concept. So the abstract is considered as having less worth than the empirical matter the intellect works on. This happens because

In this conception, abstraction means that from the concrete, one or another feature is extracted only for our subjective advantage, in such a way that with omitting numerous other *properties* or *qualities* of the object nothing of their value and of their *merit* should be lost. But, as the Real, they are always left as something fully valid, although over there, on the other side it is only an *impotence* of the intellect that it does not embrace such richness and must limit itself to poor abstraction [Hegel, 1816, pp. 258-259].

Hegel opposes this erroneous concept of the process of abstraction with what he thinks is the right one:

Abstractive thought is not to be regarded as a simple putting aside of sense data whose reality would not be thereby put in question, but rather as the taking away (*Aufheben*) and the reduction of the material as a *phenomenon* to the *essence* which manifests itself only in the *concept* [Hegel, 1816, p. 259].



This reduction of matter to the essential is nothing but than the idealizational process that eliminates secondary factors in a given phenomenon and takes into account only fundamental ones according to a structure of significance.

If we bear in mind the text of Marx's 1857 *Introduction* and we carry on reading Hegel's statements in his *Logic* we can clearly see to what extent Marx is indebted to Hegel's views<sup>10</sup>. Hegel states that it would be a great mistake to believe that the natural principle on which conceptual reflection is based is the "truth". Of course, the sensitive view (*Anschauung*) or the singular being (*Sein*)

(...) are (...) the condition of the concept, but they are not therefore the unconditioned as such (*das an und für sich Unbedingte*); rather in the concept their existence is removed and thereby the appearance which we considered as reality conditioned [Hegel, 1816, p. 260].

In other words, empirical reality is the real starting point for scientific inquiry, the premise without which theorization would not even be possible, but it only leads to science when it is *abandoned*, that is, when we use it as a base on which to build ideal models of physical systems that are in themselves "unconditioned" or free from disturbing particulars. This is a clear criticism of the "uncritical positivism" of some of his contemporaries, especially Comte. Hegel opposes the "residual concept of truth" — to be found in Comte and all forms of positivism including neopositivism — consisting of the thesis that truth is what is left once the cognitive process has been cleared of any perturbation (as Bacon had classically argued), with the need for a "treatment" of the datum that cannot be grasped in all its immediateness and therefore the necessity at each stage of the cognitive process of mediation between one subject and another [cf. Negt, 1975, p. 29]. This is the only approach that can give knowledge that is not confined to the description or generalization of particular phenomena but rather grasps its objective essential structure — which it is possible to achieve only in theory and which does not coincide with the intuitive sense-datum. On this basis rests the difference between essence and phenomenon as a manifestation of essence that we find in Hegel and which Marx was later to make his own. Hegel clearly states:

When what matters is not *truth* but only *history*, as in the imagination or in thinking confined to phenomena, then it is still possible to remain with the narration which we begin with sentiments or views (*Anschauungen*).

The intellect extracts from the multitude of them a universality or an abstract and needs that basis which, however in this abstraction, remains as such with all the reality it originally possessed. But philosophy should not be a narration of what happens but a knowledge of what is *true* in it and on the basis of this it should further conceptualize what in the narration appears as a single succession of events [Hegel, 1816, p. 260].

Which means, eliminating the "mystical shell" and grasping the "rational kernel", that there is a difference between descriptive and theoretical science — whereas the former collects and orders facts in order to describe their morphology or becoming (the stage of science before it passes over the so-called "threshold of maturity"), the latter constructs theories that do not confine themselves to describing reality but aims at giving an explanation of it by constructing ideal models that can only progressively be approached to it: thus, scientific theory (or "philosophy" to use Hegel's term) grasps the "truth" of what at first sight is a "simple happening".

This is just what Marx says in his '57 *Introduction* about the method of political economy. Like Hegel, Marx believes it is wrong to start from the real and concrete, for instance population. This would only be an "abstraction" (in the negative sense of the term, that is, assumed separately from its surrounding relationships and conditions such as classes, salary, etc.). However, although this is "a chaotic picture of the whole", thanks to more accurate detection one can reach more simple concepts: "from the imaginary concrete to less and less complex abstractions, until we get at the simplest conception" [Marx, 1857, p. 39]. Thus we reach the theory built on "simple concepts", that is, idealizing assumptions which allow us to eliminate the chaos of the empirical world. At this point it is time for the second or concretization stage. But concretization is only possible if the abstract reached is not an empty generalization, but an accurately built model in which the terms used have exact ideal relations with each other. Only in this case — that is, a completely different view of abstraction form that of classical empiricism

the true grasp of the nature of the concept (...) is absolutely contrary to this empty identity or abstract universality [Hegel, 1816, p. 261]

and the concept becomes "the basis and the source of all finite determinateness and multiplicity" [id., p. 261]. In fact the concept (a theory, to use the modern term) as such is incomplete "abstract" knowledge:



But its incompleteness does not lie in the fact that it lacks the supposed reality which would be given in sentiment and views (*Anschauung*), but in the fact that the concept has not yet given itself its *proper* existence generated by itself. The demonstrated absoluteness of the concept against the material, and in empirical material, (...) consists exactly in the fact that this material does not possess *truthfulness* – as might appear *beyond and before* the concept – but only possesses it in its ideality or in its identity with the concept. The *derivation* of existence from the concept – if it is to be termed a derivation – consists, above all, essentially in the fact that the concept in its formal abstractness reveals itself as incomplete. And through its dialectics founded in itself, passes to reality in such a way that reality is generated by itself. But the concept does not fall back on the given reality which it meets and does not refer to what was revealed as the inessential in the phenomenon<sup>11</sup>.

If we gloss over the typically idealistic language and grasp the “rational kernel” of this passage, we see that Hegel exactly describes the scientific process of concretization typical of the method the discovery of which Marx attributes to Hegel and on which he based his *Capital*. Marx states more or less the same thing, although in a “rational form”, in one of his most widely quoted passages.

The concrete is concrete, because it is a combination of many objects with different destinations, i.e. a unity of diverse elements. In our thought, it therefore appears as a process of synthesis, as a result, and not as a starting point, although it is the real starting point and, therefore, also the starting point of observation and conception. By the former method the complete conception passes into an abstract definition; by the latter, the abstract definitions lead to the reproduction of the concrete subject in the course of reasoning [Marx, 1857, p. 40].

But in Hegel this “rational kernel” is associated with the “mystical shell”, his idealism: the concept does not reproduce the concrete side of thought as an enrichment of theory by means of subsequent concretization, but rather becomes its “creator”. Shortly after describing scientific method so acutely, Hegel maintains that

logic demonstrates the raising of the idea to the level on which it becomes the creator of nature and passes to the form of *immediate concreteness*. But this concept also breaks away from this form in order to become *concrete spirit* [Hegel, 1816, p. 265].

And Marx rightly passes to the attack:

Hegel fell into the error, therefore, of considering the real as the result of self-coordinating, self-absorbed, and spontaneously operating thought, while the method of advancing from the abstract to the concrete is but a way of thinking by which the concrete is grasped and is reproduced in our mind as a concrete. It is by no means, however, the process which itself generates the concrete. (...) The concrete aggregate is a thought aggregate, in so far as the concrete subject of our thought is in fact a product of thought, of comprehension, not, however, in the sense of a product of a self-emanating conception which works outside of and stands above observation and imagination, but of mental consummation of observation and imagination [Marx, 1857, pp. 40-41].

At this point one fact seems clear: Marx found in Hegel and especially in his *Logic* the guide-lines for a scientific method using a completely different concept of abstraction from that traditionally held by empiricistic philosophy and common among contemporary positivists. Hence his great appreciation of Hegel's work and the inspiration he clearly found for his *Capital* (as is shown in his letters to Engels on the subject). Moreover, when Hegel speaks of the true speculative method in dealing with the doctrine of essence, Marx saw, once it was materialistically interpreted, the method followed by theoretical science to build its theories, again different from that proposed by contemporary positivist culture. The method concerned is the essentialist-idealizational one which the idealizational conception of science was the first to point out clearly and with methodological accuracy.

Hegel's limit, therefore, was his not realizing that the method of speculative philosophy he delineated when dealing with the doctrine of essence as the real method followed by science; so he thought it must be opposed to contemporary scientific procedure, which was interpreted in a conventionalistic, instrumentalistic way, and thus he underestimated its cognitive value to such an extent that when he encountered theoretical reflections that were not purely instrumentalistic but essentialistic he accused science of abstraction, preferring to re-interpret phenomenal data in an instrumental manner, modelling them according to the needs of his speculative attitude. Although Hegel had the undoubted merit of having correctly pointed out the importance of the general theoretical framework within which scientific concepts are articulated – a position that no longer seems absurd to modern



epistemology — and despite the German philosopher's presumed scorn of empirical matter in favour of aprioristic conceptual deduction [cf. Compton, 1984], it is nevertheless important to recognize that in his concrete analysis of particular theories (atomic theory in chemistry, the theory of gravitation, optics) Hegel preferred scientific theorization that privileged a phenomenalist approach to reality, refusing to hypothesize "abstract entities" like atoms, the laws of inertia and so on. As Compton stresses, in Hegel two planes or options on science are indistinctly mingled: the first one tends to give a conventionalistic image of scientific theories in which the constructs of physics are seen as pure, hypothetical, conventional tools in contrast with the metaphysical model in which the Spirit is the only truth; the second one tends towards a realistic consideration of scientific theory, the only one which would allow not only criticism of materialistic trends in the attempt to re-interpret observed phenomena in terms of conceptual analysis (as Hegel does) but would more creatively have enabled him to use conceptual determinations to generate new theoretical hypotheses which could provide discoveries and explanations of new phenomena [cf. Compton, 1984, p. 39]. In effect Hegel privileged the former in his analysis of concrete scientific practice. Even though one might agree with Buchdahl's criticism of certain consolidated, traditional interpretations, it is however certain that this duplicity on the part of Hegel was the basis for Marx's distinction between the "mystical shell" and the "rational kernel" and so for the necessity of distinguishing Hegel's general methodological intuitions, which Marx was interested in, from his concrete analysis of single scientific theories, where the tendency towards saving his idealistic views at all costs made Hegel propend towards conventionalistic, instrumentalistic solutions that were less compromising from an ontological point of view and so provided an opportunity for conceptual re-interpretation of available empirical material.

An explanation of Hegel's double attitude or the two planes of reflection Compton speaks about could be that for Hegel philosophy follows (or would follow in order to be authentic) the essentialistic-idealizational method delineated in the preceding pages, while empirical science follows an empiricistic-abstract method that is interpreted in a conventionalistic way and emptied of any cognitive value in favour of speculative philosophy. Marx, on the other hand, sees the method Hegel attributes to philosophy — the so-called "dialectical method" — as the

authentic method of science as opposed to the methodological self-awareness of many contemporary scientists and all positivist and empiricist philosophy which he was acquainted with, and on this basis he proceeds to invert the "mystified dialectic"; having discarded philosophy as a privileged cognitive instrument and refused an instrumentalistic approach to scientific theorization, he re-unites science and method — science is represented by the great scientists and theories of his time, the method is the one Hegel discovered and in the meantime mystified and attributed, in its mystified form, to speculative philosophy.

It is significant that when Hegel explicitly deals with the procedure of physics, he does not refer to contemporary science (for instance, Newtonian physics) nor does he describe the method actually used, but rather states his concept of science in the light of his own philosophy and thus polemically delineates the correct method science should use but which, in effect, is only used by his philosophy, seen as a superior form of knowledge as compared to science. Hegel does not realize that in effect he is describing the method really followed by theoretical science (particularly physics) since his approach is conditioned by the stereotypes of scientific method that were widespread in his time. When in his *Logic* he criticizes modern scientific procedure, he confuses its actual way of being with the empiricistic philosophy shared by contemporary scientists, so his criticism is directed against the right object (naive empiricism) but not distinguishing it from real science, he strikes science in general, proposing the correct scientific method as being one that identifies with his speculative theory of mediation [cf. Damerow-Lefèvre, 1982, p. 97]. Paradoxically, his speculative "reading" of physics is a correct description of scientific method, as can be seen from the following very interesting passage. Once stripped of its speculative form, it is an adequate presentation of the method of idealization and concretization:

In physics the particular natural properties or materials must be rid of numerous connections in which they occur in concrete reality and be presented in their simple, necessary conditions. Like spatial figures, they are also intuitive but the intuitions must elaborate them in such a way that, first of all, they appear and become stabilized as free from all the modifications produced by the opportunities extrinsic to their proper determinants. The magnetism, electricity, the various species of gases etc. are objects the knowledge of which may be given only by their determinativeness because of the fact that they can be comprehended only as extracts from the concrete conditions in which they



appear in reality. The experiment presents this for observation in a concrete case. But, on the one side, it must, in order to be scientific, only embrace the necessary conditions and – on the other – the experiment must multiply to demonstrate that the concrete inseparable from these conditions is inessential, that these conditions appear in another concrete whole, and in another again, so that for knowledge only their abstract form remains [Hegel, 1816, pp. 521-22].

Clearly anticipating Marx's ideas on the passage from the abstract to the concrete, Hegel concludes that

Everywhere the abstract must form the beginning and the element in which and from which the particularities and the rich forms of the concrete extend [Hegel, 1816, pp. 522-23].

But what physics is Hegel talking about? Certainly not Newtonian physics, which he harshly criticized and opposed with the science of Kepler [cf. Hegel, 1817, §270]. Above all, he criticizes Newton's attempt to explain the movement of heavenly bodies through physical properties that still bear traces of their sense origin. It is Newtonian *empiricism* he is attacking, his uncritical assumption of sense data, his remaining passive towards nature and the fact that he did not adequately value the active, constructive side of thought towards empirical material.

Kepler, on the other hand, supports concepts over natural determinations and so assigns philosophy an active role, rejecting a merely receptive attitude consisting of simple registration of the data of experimental knowledge. Hegel does not reject experiments (*per se*) so much as the uncritical use of experiments, the underlying "experimental philosophy". As is clear in his early *Dissertatio philosophica de orbitis planetarum* [cf. Hegel, 1801] and confirmed in his *Encyclopaedia*, Hegel polemically rejects empiricism in favour of the rational, active nature of knowledge. Newton's "philosophy" was empiricist and inductivistic. Hegel goes no further than the "philosophical awareness" possessed by contemporary science; he could not see that Newton's conceptual edifice really goes beyond his explicit statements<sup>12</sup>, and so he criticizes him in the light of his own philosophy, indicating what physics *must be* if it wants to be an authentic science. In doing so, however, he shows what authentic scientific method should be, and was, regardless of scientist's methodological awareness of the fact. He correctly understands that

science, despite the positiveness that apparently characterizes scientific knowledge, constructs its concepts by detaching itself from immediate nature and addressing itself to the construction of scientific models. So science has a "speculative" nature, in the sense that it does not confine itself to ordering and reproducing empirical events, but orders them according to rational links which lead to the construction of scientific models. Hegel sees this as Kepler's superiority over Newton: the former's model rigidly keeps to "rational" thinking without mixing scientific laws and empirical contents and thus acquiring greater logical coherence. For Hegel the proper nature of science consists of its ability to transcend the appearance of phenomena so as to explain their essence through the construction of scientific models<sup>13</sup>. Science as Hegel believes it is (and which, as we have seen, is viewed from a conventionalistic, instrumentalistic standpoint) is opposed to science as Hegel thinks it should be (and which is characterized by rationality and essentialism). But if this is the meaning of science, it is philosophy that brings it to light and to effect. Whereas in science the transcending of experience is unconscious and incomplete, philosophy is the point of arrival of scientific knowledge and thus is notably superior to the sciences in that it is omnilateral knowledge which overcomes and reconciles the contradictions of science. In philosophy reason finds its full realization, whereas the sciences are prisoners of *Verstand*, they insist on separation and this non-dialectic nature makes them stop at the appearance of things without really grasping their sense [cf. Tommasi, 1979, pp. 152-153]. The sciences have speculative value in that they impose order and rationality on sense data, but they do not take the right steps towards complete rationality of the logical concept.

Just this last point was rejected by Marx. Passages like those quoted above, in which Hegel states what the physical method should be, and several others that could be quoted, can be interpreted in two ways: in an "idealistic" and "speculative" way making the abstract (the "concept") the ontic origin of the concrete; or in a materialistic sense, seeing these expressions as a mere description of the process of knowledge. The latter is how Marx read Hegel's *Logic*.

Moreover, although Marx cannot but agree with the method Hegel describes in this passage, unlike Hegel, he avoids confusing the method of science and the empiricist (or positivistic) philosophy of science, the so-called "English method" (the spontaneous philosophy of scientists Engels was later to attack), refusing the latter but not science itself,



whose method is the same as Hegel's "dialectic method" of philosophy, correctly identified by Marx as the proper method for scientific inquiry and therefore suitable for the scientific analysis of capitalistic production methods he made in his *Capital*. But in order to be able to use this dialectic, it had to be stripped of its mystified Hegelian form and seen as the dialectic or logic of scientific knowledge. How was this to be carried out?

Of course, the epistemological panorama of Marx's day did not possess conceptual tools to express the methodological reality of theoretical science; methodological awareness usually comes after scientific practice and scientists themselves often give inadequate philosophical and methodological explanations of what they do. As Hegel would say, Minerva's owl — i.e. methodological awareness — only takes flight at dusk. Marx, who had already criticized the empiricistic concept of abstraction and had taken up a critical stand in discussion among left-wing Hegelians, was familiar with Hegelian thought and so when he read Hegel's *Logic* again, by now aware of a different scientific method from that theorized by his contemporaries, he found that it delineated the method he himself had in mind. The language was speculative, but it expressed a "rational kernel" that was to be safeguarded: it was better to use a method that was correct, although heavily compromised by an idealistic context and vocabulary, than a language and method like the empiricistic one, which was wrong both in its "kernel" and "form". Hegelian philosophy, especially his dialectic logic, provided the best set of conceptual tools offered by contemporary philosophy to express the idea Marx had formed of science (the formation of which had also been influenced by his idealistic background)<sup>14</sup>.

Obviously this would require translation into materialistic terms, the re-writing of a *materialistic dialectic* logic, but although Marx often proposed to carry out this task, he never did so. We have only his scientific works and numerous other places where he speaks more of less explicitly of his method.

##### 5. "Standing Hegel right side up"

If what has been said so far is correct, the famous problem of Marx's inversion of Hegel's ideas takes on a clearer outline and is articulated on several distinct, although related, planes. To be more precise, there are two main stages.

a) An *ontological inversion* consisting of Marx's substitution of the dialectic of Hegel's ideas with a dialectic of things themselves.

This inversion is the basic premise of all Marx's criticism of Hegel's logical mysticism from his early works onwards, also expressed, as we have seen, in his criticism of speculative abstraction; a criticism Marx refers to in his 1873 "Post-scriptum" to the *Capital*, where he states that he came to terms with Hegel's mystified dialectic 30 years earlier. It is the criticism contained both in the *Critique of Hegel's philosophy of right* and in the *Economic and philosophical manuscripts* of 1844 which is particularly expressed as a denunciation of the inversion between subject and predicate and the logic of the pure abstract concept. It is significant that at this stage of his criticism of Hegel, Marx attacks the general ontological premises of his ideas but is attracted, as emerges from his *Manuscripts*, by the historic-evolutionary idea of the Spirit as being an entity that self-generates through work: after ontological correction, the Spirit becomes man in general and so the conceptual foundations of his historical materialism are laid. At this point, it is a case of passing from the generic entity man to the social mechanisms and collective organisms that determine his individual life (this passage witnesses his departure from the early influence of Feuerbach). There is no reference in this ontological inversion to Hegel's *Logic* or his dialectic, which will only be taken up again in his mature works like *The Capital*. Most Marxist literature deals with this kind of "inversion"<sup>15</sup>.

Obviously, this definition of "inversion" — clearly stated by Marx himself — is correct, but it is not the only one. *It is merely the ontological premise for another, more fundamental methodological inversion*. If, in fact, we stop at this first kind of inversion, Marx would be just a brilliant critic of Hegel from a realistic standpoint, agreeing with similar criticisms that were made of Hegel's speculative philosophy. His standing Hegel right side up would be a generic claim of a realistic nature which most anti-speculative philosophers would agree with. But although they agree, the latter often have highly diverging ideas of scientific method, and it is just on this point, the concept of science, that the real difference lies. Marx worked out an epistemology that was for a long time misunderstood and underestimated as far as its possibilities and the alternative it offered to positivistic and neopositivistic epistemologies are concerned. The realism which subsequent Marxist dialectic (e.g. Lenin) was to insist on so much, was only the *conditio sine qua non*, a necessary but not sufficient condition in order to grasp fully the



Marxian conception of science. Beside this, there is another kind of inversion, namely

b) a *methodological inversion*, which can be subdivided into two stages:

b<sub>1</sub>) the recognition of the idealizational method in Hegel's *Logic* made possible by the peculiar concept of abstraction contained in it;

b<sub>2</sub>) Marx's attribution to science of a method Hegel considered belonging to speculative philosophy.

This is the level on which Marx extracted the so-called "rational kernel" from the "mystical shell" of Hegelian dialectic logic. We can also understand Marx's distinction, with regard to Hegel, between *system* and *method*. A widespread opinion maintains that Marx rejected Hegel's system but accepted his method; this has been countered by the thesis that both the system and the method are metaphysical, so if the method maintains its original logical structure it cannot but generate the same system [cf. Merker, 1971, pp. 121-122]. In effect, from what we have said above, one could advance the hypothesis (which would need to be supported by more accurate historical analysis than is possible in a paper) that while the ontological inversion aimed at the system and criticized its metaphysical basis, the methodological inversion only aimed at eliminating the mysticism of the method. Marx's criticism would seem to be leveled at two different stages or aspects of Hegel's thought and this can be noticed in the passage from his juvenile to his mature works. It is not that the system is "bad" and the method "good". Nor that both are "good" or "bad". It is rather so, that the system is "good" as regards the general idea of history as an immanent process of human self-generation (according to the evaluation given in the *Manuscripts*, characteristic of the young Marx when he stressed the value of this aspect of Hegelian thought). And, at the same time, it is "bad" on account of its hypostatization processes which have been discussed in some detail. In turn the method is "good" in that it points out a concept of scientific abstraction and a way of acquiring empirical data that is adequate for scientific research, but is "bad" in that it attributes this method, which is typical of the natural sciences, to speculative philosophy and does not make it a process of acquisition but of "generation" of reality.

Marx's criticism of Hegel consists of the combination of these two levels, and he was brought to it both by his own scientific practice and by his reflections on contemporary science.

Marx, therefore, continues the Galileian scientific tradition in which the method of idealization was first applied to physics, the same method he applied to economics and social sciences, so we think it is correct to label Marx as "the Galileo of social sciences". However, Hegelian dialectic was indispensable for him to conceptualize his own procedure and make it clear to himself. Hegel had the great merit of proposing the right scientific method, but his fault lies in his clothing it in speculative garments which twisted scientific hypothesis into metaphysical hypostasis, abstract thought into a creative idea of reality and the process of concretization into an ontic generation of the empirical world by the self-moving concept. It was necessary to clear this view up and solve the problem of method in science, in other words "render unto Caesar that which is Caesar's". This is what Marx intended, even though he only succeeded, as scientists usually do, in his practical scientific research without managing to write the materialistic dialectic logic he announced to Engels more than once.

But if we must recognize Hegel's great merits and his undoubted influence on Marx, this does not mean that a "Hegelian" reading of Marxism is acceptable nowadays. It would be as absurd as a "Galileian" reading of quantum physics (that is, trying to translate the latter into the vocabulary and conceptual tools of Galileo). It is not a problem of a "return to Hegel", reading Marx with Hegelian conceptual tools, but, once we have recognized the merits and the feature of Hegel's influence on Marx, and so understood Hegel's legacy, it is a question of *forgetting* Hegel and further developing Marxist epistemology in a fruitful comparison with modern science and methodology. Now we possess much more powerful conceptual tools than the ones Marx had in his time, so we do not need to use Hegelian jargon.

## 6. Concluding remarks

We may now draw the conclusions of that has been said up to now. The thesis we have tried to support in this essay could be summarized as follows:

1) First of all there seems to be a clear distinction between Hegel's view of abstraction and that of the empiricists.

2) Secondly, in working out his concept of science and his own practical research, Marx rejected the empiricists' view of abstraction and



therefore of science but found in Hegel the basic concepts underlying his work, which he expressed by "flirting" with Hegel's language.

3) Finally, to do so Marx had to separate the correct scientific method — the idealizational, essentialistic one — from its speculative "shell", not to refer it to speculative philosophy as Hegel had done, but to empirical science whether it were physics or economy. This is Marx's authentic "inversion" of Hegel's dialectics. It is not really an ontological inversion, consisting of substituting the dialectics of material or historical reality for that of ideas; this latter type of inversion is only the presupposition, a necessary but not sufficient condition.

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#### NOTES

<sup>1</sup>It is not always so: in the Italian Marxist tradition, for instance, the "Marxistic" quality of Marx's early works has been defended and the difference between Marx and Hegel even in his mature works has been stressed (especially by della Volpe). Of course, this attempt has met with great difficulties and has floundered in philosophical specialism. We do not mean that the attempt to explore the "continuity" between Marx and Hegel is to be rejected *ipso facto*, but rather that it was destined to failure if tackled with the epistemologically backward conceptual tools it was dealt with.

<sup>2</sup>This is the case of research carried out according to idealization methodology developed in the Poznań milieu, which neither assumes an openly antihegelian position nor stresses Hegel's influence on Marx. The problem has simply been ignored, and attention has been concentrated on developing the more strictly epistemological themes connected to analysis of contemporary science and of Marx's works.

<sup>3</sup>See the works of Nowak [1977, 1980] and other writings of Brzeziński, Klawiter, Nowakowa, Patryas, Zielińska and others published in the *Poznań Studies in the Philosophy of the Sciences and the Humanities*.

<sup>4</sup>It is this kind of process to which Marx referred in *Misère de la Philosophie*, when he spoke of "ultimate" abstraction and criticized vulgar economists for their "abstract" way of proceeding (cf. below).

<sup>5</sup>It has been suggested that the concept of idealization is present in Mill. Janina Kotarbińska, for instance, criticizes the thesis that Marx was the first to view the method of idealization as typical scientific procedure and points out that Mill shared the same views both in his *System of logic* and in a subsequent minor work on the method of political economy [cf. Mill, 1844], although she recognizes Marx's "worth in having applied the method of idealization on a large scale to the social sciences, so revealing a high degree of methodological awareness, a very rare attitude among the

scholars of applied sciences" [Kotarbińska, 1974, pp. 197-198]. Analogously, S. Tagliagambe recently maintained that the English economist and logician made a series of interesting remarks that partly seem to believe what he states in his major work (*System of logic*) and which "seem to anticipate some results obtained in more recent times in research into the formal and epistemological requisites a statement must possess to be classified as a scientific law" [Tagliagambe, 1983, p. 77]. The requisites Tagliagambe refers to are practically the same as those described by scholars of the Poznań milieu. Tagliagambe says, for instance, that "laws are distinguished from mere generalizations [thanks to their] (...) capacity to sustain *counterfactual conditionals*, that is, conditionals like 'if x were A, y would be B', which are called counterfactual conditionals when the antecedent is contrary to a fact known to be true" [id., p. 77]. Tagliagambe goes on to state that when Mill speaks of "abstract truths" he supports the idea that the practice of abstraction consists of the construction of a sort of "object of knowledge" based on particular "idealizing conditions" [ibid.] and so the object of knowledge obtained by means of this procedure is not a pure copy of phenomenal reality but rather an "idealized abstract replica". Hence, the laws of political economy "are only factually true" but they are "semantically true in the ideal domain" therefore "to connect theory to data we need a procedure that can progressively introduce into the theory corrections deriving from the elimination step by step of previously neglected factors, until we reach a level of analysis which takes into account all the parameters that somehow affect the event being studied and which, for this reason, can be directly compared with the results of the observations (...) Control procedures to ascertain this (the empirical truth of theories) thus consist of a development of general laws such as to 'concretize' theory progressively and relate it to the phenomenal field by means of a well defined series of steps" [id., p. 78]. Even if we accept this (and the scope here is too limited to examine the question in great detail) we can confine our remarks to the view that Marx did not set much store by the observations made by Mill to which Tagliagambe and Kotarbińska refer, as can be seen in *Theories of surplus value* where Marx expresses an altogether negative judgement on the methodological and economic work of Mill [cf. Tagliagambe, 1983, pp. 79-87].

<sup>6</sup>Interesting observations on this subject have been made by Ernst Cassirer, a thinker who in many ways shows similarities with the modern trends in philosophy of science underlying the role of idealization [cf. Cassirer, 1910, pp. 10-21 ff.].

<sup>7</sup>Cassirer acutely opposes the scientific concept to the schematic representation of types (in the Aristotelian sense), stating that "the true, real concept doesn't leave out the distinctive features of the contents it takes in, but it tries to show the apparition and the connection of these distinctive features as being necessary. So, it gives a universal rule to connect the features themselves" [id., p. 30]. So it is evident that for Cassirer abstraction "doesn't leave out the distinctive features of the contents" since his departure from concrete experience is only a "methodical step" preceding a "return to earth", the phenomenological plane, through the process of concretization. It shows that the particular contents are "necessary" since they derive from the law once one introduces corrective parameters which take into account formerly omitted factors, otherwise the law is falsified. This is the same content Marx speaks of in his "advancing from the abstract to the concrete". The scientific concepts reached through idealization (or scientific, Marxist



abstraction) both "deny" and "preserve" empirical particulars and so are *fruitful*. The "abstract" concept, on the other hand, is fruitless in that it does not allow reacquisition of experience by explaining it – particulars are "denied" but not "preserved".

<sup>8</sup>"In contrast to the abstraction of this Idea the determinations of the actual, empirical state formalism appear as content; and hence the actual content (here actual man, actual society, etc.) appear as formless inorganic matter" [Marx, 1843, p. 116].

<sup>9</sup>The problems of abstraction and alienation are clearly connected in Marx: abstract thought is only possible in alienated thought. Vadée [1975, pp. 69-74] stresses this link between the criticism of abstraction and the theories of alienation expounded in Marx's early thought [cf. also Marx, 1844]. However, these problems are not the specific concern of this essay and so will not be dealt with a greater detail.

<sup>10</sup>A. Schmidt [1971, pp. 54-62] points out that Marx is indebted to Hegel for this way of conceiving of scientific knowledge, especially the way of reaching the concrete through the abstract. What he stresses most is Marx and Hegel's criticism of "the empirical world without concepts" (on this subject, cf. also Il'enkov [1960, pp. 115-118] and the interesting remarks made by Bodei [1976, pp. 219-227]), but he neglects to observe the difference between Hegelian abstraction and empiristic abstraction. Along with what Schmidt points out, this second issue shows that Marx's concept of science does not refer directly to empirical regularity but to "ideal models".

<sup>11</sup>Hegel [1816, pp. 263-264]. And also: "Whereas in reality, be it of nature or the spirit, the concrete individuum is primarily given to subjective, natural cognition, on the contrary, in this cognition, which is at least conceiving, in that it is based on the concept, the simple, what has been distinguished from the concrete, must be the first, because only in this form does the object have the form of the universal referring to itself and of what, according to the concept, is immediate. Against this scientific procedure, since intuition (*Anschauung*) is easier than cognition, that the object of intuition, and therefore concrete reality, should be the starting point of science. This procedure could be thought to be more natural than one which starts from the abstract object and then goes on to concretize and individualize it" [ibid., p. 520].

<sup>12</sup>On the idealizational character of Newtonian mechanics, as opposed to his professed philosophy, see Boscarino's essay in this volume.

<sup>13</sup>For an assessment of this aspect of Hegel's approach to science see [Tommasi, 1979, pp. 136-149].

<sup>14</sup>This is confirmed by Engels when he discusses Marx's attitude towards Hegel. He remarks that the Hegelian method, in its original form, was completely unusable as it was idealistic being based on pure thought, whereas materialism should be based on stubborn facts. He then goes on to say, however, that as compared with other available methods used by bourgeois economists in their "inconclusive" books, among all existing logical material, was the only thing in which it was possible to place one's trust [Engels, 1859, pp. 206-207].

<sup>15</sup>Classical examples are Labriola [1897, p. 216] and various comments and interpretations like those of Dal Pra [1972, p. 40] and, more recently, Mugnai [1984] who reaches the conclusion that the "exact sense" of the inversion of Hegel's dialectic lies in the fact that "the field of objects Marx's dialectic is applied to is not formed of ideas and con-

cepts, but concrete social relations; even by things (the products of work) and by the functions that these things have in a certain historical context" [id., p. 139]. We can find substantially similar views, enriched by the infinite terminological and stylistic variations of Marxist studies, in Luporini [1974, 1976], della Volpe [1966], Badaloni [1962] and so on.

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### THE STRUCTURE OF SIX TRANSFORMATIONS IN MARX'S *CAPITAL*, VOLUME III\*

In volume III of *Capital*<sup>1</sup>, Marx starts with an abstract labour value theory of price formation that he used in the previous volumes to teach us about what he thought to be the essence of the capitalist economy. He makes the attempt to show that his abstract price theory is also a suitable basis for explaining the prices you actually find in existing, "concrete" capitalist economies.

For that purpose, he introduces, one by one, six features of real world economies that he abstracted from in his earlier treatment of price. The successive introduction of these six features requires six "transformations" of prices. Marx's basic, abstract law of value is only the first *form* of the law of value in a row of seven such forms.

All this has been brought to the attention of philosophers of science by Leszek Nowak [1980]. He called it a process of "concretization". The resulting growth of philosophical interest renders useful a complete mathematical description of the six transformations as six successive relations between seven equations explaining price from seven sets of data in seven ways. I find it hard to make clear what I mean by a "complete mathematical description" before having supplied it. Let it be said here that such a description tells us how, in Marx's view, all prices in an economy are jointly determined by a well-defined set of data that becomes larger in the course of the concretization of the theory. This adds to Nowak's reconstruction, which is a qualitative analysis of the *direction* of price deviations from the value of a commodity caused usually by above or below average conditions under which the commodity is produced: it adds insight into the way in which, according to Marx, the economy *as a whole* completely determines prices, under certain sets of conditions. The exercise following below has, to my knowledge, never been done before. This cannot be because it is diffi-