

Epistemological Notes

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'We have many times shouted to those thirsty for the palpable political success of conjuncture, that we are revolutionaries not because we need to live and see, contemporary, the revolution, but because we live and see it today, as an event, for the various countries, for the fields and areas of social evolution, already susceptible to scientific demonstration. The sure co-ordinates of the communist revolution are written, as valid solutions of the demonstrated laws, in the space-time of History' - Amadeo Bordiga - Sul Filo del Tempo 1955; Relativity and Determinism¹

¹ Quotation inserted by Quinterna n+1 in their compilation of 5 texts origination from the Italian Communist Left on the topic of consciousness, also the notes are supplemented by quotations and comments from Anti-Duhring. This compilation is in n+1 #16 and goes by the name 'Criticism of philosophy. Excursion with Marx's method

1. Epistemological Notes

From the preface [to Engels' Antidühhing] of 1885:

'It was a question with this recapitulation of the mathematics and natural sciences of mine of convincing me also in the particulars of that about which in general there was for me no doubt, that in nature there occur, in the tangle of innumerable changes, the same dialectical laws of motion which, even in history, govern the visible accidentalities of events; the same laws that, while forming the connecting and guiding thread in the developmental history of human thought, little by little come to the consciousness of thinking man; that were first developed by Hegel in a systematic manner, but in a mystified form, and that it was our endeavour to liberate from this mystified form and to make clear to the consciousness in all their simplicity and universal validity. It is understood that the old philosophy of nature, however much good it contained and however many fruitful germs, could not suffice for us.' [9]

And in the footnote:

'It is much easier to venture against the ancient philosophy of nature with people who are as thoughtless as Charles Vogt, than to appreciate its historical importance. It contains many inaccuracies and fantasies, but no more than the contemporary non-philosophical theories of the empirical naturalists; and that it also contained a great deal of wisdom and intelligence began to be discerned as soon as the theory of evolution became widespread. Thus Heackel rightly recognises the merits of Treviranus and Oken. Oken defines in his original mucous membrane and bladder what was later actually discovered as protoplasm and cell. As far as Hegel in particular is concerned, he rises in many respects above his empirical contemporaries who believed they had explained all exemplifiable appearances when they had referred to them as a force, gravitational force, buoyancy force, electrical contact force, etc., or, if that did not work, to an unknown element: fluid-light, fluid-heat, fluid-electricity. Imaginary fluids are nowadays rather cast aside, but the force mania pops up again in 1869 in Helmholtz's speech in Innsbruck. In contrast to the deification of Newton by the French in the 18th century, of Newton, whom England showered with honours and riches, Hegel proclaimed that Kepler, whom Germany let starve to death, was the true founder of modern celestial mechanics and that Newton's law of gravitation is already contained in all three of Kepler's laws; in the third, it is explicitly so. What Hegel demonstrates with a couple of simple equations in his philosophy of nature... is found as a result in the most modern mathematical mechanics at Kirchoff and essentially in the same mathematical forms first developed by Hegel. The philosophers of nature stand to the consciously dialectical science of nature as the utopians stand to modern communism.' [9-10, footnote]

around the bourgeois theory of knowledge and today's non-science'. More information about the text can be found in the preface written by them.

'As will be developed further in this paper, it [the ancient philosophy of nature] lacked, especially in the Hegelian form, in this: it recognised no development in time, no 'one after the other', but only a 'one next to the other' to nature. This was on the one hand based on the Hegelian system itself, which attributes a process of historical development only to the spirit, and on the other hand also to the state in which the natural sciences were then. In this Hegel remains far below Kant, whose nebular theory had proclaimed the formative origin of the solar system and whose discovery of the slowing of the earth's rotation by the tides had also proclaimed its end. Finally, for me, it could not be a matter of constructing dialectical laws within nature, but of discovering them in it and deducing them from it.' [9-10]

Engels demonstrates that recent developments in the exact sciences move towards substituting the dialectical method for the metaphysical, he cites the liquefaction of irreducible gases, the kinetic theory of gases, the conservation and transformation of energy, the theory of evolution and the transformation of species, the discovery of the cell and phagocytes as blows to the abstract concept of animal individuality etc.

'It was in fact the presupposed irreducible and insoluble polar oppositions, the immutably fixed lines of separation and class divisions, that had given the modern theoretical science of nature its metaphysically limited character. The recognition that these oppositions and subdivisions are indeed found in nature, but only with relative validity, that on the contrary their presupposed rigidity and absolute validity was only lent to nature by our reflection, this recognition forms the point of origin of the dialectical conception of nature. One can arrive at it insofar as one is forced into it by the ever-increasing facts of the natural sciences. One arrives at it more easily if one places awareness of the laws of dialectical thought before the dialectical character of these facts. In any case, natural science today is so far ahead that it no longer escapes dialectical interpretation. It will, however, illuminate this process if it does not forget that the results in which it summarises its experiences are concepts; that the art of working on concepts is not innate, nor even contained in ordinary consciousness, but needs effective thinking, which thinking, in turn, has a long history based on experience, no more and no less than the search for nature by means of experiment. Precisely by learning to appropriate to itself the results of 2,500 years of development in philosophy, science first of all frees itself of all philosophy of nature that stands apart, outside and above it; and it also frees itself of its own limited method of thinking transmitted to it by English empiricism.' [12]

Socialism in the History of Thought

- Socialism as a real movement and as a set of opinions or theoretical views.

According to its content, modern socialism is first and foremost the product of, on the one hand, the consideration of the class opposition prevailing

in modern society between landowners and nonlandowners, wage-earners and bourgeoisie; and, on the other hand, of the anarchy prevailing in production.

But according to its theoretical form, it presents itself at first as a continuation pushed further with the claim to be more consequential from the principles established by the great French Enlightenment of the 18th century. Like any new theory, it must first of all connect to the previous material of thought insofar as its roots lie in economic facts.

- This second aspect interests us for now.
 - As such, it is not a system of opinions in purely political or even social economic matters, but an integral conception of the world in all its aspects and parts.
- Relations and differences between the socialist conception and the fundamental philosophical schools of the past:
 - The ancient Greek cosmological philosophy;
 - Greek idealism;
 - Christian scholasticism;
 - The period of the scientific renaissance;
 - English empiricism;
 - German idealistic philosophy;
 - The French Enlightenment;
 - 19th century positivism;
 - Recent neo-idealism and neo-spiritualism;

The Enlightenment rejected all authority and subjected everything to the critique of reason. *'The world was put on its head'*. Criticism of this theoretical nature: its claimed universality was reduced to truth, justice, bourgeois equality. The Enlightenment ignored the classist explanation of the movement they represented. Appearing, in addition to feudalism and the bourgeoisie, the proletariat, an ideology of its own emerged in utopianism. [16]

The utopians go further than the Enlightenment by wanting to extend the application of reason, justice and equality not only to legal and moral relations but also to economic ones. They too are unaware that they are speaking on behalf of a class and proposing upheavals made necessary by the degree of historical development, and they believe that only the revelation of truth is the driving force. Socialism therefore appears as the expression of absolute truth, reason and justice that were only to be discovered. [17]

Meanwhile, alongside and in front of 18th century French philosophy, the new German philosophy had arisen and had found its conclusion in Hegel. His greatest merit was the recollection of the dialectic as the highest form of thought. The ancient Greek philosophers were all born dialecticians and the most universal head among them, Aristotle, had also already sought the essential

forms of dialectical thought. Modern philosophy, on the other hand, although even in it dialectics had luminous representatives (e.g. Descartes and Spinoza) was, especially due to English influence, increasingly moving towards the so-called metaphysical way of thinking, by which even the French of the 18th century were almost exclusively dominated, at least in their specifically philosophical works.

Nevertheless, they were able to produce, outside of philosophy proper, masterpieces of dialectics; we only remember Diderot's *The Nephew of Rameau* and Rousseau's treatise on the *Origins of Inequality among Men*. [19]

An exact representation of the universe, of its development and that of mankind, as well as the reflection of this development in the minds of men, can only be constructed dialectically with continuous regard to the general vicissitude of becoming and passing, to the transformations that proceed forward or backward. And in this sense the new German philosophy soon advanced. Kant opened his career by resolving Newton's stable solar system and its eternal duration, once the famous initial impulse had been given, into a historical process, i.e. the formation of the sun and all planets from a rotating nebulous mass. From this he already drew the conclusion that along with this formation, the future dissolution of the solar system was also necessarily given.

His views were mathematically founded half a century later, by means of Laplace, and again half a century later the spectroscope revealed the existence of similar luminous masses of gas, at various degrees of condensation, throughout the universe. [22]

'This new German philosophy found its conclusion in Hegel's system, in which for the first time, and this is its greatest merit, the entire natural, historical and spiritual world is represented as a process, i.e. understood as being in continuous movement, change, transformation and development, and an attempt is made to show the internal connection in this movement and development. From this point of view, the history of humanity no longer appears as a disordered tangle of unjustified acts of force, all of which are reprehensible before the desk of today's attained philosophical reason, and which must be forgotten as soon as possible, but as the process of the development of humanity itself, the task of thought of which becomes to follow the multiple stages through all the erraticities and to discover through all the apparent accidentalities the internal susceptibility of laws.

That Hegel did not fulfil this task is indifferent here. His epoch-making merit was that he posed the problem. It is then a task that no individual could have performed. Although Hegel with Saint Simon was the most universal head of his time, he was nevertheless limited firstly by the necessarily circumscribed extent of his own knowledge, and secondly by the knowledge and conceptions of his time, which were also limited in extent and depth. To this is added a third reason. Hegel was an idealist, i.e. for him the thoughts in his head did not count

as the images, more or less abstract, of the actual things and processes, but on the contrary, the things and their development only counted as the images determined by the 'idea' pre-existing in that place in the world itself.

With this everything was placed on its head and the actual connection of the world completely turned upside down, and, however correctly and ingeniously many particular connections were grasped by Hegel, nevertheless for the aforementioned reasons everything also had to remain in detail patched up, artefactual, deformed, in short turned upside down. Hegel's system as such was a colossal abortion, but also the last of that nature.' [23]

- Aleptic method and metaphysical method. Socialism treats history and economics with the scientific method, which is what philosophy is reduced to for it.

Explaining the difference between the dialectical method and the metaphysical method: this original, naive but actually correct (dialectical) consideration of the world is that of old Greek philosophy and is first clearly stated by Heraclitus: everything is and is not, for everything flows, and in eternal transformation, in eternal becoming and passing away

The principles of the method were good: what was needed, however, was the material of positive knowledge to demand from the search for nature:

'The beginnings of exact natural research are first to be found with the Greeks of the Alexandrian period and later, in the Middle Ages with the Arabs, but an actual natural science dates from the second half of the 15th century. And from this point onwards it progresses with ever-increasing speed'. [20]

However, research carried out for 400 years with grandiose results has left the habit of recording results by metaphysical methods.

'And since, as happened through the work of Bacon and Locke, this way of seeing was transported from the science of nature into philosophy, it formed the specific limitation of the last century, that is, the metaphysical way of thinking.'

- Main line of the Marxist school in the theoretical aspect.
- Deviations and revisionisms.
- Theoretical incompatibilities.

The characteristic theses of Marxism:

- Economic determinism
- The theory of surplus value.
- The theory of the class party and the state.
-

Epistemology - Criticism of philosophy

"A priori" data and the theory of knowledge [33]

- World and thought.
- Mathematics and logic are not internal constructions of the intellect, but results of the experience.

From chapter IV - Schematization of the world [39]

- Monism and dualism.
- Spiritualism: existence of God.

According to Dühring, *'the being that embraces everything is unique'*. [39] With this he wants to argue against the dual nature of being: matter and spirit - this side and that side. He argues for the identity of being and thought. With this, however, he is merely repeating Hegel (compare with the very different positivist school of Ardigò, who nevertheless speaks of psycho-physical reality as the starting point). Spiritualists might respond:

'For us, too, the world is simple, the division this way and that way exists only because of our specific earthly point of view, from original sin: in and of itself, i.e. in God, total being is unique... The comic thing about it is that Dühring, in order to prove on the basis of the concept of being the non-existence of God, applies the ontological proof of God's existence. This sounds: if we think of God, we think of him as the totality of all perfections. To the totality of all perfections belongs first of all existence because a being without existence is necessarily imperfect. So we must count being among God's perfections, therefore God exists. This is precisely how Dühring reasons: if we think being, we think it unique. That which is gathered into a single concept is unitary. So if being were not unitary, it would not correspond to its own concept. Consequently it must be unitary. Consequently God does not exist, etc. ... The unity of the world does not consist in its being although its being is a presupposition of its unity, since the world must first be in order to be unique. Being is above all an open question beyond the borders to which our horizon extends. The actual unity of the world consists in its materiality, and this is demonstrated not by means of a couple of puns, but through a long development of philosophy and the science of nature.' [41-42]

Let us compare Dühring's scheme with Hegel.

'Even Hegel begins the logic of being, being thus posits itself as nothingness. Out of this being nothingness comes the Becoming, the result of which leads to essence, i.e. a higher form of Being. Essence leads to quality, quality to quantity. So also in Dühring'. [43]

'From Sein [being] Hegel comes to Wesen [essence, substance], to the dialectic. Here he deals with reflexive determinations, and their internal

oppositions and contradictions, e.g. positive and negative. He then comes to causality or the relationship of cause and effect and concludes with necessity. Not otherwise Dühring. He philosophises in the cage of the schematism of the Hegelian categories.' [44]

From chapter V - Philosophy of Nature. Time and space [44]

- Time and space.
- Question of the infinity of space and time.
- Claim to consider contradictory and false what is unthinkable.
- Infinite series of numbers and its double meaning.
- Application to instants of time and points in space.
- How does dialectics help in this question?

Again in agreement with Hegel, Infiniteness is attributed [by Dühring] to Being, and now we look for what this Infiniteness is.

'The clearest image of an infiniteness to be thought of without contradiction is the unlimited increase of numbers in the number series.This correctly thought of infiniteness only has a single fundamental and unique directional form. Even if it is possible for our thought to conceive an opposite direction of the increase of numbers, nevertheless this infinitude, proceeding in the opposite direction, is only an inconsiderate representation.' [45]

'The first consequence that is drawn from this conception of infinitude is that the chain of cause and effect of the world must once have had a beginning.... The second consequence is 'the law of determinate number; the accumulation of some real manner of identical identities is conceivable as the formation of a determinate number'. Not only must the number of celestial bodies at a given instant be determinate in itself, but also that of all the smallest particles of matter in the universe. Every actual subdivision always has a determinacy and must have it if the contradiction of the numbered innumerable is not to be introduced.' [45-46]

Thus for the number of the Earth's rotations around the Sun and for every minimal natural process. Time itself considered divided into parts must comprise a finite number, so it must have a principle.... Dühring boasts with this that he has definitively illuminated the question, and for the first time. But Engels contrasts him with a passage by Kant from 1781, in which he demonstrates the thesis: the world has a principle in time and also according to space is enclosed within boundaries. This is called by Kant '*the first antinomy of pure reason*'. Only the discovery of the phrase '*law of determinate number*' belongs to Dühring. [46-47]

Kant, however, does not put that thesis as supported by his demonstration: on the opposite page he demonstrates the opposite thesis that

the world can have neither beginning nor end. From the demonstrability of the two opposites Kant deduces the insoluble contradiction that gives him the aforementioned first antinomy. Engels resolves it thus: as far as Space is concerned, the infinite series of numbers corresponding to the points on a line in either of the two possible directions is inapplicable. But Space is infinite in every direction, and in order to represent its points numerically, at least three different directions are needed, each with the double infinite positive and negative series. Dühring himself, who rails against the mathematical mysticism of Gauss (who did not want to be satisfied with three dimensions), at the bottom of his reasoning admits six dimensions for space. [48]

Turning to time, the line or series of units without end on either side makes some sense. However, if we posit time as counted from one onwards, then we assume that time has a beginning, i.e. we assume what Dühring claims to prove. Instead, we must admit that the one in the series is but a point chosen on the line at our will. [49]

Dühring admits that 'before' the beginning of time there was an absence of transformation and change. But if the world traversed this stage of immutability, who did? Only a push from outside the world. And here we come to God, whom Dühring claimed to have eliminated. Mr Dühring says, '*Where greatness overcomes a constant element of being, it will remain unchanged in its determinacy. This applies to matter and to mechanical force*'. [51]

It is a play on words: where greatness does not change, it remains the same. This is old stuff (conservation of matter and energy, not force). But he asks what about force in its unchanging state? Despite his grappling, Dühring fails to explain how one moves from the state of immutability to the state of force and change, which presupposes the so-called creative act.

From Chapter VI - Philosophy of Nature. Cosmogony, physics, chemistry [54].

- Origin of the universe, Kant's theory.
- Mention the most recent cosmogonic hypotheses that take into account not only gravity and heat, but intra-atomic energies and the electrical theory of matter.
- Relativity of motion, stillness and equilibrium.
- Energy of motion and position.
- Why relativity is dialectical.
- Einstein's theory.
- Theory of thermodynamics.
- Modern data on the conservation of matter and energy and the chemical elements.

The initial representation of the world in its origins was for the Ionian philosophers a state of confusion and mixture of matter (chaos). After Kant came the idea of the original nebula to which physical theories and in particular the mechanical theory of heat were then applied. Kant's theory introduces the historical concept for the first time into the physical world and the heavens, hitherto conceived of as immutable. Dühring seems to admit Kant's primitive nebula but finds this concept insufficient until the mechanical system in it is given. He wants to go further: to a 'stage of the universal medium' in which the 'unity of matter and mechanical force' occurs. [56] Dühring likes to call this a logico-real formula. So as soon as the unity of matter and force ceases, motion begins. [56]

'The logico-real formula is but a lame attempt to use for the philosophy of reality the Hegelian categories of the in-itself and the per se. In the in-itself consists, according to Hegel, the original identity of the hidden and undeveloped contradictions in a thing, in a process, in a concept; in the per-itself the distinction and separation of these hidden elements takes place and their conflict begins. We can therefore represent the original, immobile stage as the unity of matter and mechanical force, and the transition to motion as the division and opposition of both. What we have gained by this is not the demonstration of the reality of that fantastic original stage, but only this, that one can understand it under the Hegelian category of the in-itself, as one can understand its equally fantastic cessation under that of the for-itself. Hegel, help!' [56-57]

Even this original unity of force and matter, this neither static nor dynamic state of Dühring, does not explain how one could get out of it without the push from outside, without God.

'Before Dühring, the materialists spoke of matter and movement; he reduced movement to mechanical force as its alleged fundamental form, and thereby made it impossible to understand the actual connection between matter and movement, which, moreover, was not clear to any of the past materialists. Today, however, it is quite simple. Movement is the mode of being of matter. Nowhere has there ever been and nowhere can there be matter without motion.' [57]

All stillness and all equilibrium are only relative. Motion is just as increable and indestructible as matter, which Descartes expresses by the constancy of the quantity of motion existing in the world. The conception of a state of the world without motion is absolutely meaningless. From astronomy, our philosopher of reality moves on to mechanics and physics, and complains that the mechanical theory of heat in the generation since its discovery has essentially gone no further than when Mayer developed it, that it is still very obscure...

Dühring complains that the transition from statics to dynamics is not clear in it. This transition is usually known in the impact from the outside. Example of

the stone being thrown up and remaining there. The amount of energy is measurable in both cases... But always in a relative sense etc.

Stillness and equilibrium are always relative etc. This relativity is well understood dialectically, whereas it is a contradiction for Dühring's metaphysics. As a good metaphysician, he first opens a chasm between motion and equilibrium that does not actually exist, and then is surprised that he cannot bridge this chasm that he himself has fabricated. He may well put on his metaphysical Rocinante and go in search of the Kantian 'thing-in-itself', for in the end it is this and nothing else that is the bridge.

According to Dühring, latent heat has remained a difficulty for the mechanical theory of heat. Calories of fusion and vaporisation, etc.

The corresponding amount of heat is transformed into mechanical work etc. The difficulty complained of by Dühring does not exist, but these are only energy transformations that can be explained perfectly well, whereas what cannot be explained is the transition from the Dühringian state of immobility to motion, becoming, etc.

Dühring comes to chemistry and gives us three laws:

- 1) the quantity substance of total matter;
- 2) that of each chemical element;
- 3) that of mechanical force.

Things already known to which Dühring only attaches new labels such as 'laws of inertia'. [63]

Mention recent data on the transformation of elements, the transformation of mass into energy, clarifying the difference between motion, mechanical force and energy, etc.

From Chapter VII - Philosophy of Nature. Organic world [63]

- Character of the transition from one group of phenomena to another.
- Teleology in the organic world (vitalism and mechanism).
- Darwin and the transformation of the species.
- Adaptation, struggle for existence, natural selection, heredity.
- Origin of species.
- Boundaries between the animal and plant world, organic and inorganic.
- Origin of life.

'From the mechanics of forces and shocks to the connection of sensations with thought runs a single, unified series of intermediate stages'.

Mr Dühring gets off lightly. On the other hand, that assurance is only half true, at least until it is completed through the well-known Hegelian line of knots. The transition from one form of motion to another always remains a leap, a decisive turning point. Thus from the mechanics of celestial bodies to that of small masses, just as from the mechanics of masses to that of molecules (physics) and to that of atoms (chemistry); and even more so is the case for the transition from ordinary chemical actions to the chemism of organic bodies that we call life.

'Within the sphere of life, leaps become increasingly rare and irrelevant. Thus it is always Hegel who has to justify Mr Dühring. The conceptual leap to the organic world offers Mr Dühring the concept of purpose. This is again borrowed from Hegel, who in the logical 'doctrine of the concept' by means of teleology or the doctrine of purpose, passes from chemism to life.' [64]

It would take us too far to research here how far the application of the concepts of the middle and the end of the organic world is justified.

'In any case, even the application of the Hegelian internal purpose, that is, of a purpose which is not imported into nature through a third party acting on purpose as the science of foresight but which lies in the very necessity of the thing, can lead, among people who are not philosophically well prepared, to an unconsidered distinction of conscious and premeditated actions.' [64]

Dühring, who lashes out at every spiritualist, paints a nature that thinks, wills and consciously provides; we are at another bridge, the bridge from pantheism to theism. All he can say are thunderbolts against the dark treatises of Darwinism.

'Before anything else Darwin is reproached with having transported Malthus's theory of population from economics into natural science, with having embarrassed himself in his portrayal of the animal breeder, with having played an anti-scientific semi-poetry with his struggle for life, and that the whole of Darwinism, minus what was taken from Lamarck, is a piece of brutality turned against humanity. Darwin had brought from his scientific travels the view that the species of animals and plants are not stable but changeable. No better soil was offered to him to pursue this thought at home than that of animal and plant breeding. Therefore the best ground is England'. [65]

Darwin found that more remarkable transformations are produced artificially than are sufficient to distinguish two species. Darwin looked for what causes in nature could replace the intervention of the breeder. He found such causes in the disproportion between the immense number of germs offered by nature and the limited number of fully developed organisms. [65-66]

Hence a competition, a struggle for life. Prevailing in this struggle are certain properties of strength and resistance that tend to be transmitted hereditarily (natural selection, survival of the fittest). If even Darwin says that his theory of the struggle for life corresponds to Malthus's applied to the entire animal and plant world, however great the oversight may be, this does not prove that the struggle for life needs Malthus's teachings to be proven. And just as the law of wages retained its values despite the failure of the Malthusian arguments on which Ricardo based it, so it is with Darwinism.

Dühring interprets the struggle for life not as resistance to the environment, which is also common to plants and peaceful herbivores, but as the competition to prey on nourishment in bloody struggles. Hence the accusation of brutality that takes the question from scientific to moral ground that is completely wrong. Dühring accuses Darwin of drawing his transformations and differences from nothing. But Darwin abstracts from the causes that produce physiological changes in the individual: his discovery consisted in arranging and explaining the effects. The causes are today partly unknown and partly known in a general way. (Here recall Mendel's recent studies on heredity and embryology etc.).

Haeckel went a step further in explaining the transformations of species as the result of exchangeable influences between adaptation and heredity, representing adaptation as the aspect of the process that transforms, heredity as that which preserves.

Dühring does not like this either. He pretends that to speak of adaptation for the plant pushing towards the light is a spiritualistic aberration. Now the science of evolution notes in adaptation a material fact, not a conscious intention of the plant, the beast, or whoever.

Dühring interprets heredity in reverse.

Darwin does not say that all species originated from a single primitive individual, but from a few beings.

Haeckel admits one original germ for plants, one for animals and a number of germs independent of both.

It is unfair to reproach Darwin for stopping where the thread of descent (lineages) led him. Science still offers no solution to the problem of the origin of life and does not indicate how living protoplasm is formed from the chemical elements (modern results on the forms of transition between the organic and inorganic worlds etc.).

It should be noted that Lamarck's merit is not diminished if Darwin is credited with having provided the fundamental impetus for modern biological science: embryology and palaeontology emerged after Lamarck and with their concordant results served as the basis for Darwin's theory.

Further criticism of Dühring, who admits selection but as a secondary fact and would like to call it composition.

From chapter VIII - Philosophy of nature. Organic world (conclusion) [73]

- Biology.
- The cell as an element of organized bodies.
- Questions of the definition of life.
- Albuminoid bodies, their chemical composition and life.
- Transition from vegetable to animal.
- Sensations and the nervous system.
- Replacement, growth, movement etc.

It should be noted that, in reproaching Dühring for speaking of atoms that gravitate, Engels states that atoms famously do not exist through gravitation or other physical and mechanical forms of movement, but only through chemical actions. More recent data on chemistry and physics must be recalled on this.

Dühring shows that he has very little knowledge of biological matters.

'All organic bodies, with the exception of the smallest, consist of small vesicles of protoplasm with an inner nucleus, visible only by means of strong magnification; normally the cell also develops an outer membrane and the contents are more or less fluid. The smallest cell bodies consist of a single cell. The enormous majority of organic beings are multi-cellular, i.e. made up of a complex of many cells, which, still similar to each other in the lowest organisms, receive at the highest forms, groupings and functions that are increasingly different.' [73-74]

Thus from the amoeba to man, from the small desmidiaceae to the most developed plants, the way cells increase is the same: by splitting.

The author describes reproduction by splitting. Here, too, recall more recent data. Thus from the germ of the animal man develops the complete being (modern theory on chromosomes etc.).

According to Dühring we can speak of life when we are faced with the circulation of elements through channels etc. If this were the case, we would have to declare the whole world of protozoa dead because there is no articulation, and likewise for all elementary organisms. No one can define life as

any organisation whose basis is a simple type. If this type is the cell, then organisms below cells would not be alive because they are reduced to pieces of protoplasm (protoamebes).

Copying Hegel again, Dühring states that the sensation associated with the existence of a nervous system is what distinguishes the animal from the plant. He mentions the beings that one is undecided to classify between plants or animals, but it would suffice for him to mention the sensitive, insect-eating plants. Dühring then claims that there is no sensation without a nervous system etc. He still tries to define life as an exchange of elements realised by pre-established plastic forms. This explains nothing. There can be exchange of elements even without life (manufacture of sulphuric acid)...

'Life is the mode of being of albuminoid bodies, and this mode of being consists essentially in the constant renewal of the constituent chemical parts of such bodies.' [78]

Organic body is understood here in the sense of modern chemistry, which under this name gathers all complex bodies analogous to ordinary albumin, also called protein substances. The name is unsuitable because ordinary albumin plays the most passive and least vital role of all substances resembling it... For now, however, it is more general than any other. Wherever we find life, we find it united to an organic body, and where there is an organic body that is not in dissolution we find vital phenomena.

In what do these phenomena consist? Above all, in the replacement, the albuminoid body grows with material drawn from its surroundings while it rejects other material. This differs from the transformations, decompositions and compositions of organic bodies, which transform their nature, whereas the turnover perpetuates that of the albumin. From the moment this reciprocation ceases, death occurs. It follows that if chemistry is ever to be able to synthesise albumin, it must show vital phenomena. In addition to nourishment and waste elimination, there are other factors of life: irritability, contractility, capacity for growth, internal movement. If the definition is insufficient, this can be given scientifically of all the definitions that are only valid as a means of practical work. [78-79]

From Chapter IX - Morals and Law. Eternal truths [80]

- Whether there are eternal truths in knowledge in the field of the three groups of knowledge.
- There are none, nor does it make sense to speak of the sovereignty of human thought.
- The opposition of truth and error is not absolute.
- Neither is the opposition of good and evil.

- There is no absolute human morality, nor do the various possible and known morals have a common foundation.
- Each morality corresponds to a historical situation and the rule of a class.

On the problem of conscience Dühring asserts that pure thought is done outside the forms of language...

In dealing with morality and law, he claims that the principles of morality would be the same on other inhabited worlds.... He asserts this from the outset because the foundations of morality and law *'as well as those of general knowledge'* stand above history and above the present distinctions of peoples. They can assume a validity analogous to the investigations of mathematics.

'Is human thought sovereign? Before answering yes or no, we must research what human thought is. Is it the thought of a single man? No. But it only exists as the single thought of billions of present, past and future human beings.'
[82]

Talking about collective thought as it will be after a long further development serves us little purpose. On the other hand, the occasional thought of individuals is far from sovereign and is subject to innumerable errors. Thus there is no sovereignty of thought nor are there any eternal truths. [83]

Will we then have no statement in the field of knowledge that can be considered of absolute certainty? To answer Dühring, Engels uses the old distinction of knowledge into three fields: exact sciences, biological sciences, and humanities. [84] For mathematics itself, we have seen that its great developments have brought it into the realm of only relative truths. So for mechanics and physics (relativity etc.). In chemistry, etc., we increasingly have simple hypotheses substituted for certainty.

In the second group, there are more and more unsolved questions and often all notions are subject to revision.

Even more so in the third group where phenomena do not occur at will, nor, as in organic life, do they present themselves to our study in a repeated and cyclic manner. Less so do we find absolute and eternal truths here. [85]

Hence the principles of morality and law cannot be eternal, of which every social reformer presents us with new schemes, at the same time throwing down with contempt those of his predecessors, and claiming that his have immanent value.

Even if we mention the sciences of thought, logic and dialectics, neither can we find eternal truth in them. Truth and error like all thought polar

oppositions have no absolute value. [87] Outside of a very narrow territory the contraposition has relative value, taking it in an absolute sense it only leads to contradictions. Example: Boyle's law.

What we have said of truth and error can also be said of good and evil, especially since here we are exclusively on the terrain of the third group. Good and evil change from people to people and from time to time. There are many religious and political morals presented to us by the opposing schools. So we think that men more or less consciously derive their moral views from economic relations, etc.

But is there not a minimum common content of the various moral theories - say: feudal, bourgeois and workers' - that can serve as a morality valid for all time? Those moral theories represent three different degrees of the same historical development and thus have something in common. For example: all morals corresponding to the various types of private economy have in common the precept: do not steal. Is this perhaps an eternal precept of morality? Not at all. In a society in which the reasons for stealing were eliminated, that precept would be useless. [90]

We deny morality a general validity beyond history, and indeed believe that every moral theory corresponds to a given historical situation, and as long as history has been the history of class struggles, every morality is class morality. There is no human morality above classes, or there will only be for a social stage that will have not only overcome, but forgotten, class oppositions for the purposes of the praxis of life. Far be it from us to expect such morality from Mr Dühring! (Here the story of the cat wins out). [91]

From Chapter X - Morals, Law, and Equality [91]

- Absurdity of the doctrine of innate equality.
- Origin of social inequalities.
- Historical value of equality claims.
- Ancient world, Christianity, feudalism, capitalism.
- Equality as a proletarian claim is also a contingent formula and not an absolute principle.

Dühring claims to apply a purported mathematical method to all disciplines, and thus also to social disciplines, reducing them to simple axioms from which everything else can be deduced with absolute certainty. It is the old ideological, aprioristic (scholastic) method of deducing the properties of an object not from the object itself but from the concept of it. One then wants the thing to fit the concept and not the concept to the thing. In this way, the purported philosophy of reality becomes pure ideology. This method applied to morality is based on what material? Firstly on the minimum possible remnant of

real content on that ground of extreme abstraction and secondly on the content of our ideologue's personal consciousness, which he draws from his environment without realising it. These simple elements to which Dühring reduces society to operate axiomatically and deductively consist of a pair of men. Hence the moral axiom: *'Two human wills as such are perfectly equal'*. And herein lies the fundamental form of moral and legal justice. [92]

Critique of the two men. At least this initial pair must be of different sexes. With the discovery of the two men Dühring thinks he has everything solved, but the discoverer is not him. Rousseau was already talking about it and so were Smith and Ricardo at whom, however, they are no longer equals because one is a hunter, the other a fisherman, and they exchange products. [93]

As for Dühring's two men, their equality of will presupposes that they are free of all particularities of national, economic, political, etc. relations. They are reduced to the pure conceptual scheme man.

There are two spectral factors evoked, etc. And here we are in the spiritual realm. Since neither man can impose his will on the other, if one gains the upper hand by force, then injustice, oppression and servitude arise. In reality, things can be different. A is more intelligent and capable than B, who ends up spontaneously doing as the other wants. Here without violence, inequality and servitude arises. After all, there are historical examples of spontaneously created serfdom.

In Germany after the Thirty Years' War, when serfdom was abolished and with it the duty of the lords to provide for sick and invalid servants, the peasants asked the king to re-establish serfdom. [94-95]

Contradictions in Dühring's application of his formula.

He himself makes several exceptions: first, when dealing with children; second, when man and beast are placed in one person, for then the violence of the other being would not be against morality and law! And here we distinguish humanity into two types: human and beastly, which Christianity also does, but with greater consequence in that it introduces a judge of the world, God. Then there is a third case, if one acts according to science and the other according to prejudice! Full equality has resulted in moral and spiritual inequality. Violence is then justified and we are then at the Hegelian theory that punishment is the right of the offender. [97]

In conclusion, without following Dühring any further in his lucubrations, it is clear that the equality of the two wills can only arise as long as they do not will; for the equality disappears as soon as they act as individual wills, appearing this as infancy, folly, bestiality, prejudice, incapacity on the one hand, and

maturity, truth, science on the other. The claim that all men as such have something in common and are therefore equal is very old. But the modern claim to equality is quite different and consists rather in the claim of equal political and social value of all men or at least of the citizens of a state, etc.

For this, many centuries had to pass; in ancient societies, one could at most speak of equality between those in the same situation: women, slaves, foreigners, etc. were a-priori excluded. Under the Roman empire, legal differences disappeared with the exception of those between freemen and slaves, and the foundations of that equality between private individuals that formed Roman civil law were developed. But as long as there were slaves, one could not speak of general human equality.

'Christianity could only speak of an equality of all men, that of equal capacity for sin, which corresponded completely with its character as a religion of slaves and the oppressed. Therefore it knew above all the equality of the elect of which, on the other hand, it spoke only in the beginning.' [99]

However, these were not actual egalitarian claims. Soon the opposition of clerics and laymen took over. The Germanic invasions eliminated the concept of equality for centuries by introducing a very complicated political order...

The feudal middle ages developed the class that was to invoke modern equality: the bourgeoisie. The economic relations that developed with the bourgeoisie needed freedom and legal equality. These were proclaimed with human right; but it was so inhuman that if the abolition of political class privileges began in America, race privilege survived with the enslavement of black people. [99-100]

The proletariat arises with its special claim to equality.

In the right theoretical sense, we cannot even speak of equality. It is a watchword of agitation that is well suited to polemics with the bourgeoisie, etc. The exact expression of the proletarian programme is not human equality, but the abolition of classes.

From Chapter XI. Morals and law. Freedom and necessity [103]

- Question of free will and determination.
- Freedom can only be conceived as knowledge of natural necessity.
- The achievements of human technology are liberating.
- In what sense will the greatest liberation of humanity take place.

Turning to political and legal issues, Dühring invokes his special preparation in jurisprudence. Engels shows that this preparation was limited to

knowledge of old Prussian law, as Dühring makes serious blunders about the principles and procedures of French and English law. This contrasts strangely with the claim to build a philosophy of reality valid for Earth and Heaven.

'One cannot treat morality and law well without coming to the question of so-called free will, of man's responsibility, of the relations of necessity and freedom. Even the philosophy of reality has not just one but two solutions.' [108]

'In place of all false theories of freedom must be placed the experimental treatment of the relation in which on the one hand rational investigation and on the other hand impulsive determinations are equally composed in an average force....' [Dühring, 108].

Freedom would consist in this, that rationality pulls the man to the right, the unconscious appetite to the left, and as a result of this parallelogram of forces the actual movement follows along the diagonal. Freedom would thus be the average between reasoning and appetite, intelligence and non-intelligence, and its degree should be established experimentally with each individual through a 'personal equation' [108] to use a fantastic term. A little later, however, Dühring goes on to say:

'We base moral responsibility on freedom, which for us, however, means nothing more than the susceptibility of natural inherited intelligence to moderation by conscious motives. All such motives act despite the occurrence of possible contrasts in action with inevitable dependence on natural laws. But we calculate precisely on this necessity, when we assume the moral lever.' [108]

This second determination of freedom is but an extreme trivialisation of the Hegelian conception. Hegel was the first who correctly presented the relationship between freedom and necessity.

'For him, freedom is reasoning about necessity; 'necessity is blind only insofar as it is not understood'. Freedom does not lie in the dreamed independence of natural laws, but in the knowledge of these laws and the possibility thereby given of letting them act according to our own design for given purposes. This applies both to the laws of external nature and to those that govern man's physical and moral essence. Two classes of laws that we can at most separate in our representation, but not in reality. Freedom of value means nothing other than the ability to decide with knowledge of things. The freer a man's judgement is in relation to a given matter, the more the content of this judgement remains determined, whereas the uncertainty that follows from non-knowledge and which seems to choose arbitrarily between multiple, diverse and contradictory possibilities of decision, shows precisely for this reason its non-freedom, its lordship by the things it claims to lord over. For freedom consists in mastery, based on knowledge of natural necessities, of ourselves and external nature; it is necessarily a product of historical development. The first humans who distinguished themselves from animals were essentially as unfree as the animals themselves, but every step forward in civilisation was a step towards

freedom. At the threshold of human history lies the discovery of the transformation of mechanical motion into heat, the production of fire by rubbing; at the conclusion of the present development lies the discovery of the transformation of heat into mechanical motion: the steam engine. And despite the liberating transformations that the steam engine brings to the social world and which are not yet complete, there is no doubt that fire by rubbing surpasses it in liberating effectiveness in the world. For fire gave men for the first time dominion over a natural force and separated them definitely from the animals.'
[108-109]

The machine will only make such a leap when it has made possible a social state in which, for the first time, there is no longer any question of class division, of concern for individual means of existence, and thus of effective human freedom, that is to say, an existence in harmony with known natural laws.

As young as human history is and as ridiculous as it would be to ascribe any absolute value to our present-day views, nevertheless the simple fact presents itself that all of past history can be designated as the history of the time interval between the practical discovery of the transformation of mechanical motion into heat to the discovery of the transformation of heat into motion.

Dühring divides history otherwise:

- 1) From the state of immobility of matter until the French revolution;
- 2) From the French Revolution to Mr Dühring. [109-110]

He belittles past history of any importance. Instead Engels observes that the original antiquity forms - and will form in the future - a historical period of high interest because it is the basis of later development, and takes place from the formation of man to the success against such difficulties as were never afterwards faced by associated men.

One of the points Dühring deals with most is the individualisation and valorisation of life. He starts from his purported new 'law of difference' [111] that boils down to the well-known scientific truth that sensation does not arise from the absolute intensity of the stimulus, but from its relative variation. On this he builds a whole doctrine of the affectation of life etc. on the basis of talk. He comes to advice on hygienic regimen: he disavows the abuse of tobacco and exciting foods and drinks.

It would seem, however, since the economics course praises brandy factories, that his prohibition is limited to beer and wine. Yet he could be more liberal! He, who struggled so hard to find the bridge from statics to dynamics, should feel sympathetic to the poor binge-drinker who in vain seeks that from dynamics to statics! [113]

From Chapter XII - Dialectics. Quantity and quality [113]

- Is contradiction nonsense?
- Example of the differential geometry of curves.
- Dialectical method and contradictions.
- Movement.
- Life.
- Contradictions in thought and elementary mathematics.
- Marx and the transformation of quantity into quality with regard to minimum capital.
- Example of fusion and vaporisation.
- Example of the paraffin series.

Dürring barely mentions dialectics in his philosophy course, but at greater length he rails against Hegel's dialectic on Critical History. According to him, contradiction means nonsense and cannot occur in the real world. This statement seems to common sense as legitimate as the statement that bent is not right and right is not bent. However, the differential calculus achieves the most useful results precisely by treating the curved as identical with the straight in given circumstances.

'As long as we treat things as still and lifeless, each by itself, near and after the other, we do not run into any contradictions. We will find certain properties which, partly common partly separate, contradict each other, but in this case they are apportioned among the different things and therefore contain no contradiction in themselves. As soon as we come out of this field of contradictions, we also abandon the usual metaphysical method of thinking. It is quite another thing as soon as we consider things in their movement, change, life, mutual influence. Then we immediately bump into contradictions. Movement itself is a contradiction.' [114-115]

Indeed we have here a contradiction that exists in the same objective things and processes, as Dürring says. If simple mechanical movement contains a contradiction, all the more so do the highest forms of transformation of matter, such as organic life. And even in the field of thought, we cannot escape contradictions. We have mentioned the one that underlies the differential calculus. But even in elementary mathematics there are contradictions, such as that that a power is a root, or that the root of a negative number exists:

$$A^{1/2} = \sqrt{A}; \sqrt{-1}$$

[116]

With the treatment of variables, mathematics entered the domain of dialectics. [116]

Dürring's greatest anti-dialectical disdain was manifested against Marx's Capital. Yet when the first volume of Capital appeared, Dürring was able to give it a tolerable review.

Even if then he made the mistake of identifying Marx's dialectics with Hegel's, he had not lost the ability to distinguish between the methods and the results achieved with them and to understand that one does not refute the latter in particular if one rejects the former in general.

Dürring asserts that Marx's point of view is the identity of contraries so that in conclusion 'everything is One' [118], capitalist and wage-earner, feudal, capitalist and socialist production, etc. Although Dürring ostentatiously keeps to the generalities by declaring it his mission to summarise in broad strokes and in grand style, he nevertheless deigns to give two examples. He calls the reference to the

'confused and nebulous Hegelian representation that quantity is transformed into quality and that therefore in advance, reaching a certain limit, for this pure quantitative increase becomes capital'. [Dürring, 119].

But let us see what Marx says following the research on constant and variable capital and surplus value:

'Not every sum of money and value is convertible into capital; for this transformation a determinate minimum of value of gold or merchandise in the hands of the individual possessor is presupposed.' [119]

He gives as an example that daily out of every day the labourer works eight hours for himself to reproduce wages; and four for the master producing surplus-value. In such a case, for a master to be able to live at least as a labourer, he would have to possess so much as to employ at least two labourers: nor would he be a true capitalist by not having the characteristic of living better. Wanting to consume twice as much for himself as the worker and furthermore capitalise half the surplus-value he will have to employ a minimum of eight workers. Marx concludes that this fact is proof of the truth of the Hegelian law. Dürring tells the story in the sense that Marx, having admitted Hegel's law a priori, deduces from it that a minimum of value is needed to have capital, etc., i.e. the opposite. [119-120]

We have already seen in the schematics of the world how Dürring unknowingly applied the Hegelian series of quantitative relations, which at a certain point brings about qualitative change. And we have given the example of the change in the physical state of water at zero and 100 degrees. One could cite as proof of this law a hundred other facts also drawn from economics and social life, and so throughout the section of Capital on the production of relative surplus-value.

In addition, Marx deals in a footnote with the famous example of the series of organic acids which have the formula C_nH_nO and which, while retaining the same proportion of components, change their physical qualities with the change of the number n . [122] Engels then gives the famous example of Napoleon's comparison between the Mamluks and the French: two Mamluks are worth more than two Frenchmen, one hundred Mamluks are equal to one hundred Frenchmen, three hundred Frenchmen win three hundred Mamluks, one thousand Frenchmen are enough to beat one thousand five hundred Mamluks. Evidently Napoleon was also sick with Hegelian fantasy! [123]

From Chapter XIII - Dialectics. Negation of negation [124]

- Dühring's false presentation of Marx's application of the formula.
- Marx and the expropriation of the expropriators.
- Examples of the negation of negation at Marx.
- Demonstration applied not to the virtue of the formula but to historical-economic data.
- Dialectics and logic as instruments of proof.
- Various examples of the dialectical process: germination of grain, insect cycles.
- Examples from elementary and higher mathematics.
- Historical examples from the history of philosophy and Rousseau (origin of inequality).
- Character of negation.

Dühring, while praising the Marxist historical sketch of the formation of English capitalism, rebukes the application of the Hegelian formula of negation of negation, comparing Hegel's first negation to original sin and the second to Christian redemption. We are still at the same point, i.e. Marx, according to Dühring, would only derive the demonstration of the necessity of a new social order from the response to the Hegelian negation of negation. And to implement the reconciliation of contraries, right Hegel, he would preconise a type of property that is both individual and collective. [125-126]

According to Marx, individual property is the negation of primitive communism, while the establishment of a new collective property will be the negation of the negation, not bringing us back to primitive communism without high productive technique, but preserving the technique itself, associated no longer with personal property but with common property. Furthermore, capitalism appeared as the expropriator of the worker's personal property: the expropriation of the expropriators will re-establish the worker's property but as common property.

This is not collective and private property at the same time, but exclusively collective ownership of the means of production including land, and personal ownership of only the products as objects of use. Marx, on the contrary, says that it is a matter of common labour power, of common and social product, part of which remains social because it in turn becomes the means of production, while the other part is distributed as means of subsistence to individual workers.

Dürring, as usual, has completely falsified for the mania of reproaching Marx with a purported Hegelianism. This Dürring does in order to counter his 'Economic Commune'. [126]

What does the negation of negation represent for Marx? He explains it clearly after expounding the so-called primitive accumulation of capital. These are the stages: private ownership of the artisan worker over his means of production and his product - violent separation of the worker from his tool and his product (prehistory of capital). Craftsmen are turned into proletarians, their means of labour into capital appropriated by the few. This expropriation of private individuals is succeeded at the end of capitalism by another, which is the expropriation of the capitalist few by the workers, just as before there was the expropriation of many capitalists by the capitalist few.

Marx does not put it all together for the sake of resting what he expounds on Hegelian schemata: he simply demonstrates with historical evidence and summarises the actual factual process. The real-historical process has dialectical characteristics. Marx notes this but does not claim it a-priori.

'When Marx points to the process as the negation of the negation, he does not thereby think he wants to demonstrate it as historically necessary. On the contrary: since he has historically demonstrated that the process, in fact, partly took place and partly must take place in such a way, he subsequently designates it as a process that is carried out according to a given dialectical law.' [128]

It is therefore a pure assumption on Dürring's part that Marx would assert that the negation of negation must here serve as a midwife by means of which the future must be delivered from the womb of the past; or that Marx would claim that we must allow ourselves to be convinced of the necessity of the collectivisation of land and capital on the faith of the negation of negation. It is a complete lack of understanding of the nature of dialectics to regard it as an instrument of pure demonstration, like formal logic or, in a more limited sense, mathematics.

Formal logic, too, is first and foremost a method of finding new results in order to move from the known to the unknown; and the same - but in a much more eminent sense - is dialectics, which, moreover, since it surpasses the narrow horizons of formal logic, contains the germs of a general conception of

the world. The same relationship is found in mathematics. Elementary mathematics, that of constant quantities, moves within the limits of formal logic, at least wholesale; the mathematics of variable quantities, of which the most important part is the infinitesimal calculus, is essentially nothing more than the application of dialectics to mathematical relations. [129]

Pure demonstration definitely takes second place to the many applications of the method to new areas of research. But almost all the demonstrations of high mathematics, from the earliest ones of the differential calculus strictly taken, are false. It cannot be otherwise if one wants to prove results gained on the dialectical terrain by means of formal logic.

Just as the demonstrations of Leibniz and his school were incomprehensible to the mathematicians of the time, so are the applications of dialectics to metaphysicians like Dühring.

The negation of negation boils down to something very simple: it is a process that is completed everywhere and every day and that even a child can understand as soon as one gets rid of the mysteriousness under which the old philosophy was enveloped. Here the author gives the example of the grain of wheat that is negated by giving rise to the plant. This is then negated by reproducing the seeds. But we are not at the starting point, for instead of a single seed we have a large number of them. Take an ornamental plant: thanks to the care of the breeder after each cycle the seed will have changed not only in quantity but also in quality. So for the metamorphosis of certain insects: egg-larva-insect complete. So for geological processes, e.g. uplift and erosion. [130-131]

Also in mathematics, the negation of the negation occurs with the positive square of a negative. More so in high analysis as in the sum of infinite small quantities.

Example of differentiation: x and y are reduced to the infinitesimals dy , dx , which are actually zero, and their ratio, which would tell us nothing as $0:0$, becomes susceptible of a fruitful calculation as $dy : dx$.

At the end of the calculation the negations are negated, i.e. integrated, returning to the finite quantities y and x , but with very important new results. [132]

Thus in history. We have primitive communism, negated by private property, and finally the need to negate private property too, but to go one step further etc..

So in philosophy. Ancient philosophy was materialism, but it was incapable of resolving the relationship between thought and matter. From this came the doctrine of the separable and immortal soul and finally monotheism, i.e. idealism denied materialism. Idealism is now denied in the new materialism, which, however, does not coincide with the old. Finally, Rousseau's own doctrine of equality, written before Hegel, is based on the negation of negation. Even for Rousseau, the negation of animal equality is a step forward. Inequality leads to tyranny: the revolt of the peoples re-establishes equality. [133]

In Dühring's own ridiculous social system we could find the negation of the negation: equality of the two men-system-of-robbery = new-civilisation of Dühringian-philosophy.

The negation of negation is a law of development, of nature, history and thought, which is extremely general and therefore also extremely effective and important...

It is self-understanding that in saying that in all the preceding examples the negation of negation occurs, I have not thereby given or pretended to know their particular characters a priori; but have only struck a general character from them.

It is foolish metaphysical objections to say that negation must consist in grinding the grain of wheat or erasing the size A etc.. The negation must be of such a nature that it does not exclude the second process, and the manner of the first negation must be established not arbitrarily, but according to the actual requirements of each particular case. [136]

Dialectics existed long before Hegel and was thought of dialectically before this term existed: Hegel is simply the first who formulated the law precisely. [*Here the notes end*].

2. Fragment on the Revolutionary Theory of Consciousness

Premise

In the preface to the second edition of the popularly named Antidühring, dated 23 September 1885, Frederick Engels summarises the origin of the doctrines he expounds as follows [6].

Marx's communist conception of the world first appeared in the Poverty of Philosophy and the Communist Manifesto of 1847. It then went through an incubation stage of 20 years until the appearance of Capital, spreading from

then on more and more widely in all countries '*where on the one hand there were proletarians, on the other hand scholars free from prejudice*' [7].

The Poverty of Philosophy and Capital dealt mainly with economic matters; the 'Manifesto' was the programme of a political party; so that it could only be thought of as a new economic school and a new party.

The doctrine, on the other hand, comprised a general vision of all problems of human action in which all problems of knowledge were included; and that at the same time it announced itself not as the birth of a new school of thinkers, but as the theoretical baggage of a part of mankind clearly defined by its material relations with others: the wage-earning class.

What was missing was a text summarising the general communist conception of the world, meaning the world as the whole complex of facts presented to us by nature, including of course those concerning man and his functions; a text that alone could clarify the theoretical content of the communist movement and the necessary stance not only in the face of the opposing classes and parties, but also in the face of religious and philosophical and ideological statements and positions in general.

One of the theses of the new doctrine - being that no author or school can ever give the complete and definitive 'system' of 'truth' - [stated that] it was particularly difficult to fulfil that task in a positive and ex professo manner. Engels seized a polemical opportunity in the publications of the German professor Dühring who had joined socialism and brought with him serious ideological confusion; publications that have lost all importance today.

It is, however, extremely important that Engels was able, in 1878 and with Marx's direct collaboration, to coordinate the enunciation of his doctrine in the most diverse fields, availing himself of the possibility of removing pretension and heaviness from his own work and that of the reader; so that the writing retains great value and dates, like the other fundamentals mentioned earlier.

Engels was able to follow the order of Dühring's work rather than that proper to the new doctrine, which would in fact be very laborious, because it should consist of a recapitulation of the principal data of all the sciences of the physical, organic and human world, culminating in the study of the problems of human thought and action. In the traditional order, the series is partly reversed, and this remains unavoidable to this day because we too work with the traditional apparatus at least of language.

Fifty years after Antidühring, the data of knowledge acquired in the various fields has multiplied and even changed, if, conversely, the vicissitudes of the history of social conditions and the reflexive history of thought have not

freed us much more from the difficulties we were already struggling against at the time.

For a study of the communists' own general world conception, Engels' book remains fundamental, but it would be difficult to work on it without taking into account later achievements in the field of science, even without making a secret of the fact that we largely overlook contemporary achievements in so-called philosophy.

However little Dühring interests us today and we can even do without quoting him, we can follow the order of Engels' work despite the inevitable anticipations, which it makes necessary, of results set out in the later course of treatment.

It is necessary to co-ordinate, with a stance in the face of the various problems, which arise and resurrect from the field of science and pseudo-science and all the traditional or latest fashionable ideological elaborations, the best-known postulates of the doctrine that are for the most part its characteristics. Not least because these themselves are mostly misunderstood and poorly enunciated due to the defect of the general connection we are interested in here.

Socialism in the proper sense is something more than a programme of social order based on economic equality; at the same time it is something more than a social and political movement for the defence of workers' interests. The acceptance of socialism in the Marxist sense (which is identified with the first historical name of communism) consists in the acceptance, as fundamental points of doctrine and collective action, of the following cornerstones:

1. Economic determinism or the materialistic conception of history, a positive explanation of the determination and development of human collective action and thought;
2. The doctrine of value and surplus value and the corresponding scientific explanation of capitalist production with its laws of development;
3. The programmatic doctrine of classes, parties and the state, a doctrine that defines the movement and struggle of the working class; the party as its political organ for the conquest of power; the workers' state or dictatorship of the proletariat.

These three doctrines are developed in the second and third parts of Antidühring (Political Economy and Socialism) [140 and 245].

The first of these also provides the fundamental elements in the study of the first part of the work itself (philosophy); the second, however, finds a more suitable place in a study on the outline of Capital; while the third can especially

be carried out on the basis of the programmatic part of the Manifesto and on that, which is particularly important because it has a restorative value after the well-known deviations and revisions, of Lenin's State and Revolution, which also draws on a further vast historical experience of the proletarian struggle.

A general study such as the one outlined by Engels is, however, worthwhile not only to co-ordinate the best-known historical, economic, and political theses, but also to establish how one who accepts those and does not wish to be the unconscious object of extraneous influences is not free to adhere traditionally or extemporaneously to even circumscribed currents of opinion, cannot remain or become, for example, Protestant or Jew, theosophist or spiritualist, Platonist or Spencerian, protectionist or Paretian, and so on, having the pretension of freeing such attitudes from those determined by his siding with the current of thought or action that corresponds to the advance of the working class.

Chapter One

According to the traditional conception, philosophy is the unfolding of the highest forms of consciousness of the world and life, and in a broader sense, embraces the principles of all knowledge and will.

The principles of every group of forms of existence and knowledge are the object of philosophy.

These principles would be the simplest constituent parts into which the complexity of knowing and willing can be broken down or from which it can be reconstituted. Once acquired, these principles would be of value not only for the field of known and accessible data, but also for still inaccessible and unknown spheres.

In this way, the principles of philosophy would represent the final completion that the individual sciences, all of which are differently incomplete, need to become a unitary system of explanations of nature and human life.

Philosophy would therefore have as its object first the fundamental forms of all existence and then the doctrine of the principles of nature and that of the human world.

Hence a partition into three groups that more or less present us with all philosophical systems. In the first group we are dealing with the principles of being, i.e. fundamental theses drawn from pure thought. And in the other two groups, these theses are applied to the world of nature and the human world. The conclusions of the first group are for the various schools more or less extensive, but in one sense or another they are always presented as prejudicial.

The philosophies of transcendence, assuming that those first principles are unattainable to the limited forces of human thought, enunciate them: either as positive revelations from a higher consciousness, the divinity, or as data imposed on human consciousness by a force that it feels but cannot analyse or comprehend. Philosophies of immanence constitute these principles with operations of pure thought that they claim to implement before the data and sensations of the external world have influenced thought itself. Finally, even philosophies of experience can hardly escape the thesis that in experience one of the factors is the human ego; and even more so in the cognitive arrangement of the results of experience itself.

Since thought is the fabric on which the results of observation of the external world are arranged, certain properties and laws of thought that can be reduced to a more or less restricted set of relations (logic, mathematical logic, etc.) should always be recognised as prejudicial, if not to the reality of this world then at least to our interpretation and exposition of it.

These are the various answers given to the problem of the 'theory of knowledge' (gnoseology) but, apart from the different importance attributed to this prejudice, it would seem unquestionable that we cannot escape the need to explicitly and implicitly resolve this problem in some way before dealing with the external world in its various distinctions, psychic and material, organic and inorganic, etc., since every element of such a treatment implies a human cognitive act.

And as long as this bias is recognised, philosophy survives as a separate doctrine, with its claim to 'complete' the gaps in positive and experimental knowledge, a claim that ranges from the minimum of certain formal schemes reached by the schools we mentioned earlier, to the maximum of world-building, projecting onto the external world that which is internal to the thinking ego even in spite of its 'false appearances'.

Be that as it may, these are always principles, i.e. fundamental theses drawn not from the external world but from thought. These principles should apply to every being insofar as they claim to apply to the real world, so they condition not only the first group but also the other two.

For example, in Hegel's system, the first group constitutes logic, which is not only the technique of employing thought and reasoning, but is at the same time the fundamental doctrine of being (ontology).

The second group in Hegel is the Philosophy of Nature, the third the Philosophy of Spirit. The data of the next two groups are drawn from the constructions of the first, which are purely ideal.

These traditional conceptions are to be opposed by their complete reversal. Man's thinking is a process provoked and conditioned by a very long series of other natural processes. Its laws and principles cannot be considered as starting points for research, but are instead its points of arrival.

They are drawn from the external world, i.e. from nature and the realm of man, which do not govern themselves according to principles: on the contrary, principles are just insofar as they accord with the facts of nature and history. Consciousness and thought are not something given that pre-exists and at the same time stands in opposition to being and nature, they are products of the human brain just as man is a product of nature, and thus it is easiest to understand that thought and its principles, being ultimately products of nature, agree with the whole of it rather than contradict it.

If we try to derive the pattern of being, i.e. of the world, not from our head but by means of our head from the real world, then we no longer need philosophy but positive knowledge of the world and what takes place in it, i.e. positive science. Since there is no longer any need for philosophy as such, the need for any system also falls away.

The notion that the whole of natural processes has a systematic connection forces science to search for it everywhere, in particular and in general. But a decisive and complete representation of this overall connection, i.e. the construction of an exact mental image of the world system, remains an impossibility for us and for all time. Such a result would entail the consequence that any subsequent events, and the very complication and differentiation of brain functions (without here claiming that this is an eternal process with a constantly positive meaning), could no longer change anything in the system of knowledge.

In fact, any attempt to systematise knowledge is provisional and transitory, as it is limited objectively by the historical situation, and subjectively by the physical and mental characteristics of its author.

Just as the process of the formation of human knowledge is indefinite, so it appears necessary to reject all the a priori we have alluded to, whether they are taught by God or excavated from the depths of thought; surfaced as intuitions or patiently fabricated as absolute demands of reasoning.

We have already alluded to the traditional objection that all our relations to reality are obtained by means of knowledge, and therefore the conclusions we reach about reality contain an element that is proper to our thinking.

And so also those who attach great value to the results of experience, as we said, recognise that certain criteria of knowledge such as pure mathematics

and logic are produced outside it. These theses are, on the basis of recent results, increasingly to be rejected, since, as we shall see, experience conditions the conclusions of geometry, mathematical analysis, and logic itself.

We do not deny the existence of logic as an instrumental science and technique of the forms of thought; indeed, it is well known that in the Marxist conception its use is accompanied by that of dialectics, or the science of relations, of which we shall speak. But what must be made clear is that logic is constructed and justified by its application and correspondence to reality and not codified a priori in our heads, and only then applied to things.

It is no longer the science of the principles of thought, which becomes the science of the principles of being, but is merely the science of the forms of thought, not absolute and fixed, but always ready to be modified by the results and data of the external world.

Whatever, then, is the part attributed to experience in the formation of knowledge, we are faced with a very old objection: the experience of our senses often tells us the false; we do not believe it but rectify its indications by means of our reasoning; therefore the function of this must precede all experience.

Let us next deal with these four arguments that purport to demonstrate the necessity of placing more or less extensive a-priori data of the intellect at the basis of the study of the world.

- The act of knowing as a relation between the ego and the external is conditioned by the priorities of the ego, i.e. thought.
- The results of mathematics are products of pure thought.
- The laws of logic, at least in the narrow formal sense, are products of pure thought.
- The utilisation of experience is impossible without certain critical preconditions set in our thinking.

[Critique of the first point: The act of knowing as a relation between the ego and the external is conditioned by the priorities of the ego, i.e. thought].

Undoubtedly we express, record, and communicate our knowledge by means of thought, and in a more concrete sense by means of spoken and written language. On the data thus accumulated we then make operations or reasonings from which we draw out new results in the form of suppositions or predictions which in turn are generally confirmed by events in the real world.

The argument seems very strong that this whole system - notion, reasoning, prediction - cannot exist without the subject man, and moreover thinking man, and that its relations and connections are not the property of an

external extra-human world, but of a world that is such insofar as it is known and thought of by us. In truth, the serious difficulty of this problem consists more in the imperfections of the language into which we try to translate it. If we claim to solve it by thinking, we have already placed ourselves on the terrain of those who wish to convince us that every result is conditioned by intrinsic laws of thought. The correct procedure, however, is the opposite: the mechanism inherent in the instrument of thought, i.e. language, needs to be perfected and corrected in order for the question to be eliminated.

Correcting and rectifying the mechanism of language means appropriately modifying the value of the terms that represent real things and facts, and of the logical-syntactic relations that can be increasingly adapted to their purpose.

It is a fact that the mechanism of language changes not only from epoch to epoch and from people to people (although the fundamental laws can and must be considered common to the various idioms), but also from school to school, from author to author, from researcher to researcher.

The value of linguistic terms and relationships is constantly changing and evolving: it is precisely the experience of the outside world that ultimately decides the validity of changes. It is only that the slowness of these makes one believe that they are unimportant and thus limited by the absolute content of thought.

[Critique of the second point: The results of mathematics are products of pure thought].

This will be made clearer by the discussion of the alleged a-priori validity of logical schemes and mathematical principles. In reality, the susceptibility of thought to adaptation is absolutely limitless: what was unthinkable at one time and was regarded as such as an absolute property of thought may be very thinkable today; and so if we compare, instead of different times, different races or individuals of different social classes, different brain development, etc., we can see that the ability to abstract and to abstract is the product of pure thought.

Especially the faculty of abstracting and generalising is acquired by a long exercise of the collective and personal faculty of thinking, and the exercise consists in the repetition of endless particular applications all satisfying experimental conditions.

The purported absolutes of thought are but successive generalisations, most often destined to give way to others, and thus devoid of definitive value: in any case, they are the opposite of unmodifiable primitive principles serving as starting points.

The particular historical, ethnographic, etc. facts that prove this are innumerable. The savage cannot think of a number greater than three or five, the ordinary man must already make an effort to see clear in his thinking a demonstration of elementary mathematics, and he refuses to admit that calculating on the infinitesimal parts of finite quantities makes any sense.

The modern mathematician, on the other hand, does such calculations as a matter of course, but may feel a sense of unease when faced with the proposal of further abstractions such as differential forms with more than three dimensions, Cantorian numbers (two infinite numbers, better known as transfinites can be greater than each other) etc.

These impossibilities of thinking, many times employed as demonstrations of the absurdity of certain theses, have then had to be allowed to pass.

[Criticism of the third point: The laws of logic, at least in the narrow formal sense, are products of pure thought].

In the more proper field of language, the same observations can be made about both the value of words and their relations. For example, the verb 'to be', which represents the abstraction of abstractions and is the pillar on which the advocates of the 'a priori' want to base the absolute laws of thought, goes back to an Indo-European root meaning to breathe, i.e. a very concrete way of being that is peculiar only to living organisms. Slowly reaching generalisation, Scholasticism wished to derive from it the property of all material, spiritual and divine essences, just as classical idealistic philosophy wished to base the origin of all superimposed logical schemes on it.

In the field of syntactic relations, it is remarkable how, for example, the first steps of Hegel's gigantic logical construction are conditioned, as has been observed, by the confusion of two instrumental functions of the verb is. If I say: Socrates is mortal, the verb 'is' has the function of a copula between subject and predicate; whereas if I say: Socrates is Santippe's husband, the same verb expresses identity, i.e. it is equivalent to the expression 'it is the same man who is husband etc.'. In the mechanism of thought, the two functions are different, and it is worth studying them by recounting all the particular 'cases'.

But that would be an offence to the absoluteness of being, which admits of no specification or modification except non-being... ! [Hegel thus preferred to conclude that since Socrates is mortal and particular, while mortal is universal, the universal and the particular are identified, that is, they are reconciled in the inner stage of the scheme of being: the individual would be the concrete universal, and so on].

With regard to being, it should be considered that speculation by even the most powerful brains (let alone the innumerable amateurs of philosophy) can

never discover anything. Rather, the extent of the generalisation of all forms of being, common to mineral bodies, organisms, man, etc., can be better regulated even in the mechanism of language and syntactic logic when more complete data is available on the phenomena of the transition between the mineral, organic and human kingdoms, etc. [because each of these beings and phenomena is a different matter]. [because each of these beings and phenomena have different forms, in the development of each existence].

It would seem that a certain value of the objection we discuss is not eliminated, or at least that it is reduced to the impossibility of science and its development.

Even if the 'language' mechanism is constantly changing and lacks any definitive character, this does not detract from the fact that there is no science outside of its use, and that there never can be.

Now, if science is constructed with the 'language' mechanism, as well as with experimental data, and the perfection of that mechanism is expected from science itself, we are in a vicious circle because science will never acquire a value independent of the mechanism itself: either the mechanism has its own internal perfection on which science rests, and we are at the aprioristic thesis; or the language-thinking instrument is imperfect by nature, and at least in part the operations of science and its reforms of the way of speaking and thinking will always be imperfect.

[Critique of the fourth point: The utilisation of experience is impossible if certain critical preconditions set in our thinking are missing].

But even this vicious circle is but a legacy of the traditional way of thinking. We cannot stop at the empty expression 'vicious circle': what seems so today may not seem so tomorrow. In fact, such an objection to the cognitive process can be made to all the practical processes of everyday life, which, however, are not deemed vicious circles.

Let us give a few examples, although any of those processes present themselves with the characteristics to which we allude.

Today, scales are built to the hundredth of a millimetre. High-precision machines are used to make them, the construction of which requires an approximation in the size of the pieces that a-priori must be no smaller than a hundredth of a millimetre. Put the problem to the most skilful mechanic locked in a room, and he will not solve it; which does not detract from the fact that technology solves it in practice. The vicious circle that would discourage a pure logician from attempting it has actually been overcome by successive approximations. Let's summarise them as follows: with the tool to the tenth of a

millimetre and with appropriate demultiplier arrangements, the graduation to the tenth of a millimetre was made and the tool that cuts the tenth was constructed. With the parts to the tenth, a tool was constructed that cuts to the exact twentieth etc. etc.. It was also different and more complicated, but that does not matter. That is to say, it is always the tool that is imperfect, and yet it produces results that diminish its own imperfection.

A similar example could be given by referring to advances in the hardness of steels, not in the sense of new chemical-siderurgical resources, but in that of the actual cutting of the machining tips. It would seem, logically, that if there is a tool bit of hardness 20, there must first be a bit of hardness 40 to cut it. In practice, the opposite has happened, and continues to happen.

So too, high-precision thermometers were needed to study the laws of thermal expansion of gases. The vicious circle was there, but only between words; in reality, today the law of the phenomenon is known even in very advanced decimal places, and we have gas thermometers that give very small fractions of a degree centigrade.

For the language-instrument, the same thing happens: we must content ourselves with setting out by using it, even if we know it to be imperfect, but we do not know precisely in what and by how much. This will not prevent us from obtaining good results, even if not certain, which will lead to improving the instrument, and so on with infinite cycle repetitions.

The analogy of the examples we invoke is of course contested by traditionalists. In an effort to explain the cognitive process without the use of a-priori data, we have given examples taken from active processes, between material things, but in which man and his criterion participates as the directing element. One could attribute the breaking of the vicious circles in which practical life and man's struggle against the environment are woven to the power of choice and discrimination of human reasoning.

Although it is more difficult, it can however be shown that the fact of successive corrections is actually directly determined by material conditions and occurs in processes in which man has little or no part, nor do living organisms.

This we could do in the special chapters on the organic and inorganic world.

In any case, it is evident that those refinements are not made in an arbitrary sense. Just as the great scientific breakthroughs, so the devices of technology have been achieved by many independent routes.

It is trivial that the millstone has taken the circular form everywhere, but far more impressive examples are very frequent in the history of science and

technology and are resolved in the systematic dispute over the priority of findings.

Finally, the practice of skipping human intervention in certain links of the technical process with innumerable automatic devices is becoming increasingly frequent, with the sole aim of proving that the intervention of a human being's act of knowledge and will does not necessarily imprint a process with a character that cannot otherwise be reproduced.

The separation of the technique of language from the characters that the human subject imprints on it can lend itself to irony, as can the reference to various past attempts at reasoning machines and the like. However, the fact that the instrumental evolution of human language, in which thought is expressed, is carried out in a sense that is substantially determined by the relations of the outside world is also proven (although the need for a single world language seems very immature today) by the demonstration given by the glottologist Trombetti on the fundamental unicity of type of all languages, patiently found through countless phonetic differences and degrees of conceptual development and independently of the thesis on a single origin of human races.

We repeat that the least insecure conclusion to the cognitive problem is to accept as it is the instrumental set of laws of language and forms of thought in order to apply it to the unfolding of positive knowledge, expecting that those laws may still change in such a way as to frame the totality of knowledge with the necessities of their critical comparisons, denying that pure thought may still reveal its intrinsic laws and principles.

At the highest stage of positive research lies the answer to the problem of the relations between mechanism, physiology and products of the organ of thought, our brain, which may perhaps provide a general solution to the relations between the external world and human thought, or rather to the way in which these relations arise. This does not exclude working on this research by provisionally accepting as good - modes and positions that will have to be surpassed. This procedure has a fruitful history of fruitful results in all fields: speculation has only created illusory difficulties and often unnecessary renunciations; when it has appeared to produce useful results, it has only been a matter of results subtracted from the unconscious application of the approximate and concrete method we have derived.

[Here the fragment ends].