

Overturning the Cognitive Pyramid

*From a recording of a meeting of the International Communist Party in Bologna on 13th November 1960
Translated by Balance y Avante*

A Body of Theses on Knowledge	1
On the Trail of the Original Heritage	2
Art: Creation or Production	4
Extraterrestrial Communism	5
Evanescent Quantum Matter	7
Thank you, Einstein!	8
Physical and Mathematical Creationism	10
First Conclusion: Science does not Always Move Forward	12
Second Conclusion: Science Blocked by the Social Relationship	13
Overturning the Cognitive Pyramid	14
The Science of Don Ferrante	15
Double-Entry Physics	16
Fruitful Destruction of Barriers	19

A Body of Theses on Knowledge

It often happens, as between the Casale meeting and this one in Bologna, that other important tasks subtract time from the writing of the reports, on which, communicating between distant cities, the comrades presenting the various topics must collaborate. Thus the new meeting takes place without the exposition of the previous one having been carried through to the end and, above all, written in complete form. It is therefore not a matter of journalistic chronicle but of two complementary aspects of the same collective work. Although none of the topics we dealt with should ever be considered closed, it can be repeated that the materials of the party's positions on various vital points have now been satisfactorily elaborated.

Using known and almost unknown texts from Marxism, we have worked on the subject of knowledge and 'philosophy' in recent meetings amidst evident interest from the participants. We are, however, late with the publication of the reports, so much so that of the discussions not only in Casale but also earlier, in Florence, we have nothing published. The comrades have organised a tape recording of these reports, which is used for internal dissemination, which is too limited compared to what we would get from the press. At today's meeting we are counting on taking stock of the work on a subject that some improperly still

call philosophical, whereas it is the vital core of Marxism as a definitive human historical and social science.

It is to be hoped that between this meeting and the next we will be able to give an orderly account that fills the gap opened up by several meetings. As we have announced, but not yet implemented, it is a work that should be framed in a body of theses in which all our work on the programmatic arrangement of original and classical Marxism is presented as an inescapable basis for party membership and external agitation. This task is exquisitely international in scope, as movements similar to ours are being organised in a number of European countries, and the linguistic part is crucial to achieving unanimous clarity.

Work is well advanced on a dictionary of Marxist vocabulary extended to four languages: German, English, French and Italian. For the time being, in our meetings, multilingual listening is entrusted to the efforts of volunteers who organise small homogenous groups of comrades who speak a given language. A special meeting will deal with the dissemination of material and our press in different languages. However, it is not possible to promise the time when this international corpus will be published, as we want to first prepare it in the various languages at the same time and perhaps present it in Italian at a forthcoming meeting.

The young people who have come to us rightly insist on having within their grasp a material that, due to the presence in our ranks of worthy elders, is not library literature but living data of struggle. The comrades of the middle generation, but who do not reach the crucial post-war period of 1918-1926 with their experience, also show the need to be better equipped with these vital weapons.

On the Trail of the Original Heritage

[We have done a great deal of work on the so-called youthful writings which] Marx had prepared before he even devoted himself to writing a critique of political economy that could be [published]. Much of this work was then transfused into the first chapters of Capital, and from it we drew very important conclusions from the point of view that one usually calls philosophical, but which we define rather as a critique of all previous bourgeois philosophy, using here a phrase that Marx uses many times. We then moved on to use another text, again translated with the invaluable collaboration of our French comrades. Roger brought us a remarkable part of the translated Grundrisse, which concerns precisely a passage useful for the present work. Indeed, in this first draft, the concept that I told you at the last [meeting] is particularly emphasised (I was only able to give it a cursory glance because one cannot examine so much material in two days): all capital, all money, is nothing but dead, objectivised

labour, subtracted from society, crystallised. The same concept lies at the basis of the numbers game, of the demonstration of quantities that are subtracted and added [in bourgeois budgets, and which we ascribe to the social liabilities of this dissipating society, dedicated to the squandering of the energy of the whole species, not only of the proletariat].

The Grundrisse also provided us with the elements that we developed in the very interesting question, re-discussed up to the Casale meeting, of the forms that preceded the economy of capitalism, which were then arranged in the complete study that comrade Roger made, of which we were only able to give you some minimal data in the tableau that we must remember to examine so that it is ready for definitive publication. We then turned to the famous Economic-Philosophical Manuscripts of 1844, so called because they are Marx's notebooks that were found and rearranged, of which there are contradictory editions, and of which we have given the exegesis and indication of the differences that result from their comparisons. We have taken other concepts from this other fundamental work of Marx. I mention all this so that it is clear that we always work on the track of our party's original heritage of principles and theory.

Our studies led us to the correct interpretation of historical materialism and determinism as understood by Marx; to the correct interpretation of the value of proletarian action and the party; Finally, they led us to apply a beautiful formula that we find in the Manuscripts, namely that the appearance, almost explosive, at a certain moment in history, of the communist doctrine, of the vision of the future society that will emerge from the limits of private property, is equivalent to the unravelling of traditional enigmas, those in which human thought has been wrapped up over centuries and millennia, and has provided solutions that were absolutely unthinkable for ancient philosophies and schools.

This virtue - of discovering a truth for the first time - is certainly due to revolutions, but it is not of all revolutions to eliminate the class cycle. All revolutions represent a step in the direction of greater knowledge, but until now they have been linked to a class cycle that succeeded the advent of the society for which they exploded. Their explosive phase has been succeeded by a fairly long history cycle in which the victorious class has rested on the revolutionary results. And this can be said of the Christian revolution, which abolished slavery, and the democratic revolution, which abolished feudalism. They continued to hinge on class domination, to revolve therefore among the dualisms, the questions, the enigmas of human thought that have hitherto been imagined eternal; they could not provide a definitive solution.

Our epistemological revolution, our doctrine, appears with the communist revolution before it explodes into violent transformation. As I also tried to unfold in my commentary on Lenin's Extremism, it is even formed in the previous

anti-feudal revolution, since proletarians already appear there, and fight, and elaborate, and illuminate with their primordial claims the background of the complete doctrine of the future revolution: that which the proletariat will bring to further perfection when it will no longer be merely auxiliary troops of the bourgeois revolution, but when it will fight for itself with its own party at its head. A final cycle of class epochs is thus established. In this sense, the solution to the riddles is final: in the doctrine of revolution, the doctrine of future humanity, which explodes between 1789 and 1848 and is condensed in the work of Marx and the great masters who anticipated him.

Art: Creation or Production

We now want to take stock of the investigative work done so far and draw some conclusions. We had already come to an initial conclusion at one of our previous meetings, and that was to answer a problem posed by bourgeois intellectualism in certain of its writings, namely: why is it that all writings of a scientific and scholarly nature have the value of a transient product and are quickly superseded? Why is it that the literature that transmits the product of the various generations in the field of scientific culture in general is quickly superseded, while the artistic manifestation of human thought (which by the bourgeois is not considered scientific) gives rise to phases that are transmitted forever in such a way that even now we consider the texts of Homer, Virgil, Shakespeare and Dante to be definitive and eternal, while the corresponding scientific writers and thinkers are gradually superseded and replaced by new achievements? [The author we quoted at the time] attributed this distinction to the fact that art follows an intuitive revelation, while science is the product of rationality and calculation. Therefore our knowledge would have two aspects: one intuitive and sentimental; the other scientific and cognitive-rational.

That artistic intuition is immanent and eternal, that art is sudden illumination capable from time to time of procuring visions, that these intuitive data inherent in the human spirit produce art, is one of many conceptions with an idealist and spiritualist background [which the bourgeoisie shares with the classes that preceded it]. Over the course of centuries, visions would appear to humans that led to the formation of great masterpieces, illuminating - who knows why - the minds of a few great poets, a few great chosen artists (for this applies not only to literary production, but also to the great works of sculpture, painting, etc.). We answered that these explosions, typical of certain epochs of human society (the golden age of Greek classicism; that of the great cathedrals, the Renaissance, which coincides with the first expression of bourgeois forms) are linked to a revolutionary transition, which transformed society. These are productions that bear the imprint of the great processes of social metamorphosis.

Thus, art is more stable, it is less transformable, and it is eternal - if you like - unlike science, because the key to the problem lies not in the opposition between intuition or reasoning but between revolution or conservation. While culture, the school, the academy, treatises, and science in general conformistically convey the ideas of the ruling class, art, from time to time, announces the appearance of a future form and imprints on itself the result of one of these great turning points, during which we argue that human knowledge is built on new foundations. Knowledge is not a heap, a mountain that is formed with the contribution of so many data as grains, of so many pebbles, but it is a construction that is formed by great spurts forward and upward, which is then followed by a period of rest waiting for another of these great catastrophic, revolutionary, explosive periods to come. [Where, then, is the opposition between art and science? Here] with which track we seek to follow the construction of human knowledge, now perhaps reaching, in the present age, a turning point that would place us between the prehistory of humanity (and thus of the human capacity for knowledge) and the realm of freedom.

Future history begins here, with the ascertained and proclaimed death of capitalism, which only awaits its actual death, [the political] revolutionary break in history. Everything unfolds, as you see, in accordance with what I was telling you about Marx's doctrine of the various revolutions, of which ours is the final one.

Extraterrestrial Communism

Then we discussed, almost as a matter of curiosity, another possible objection to this construction of ours, namely a criticism of our scheme of knowledge development which would not have been formed through explosive revolutionary periods but in some other way. The doubt has come to some authors, who [seem to have an irrepressible need for substitutes for creation]. In fact, they say that the formation of knowledge - that is, of human knowledge as it has been transmitted to us in different forms through the first religious texts, the first artistic forms, and the first philosophical-scientific research - may have received impetus from contact with other humankind, which evolved on stars foreign to our Earth.

With the infamous rocket-satellite quandary, it has now become fashionable to deal with what happens on the other stars that occupy the cosmos. It is believed that exploratory voyages of discovery can soon be made by transporting man himself to these stars, although one dares not envisage reaching bodies in the solar system on which life forms might exist. Still less is there any serious thought of the existence of life organised to the point of producing rational thought. Yet the theory has been constructed that other mankind, having left in advance of our own, evolved on planets in other star systems. They would have begun millions of years before us to evolve from

simple formations of organic life to the thinking animal, arriving at thought in advance of man, who would have been able to take advantage of these products of intelligence stored in the cosmos through some excursion into space.

We have not yet succeeded, in interstellar travel. We will have to wait for Khrushchev to see the spaceship capable of carrying men into space, but hypothetical cosmic civilisations would have managed it millennia before us. It is said that on Earth there is some trace of the descent of devices of ancient space explorers, who would have delivered to the men of time a dictate of the truths they discovered. All this, it is evident, replaces in a certain way the myths of transmission through divine revelation, the one who chooses his prophet, calls him to Mount Sinai, Golgotha, the Arabian Desert or elsewhere on Earth, instils in his mind his truth so that he translates it into a text to be spread among men, through the formation of churches and so on. We recalled the episode of the excursion of extraterrestrial travellers, of which there would be a trace in the Bible, and read the passages about Sodom and Gomorrah, sinful cities destroyed by [Yahweh or, unintentionally, by extraterrestrials]. In the Bible, therefore, there would be nothing more than the legendary presentation of an encounter between different mankind and some confirmation would be found [in the Dead Sea Scrolls, in the particular structure of certain radioactive minerals and in the Baalbek platform].

[If this were the case, no one could prevent us from imagining the reverse path: instead of a creation from outside, we could think that the theoretical elaborations of our intelligence, thanks to our memory and that of nature, simply find confirmation in an unexplored field. We set off with our rockets to another star system] and find that there all the way has been done, that the extraterrestrials are in full communism, as we predicted. Thus, when we then return with our rocket ship to Earth, it will be evident to everyone what I here am sweating my heart out to explain far less well than I could do with a practical example at hand. In this case, we would be prepared to give great credit to the aforementioned science-fictionists and to accept without question that the whole hard, laborious, bloody path of our humanity towards the new society could be shortened by an [excursion to] these peoples, to this [perfect communist society they have already achieved].

As you can see, the literature on interspatial communication is now also changing: until recently the Martians were depicted as curious beings, they did not have the face of men (or were machines and did not have the face of men at all), they had vibrating antennae coming out of their heads, they had eight feet and three arms... Now it has begun to be imagined that they, beyond space, on planets that are supposedly inhabited, could have the same conformation as us, the same faces as us, the nose, the mouth, also because it would be convenient for space travellers to make love as soon as they arrive, so that the sexes of

both mankind could unite and perhaps produce new products [as it is written in the Bible].

This branch has developed tremendously and it seems that modern youth is particularly greedy for it. We too, when we were young, had our own science fiction literature. We had Verne, who wrote *From the Earth to the Moon* and *Around the Moon*, other authors, such as Wells, who described the descent to both the Moon and Mars, [or the coming] to Earth of some Martians, who later died unfortunately. In short, the idea of escaping from the planet that keeps us clinging to gravity, rooted without being able to move, is something that has always seduced youthful spirits. So, let us hope that it is indeed possible to find a much more evolved humanity. We are convinced that if it were found, it would have no company, no market, no money, and that certainly the demonstration of the necessity of communism, so laborious today, but which has historically cost the proletariat hundreds of thousands of dead, sacrificed in the struggle, could be confirmed by such an expedition.

Evanescent Quantum Matter

Now, in order to complete, to define a little bit these observations of ours - recalled schematically because time prevents me from giving you a more complete outline - I want to take a somewhat extemporaneous departure from a recent comment on some of the latest discoveries in nuclear physics. We know that this is a field in which extraordinary developments are taking place and that [particle physics] is the one that is most often cited today to convince the masses of the great advances in science. This is obvious, since the more the masses are convinced the less they can understand. Since the latest achievements in nuclear research are things that are actually hardly comprehensible to ordinary readers - I include myself in this, of course - they are presented as astounding and marvellous. The attempt to deepen our internal knowledge of the subject - because we always return to the subject - thus brings us back to that fundamental enigma that the emergence of communism had dissolved. The old opposition between subject and object, between acting and suffering, between matter and spirit, etc., was condensed into this solution: there is no longer any need to have a dualistic conception, to imagine in reality a material element distinct from a spiritual one; our conception now rests essentially on matter, which in its evolution, in its development, has determined the development of all the facts of life. At first purely organic-vegetative, then animal, then also spiritual (psychic life, as they say), inherent in the manifestations of the spirit. For us, all this could not happen if we did not think of evolution as a complete excursus, a kind of palingenesis development of matter. We use the term 'evolution' with caution because it would seem to exclude those revolutionary periods, those cusps, which for us are always fundamental.

For us, the 'spirit' could not be introduced either by an entity that existed before the cosmos and that from time to time manifests itself by illuminating the minds of humans, according to theological and fideistic visions; nor by a quid strangely innate to our psyche, immanent to our brain, that guides us in our contacts with the external material world and with that part of matter that is within ourselves. Be that as it may, we materialists are enormously interested in the history of this investigation into the inner mysteries of matter. Matter, at the beginning of the 19th century, was hypothesised as being decomposed into atoms, returning to an intuition that philosophical thought had already known since the time of the Greeks, who had speculatively identified the indivisible particles of matter, the atoms, with the atomist school of Democritus and Leucippus. Particles of matter that elude our senses, but of which scientific investigation was certain [before empirical evidence was available]. Originally, Democritus called them 'atoms' (which cannot be broken down) because thought tells us that there is a limit to trying to break matter down into smaller and smaller parts. Later, the atom was further investigated into its components and it was seen that it could be 'cut'. Not that they cut it with a knife and fork, but material sub-units were found within it, other particles, [some of which can hardly be defined as 'matter' according to the language we have, intra-atomic connecting forces, energy as the equivalent of matter, etc., all of which can be known indeterminately according to the laws of probability].

Then we might ask ourselves: does the solidity of our world view - which is a scientific, political, materialist party view - begin to be shaken by this evanescent matter on which we no longer feel our feet firmly planted? Does it begin to be something even more indecipherable, more complex and more difficult than the spirit itself with its mysterious manifestations? These particles - every few months a new one is discovered - have become such a range that we no longer understand what it is that we call 'matter'. The atom was broken down, first the swarm of electrons revolving around it was found, then the components of its nucleus were isolated, it was seen that it was not a unit but was itself composed of other particles. In an article I am now referring to, there is a list of 16, 18, I don't know how many, electron, positron, proton, meson, neutron, etc., and it is not even up to date. It seems that matter is increasingly eluding observation, direct possession by those who want to know it. The investigation of the atom has been joined by the new physical theory of relativity, which we have established as fitting our conception because it tells us: matter and energy are the same thing. Energy therefore as something completely positive, something completely real.

Thank you, Einstein!

So far we would have no reason, from the point of view of our own theory of knowledge, to be too surprised. We have no difficulty, we have possessed this knowledge ever since materialism arose, and it predates Marxism, since the

bourgeois one first dismantled the creationist hypothesis. In classical physics, the matter-energy relationship had been encapsulated in two anti-creationist laws par excellence: one, that of the conservation of matter; the other, that of the conservation of energy. Now, [with Einstein's research, we are at the complete identity between matter and energy, so much so that it is possible to write the equation. At the same time] we see creationist cosmologies or, cleverly, [neo-creationist theories] being reaffirmed as a continuous process of creation. The Creator, whom the bourgeoisie thought it had expelled from its doorstep, would re-enter [through the window] to explain these very modern conundrums, or rather, in a certain way to lubricate and put the ancient ones back on track.

Forgive me for using a joking tone for these things; but I would not like to take on a doctoral air that I am not able to give myself and that it would not be right [to assume] in front of you, even if I could. Let us leave aside discussions about the limits of the universe, its infinitude or limitation, the limits reached by the most distant galaxies, their sizes, contractions, expansions - we would be touching on very difficult problems of modern physics. Be that as it may, it was assumed until not too long ago that a wealth of matter existed in the universe; that one could pass from one form, mass, velocity to another, but the total, the final balance would always remain the same. It was said that no particular matter could be destroyed or created. This thesis of the conservation of matter was coupled with that of the conservation of energy. It was said: you can neither destroy nor create any part of the total energy with which the cosmos is endowed. One matter may change into another (through chemical or nuclear processes) but the total mass cannot change. Energy can change from one form to another (mechanical, electrical, heat, chemical) but the total is always the same. Einstein comes along with his theory of relativity and says: *'No, matter and energy are but the same thing because a part of matter can disappear as long as a certain corresponding amount of energy appears; conversely, a certain amount of energy can be absorbed to crystallise and create a new part of matter'*.

Thus, even if a general matter-energy equivalence is established, the question of the dispute over materialism and spiritualism does not yet seem to be called into question. [Indeed, did not Einstein try to bring to unity a system of cosmic equations, the same for any observer in motion, written in the form of derivatives, i.e. assuming variable quantities for evanescent 'infinitesimals'? And did he not expound his profound doubts about the indeterministic path that is based on finite and numerable quantities, albeit very small ones, such as electrons, protons, photons, i.e. all the phenomenologies studied by physics, including those that for Planck and the other indeterminists are susceptible only to a statistical and probabilistic description? Here Einstein may have utilised the doctrine of de Broglie, who reconciled corpuscles and waves, discrete and continuous, bringing the motion of particles and quanta of energy under the grand banner of the canonical equations of the continuous. Let us simply assume

that Einstein's last papers (on whose 'mystery' a freak publicity stunt would be unleashed) contained this research, to which his last work was consecrated. Would this not be a great step on the road to Monism, to our unitary conception of the world? If the mechanical, electrical, magnetic, optical forms of energy, of matter-energy respond to a single law from which we deduce the movement of Sirius light years away and the trajectory of the proton in the core of the millionths of a millimetre, then with Einstein we have come very close to the unitary assimilation even of that still little-known form of vital energy that we call 'thought'].

[Ancient categories reappear, however, when we abandon the physics of the real, macroscopic world and limit ourselves to the microscopic (Einstein did not admit two different systems of laws for the two worlds, since the macro is made up of the micro) of particles. In fact,] recently, something really strange has happened: by dint of discovering particles, certain ones have begun to emerge that have characters perfectly opposite, as far as one can tell, to the particles already known, and they have begun to be called 'antiparticles'. It is necessary to reiterate, even though it is well known, the fact that modern science has not achieved a clear-cut arrangement of all physics. Even with the introduction of the new concepts that followed Einstein's relativity and the discovery of the identity between matter and energy, it has not yet succeeded in framing in a single theory the data from the various sciences into which physics is divided, depending on whether it deals with the dynamics of material forces (mechanics), electricity, magnetism, optics, etc. Engels was said to have managed, in the last years of his life, to collect documentation on this problem.

Physical and Mathematical Creationism

Someone is still looking for a unified theory, but there are many contradictions. We have now arrived at the discovery of antiparticles and anti-matter, [but it was a long road, we first had to establish the priority of matter, with Laplace] and the bourgeois revolutionaries. We materialists at that time were all happy to say with them: God is no longer an issue, we only care about matter. But the structure of matter was becoming more complicated, with the atomic hypothesis, electricity, magnetism, gravity. In the meantime there had been an exclusively energetic theory that said: matter does not exist; but it did not have much luck. Thought had arrived at this result: matter does not even exist, only energy exists, only movement, vibration, oscillation, undulation. What appears to us as matter, as an atom, as a particle, as a tiny corpuscle, is but the concentration of an energy field. This was Ostwald's idea, which is now considered outdated. So we first had a certain transition, when it was said: matter can disappear and reappear as energy or energy disappear and reappear as matter. Now (every four or five years, official science 'surpasses' everything) these particles tell us: no, matter really exists, and it manifests itself both with

energy fields and in places, centres, where electrons, protons, neutrons and all the other particles that have arisen with their good anti-particles at their side.

[But evidently the human brain rebels against eternity, against the infinitude of time and space. There are therefore the proponents of sudden creation and those of continuous creation. On the one hand, one admits the formation and annihilation of matter in an energy (or material) equilibrium, a global balance according to the old laws of conservation: matter, from a certain moment onwards, must always be present in the same 'quantity', manifesting itself in one way or another, becoming rarer as the Universe expands. On the other hand, one admits that matter has always existed, but one explains the persistence of the average density of the Universe, despite its expansion, by the creation of ever new matter].

What is it then, and where does this other new matter come from? Do not expect me to explain it to you because I have not understood it myself. It's something of a puzzle. [It seems that matter can be created out of nothing in the laboratory, as long as it remains on the scene for less than the time established by Heisenberg's uncertainty principle, but here we are dealing with a stable creation on the scale of the Universe]. In any case, every existing particle has its anti-particle that lies, in a certain sense, in the shadows behind it. Just as the various particles combined together form the nucleus, the atom, the molecule, matter, the world, so the specular antiparticles would form the anti-atoms, the anti-matter, the anti-world.

It is true that I said, [joking, that ideology] is a mirror of reality, but I certainly did not mean a [quantum] mirror. We are the stage world - me, you who are listening to me, the real objects - and that form, that false and evanescent shadow that you see in the mirror is that of ideology, a mere reflection of reality, a backstage world that we would not go and catch. So, creation or not, matter has been saved, it has been allowed to exist again distributed in these particle patterns, as long as we admit, along with it, the existence of an alternative world of an anti-matter. What is the interesting thing? I have here some articles... an essay by a certain doctor [...], whom I admit I do not know, but who is endorsed by a signature, that of Francesco Severi, to whom we must pay homage even though he is our adversary, an exponent of bourgeois science. He is the greatest living Italian mathematician and perhaps one of the greatest mathematicians in the world. He says: 'Publish these articles because I take responsibility for them. I have read them, I agree with their statements'. The title of these articles is really interesting: Return to Aristotle.

It says that the latest discoveries - the ascertainment of new anti-particles - have led to this consequence: we scientists, we physicists, have always believed that Galileo and Newton were right once and for all in the face of Aristotle... We believed that the new vision of the material cosmos was governed

by the dynamics discovered by Galileo and Newton, and not by the old, as Aristotle conceived it. Instead, we now see that Galileo's and Newton's formulas - with which physicists, engineers, technicians have been working confidently for almost three centuries, and on which all the living and pulsating technology of the world has rested - were wrong. Aristotle's ideas are better able to explain the presence of these two worlds than those of modern scientists. Basically, what do these ancient ideas boil down to? [To the fact that, as the Greek philosopher says, nature would be a matter of form rather than matter. Matter would be a substance that precedes the form into which it is transformed, as a seed precedes the ear, or a power precedes the act. Matter would always be the same, while form changes according to purpose].

From this fact I draw two conclusions.

First Conclusion: Science does not Always Move Forward

First of all, it is remarkable to see that it is not true that we are always moving forward. We have always said that the greatest economist of today cannot be superimposed on Marx and make him disappear by saying: Marx is old, he wrote in the 19th century, I write in the 20th century and I will have greater things to express. It is possible for some imbecile to strut in this way, but it does not count. Rather, today we see scholars of conformist thought coming to recognise truths that only we used to defend; we see our adversaries capitulating in the face of Marxism; we see 'progressive' scientists recognising that fragments of useful truth may even appear millennia before our time, as demonstrated [not only by the example of Leucippus and Democritus but also that of their enemy Aristotle who, Galileo says, was not dumb enough to miss the phases of Venus through the telescope, as Aristotelian priests did]. We do not allow ourselves to pass judgement between Galileo and Aristotle. We consider the entire history of knowledge, nothing excluded, to be possible until that millennial cycle is completed with the burial of human prehistory and the opening of the new history and the new harmonious and joyful epoch of the species.

In some ways, it is even remarkable for us that we return to Aristotle. As you will recall, we based our critique of the Aristotelian logos precisely on the logos itself. When we treated, in a very elementary way, the question of man-made bodies, of artificial satellites revolving around the Earth, we studied them according to the laws of Galileo, Newton and Kepler. We recalled the laws they discovered and the consequence on the dynamics of artefacts. We believe that all those who study thrusts, trajectories and orbits are doing the same. They are perfectly safe formulations even though they are three hundred years old, and many times, in a criticism of the changing opinions in matters of revolution and party, we have made the comparison with the changing opinions in matters of physics, which should be a perfectly objective subject. We are

therefore not shocked by a 'return to Aristotle', but we are sure that the motive and the manner conceal an ideological trick.

Second Conclusion: Science Blocked by the Social Relationship

Remember the motion question: the artificial satellite revolving around the Earth does not need any energy to maintain its trajectory, to remain in orbit. It is eternally in revolution around the planet by virtue of Newton's law of inertia deduced from Galileo's principles (here they want, somewhat out of nationalism, to save Galileo over Newton). Why does it 'cost' nothing to keep a satellite in orbit? [Aristotle believed that to keep a body in motion, even without accelerating or retarding, a force must be 'expended'. Galileo said that force is needed to modify, not to produce movement. Newton did not make assumptions, he found laws and calculated the motion of the admirable gravitational system that had been repeating its cycle for thousands of millennia without 'expending' anything. Newton thus saw that every body, whether at rest or in motion, needs a force to overcome inertia if it is to change its state. The state of a satellite is to be in Newtonian free orbit in inertial motion after receiving an Aristotelian push to reach escape velocity and another, Galilean, push to modify its trajectory].

This means that the motion of all bodies in orbit, no matter how elliptical, accelerated at perigee and decelerated at apogee, is assimilable to uniform rectilinear motion and therefore there is no need to 'expend' any force to keep it in the state it is in. And that is why I have used the economic terms of value here several times: cost, spend, free. Not because I remotely want to criticise this Return to Aristotle, since I do not possess the scientific knowledge to do so, but to show how the prevailing ideology intrudes into the realm of subtle scientific explanations, becoming the banal expression of today's society. What I am telling you is very important. I want to point out to you that bourgeois scientists reason just as we say they reason, i.e. they regress by millennia and at the same time introduce economic-social comparisons of vulgar relevance, borrowed from the ideology of their class. As long as the revolutionary notion drawn from ultimate science illuminates the primordial one [they make the sufficient and shout: Down with Aristotle, down with Thomas Aquinas! As soon as revolution is behind us, ideology takes over; as soon as conservation is the order of the day, here come the priests and Aristotle again].

I am going to conclude because I am getting very tired, I would not want you to get tired too.

In other words, bourgeois philosophical thought has so far constructed a pyramid of the sciences made of steps. At the base of the pyramid is mathematics, on top of it is physics, then there is chemistry, then there are the biological sciences, then there are the social sciences, economics, sociology,

psychology. At the top is philosophy, the science of the spirit. We, say the bourgeois, are quite sure of what is at the base of the pyramid, one can opine and argue about what is at the top. We communists say that we question all knowledge, from the base to the top and vice versa. Nothing we leave standing [especially since the pyramid of bourgeois knowledge is upside down, rests on its ideological summit and everything else comes as a consequence].

Overturning the Cognitive Pyramid

Now, as the chatterbox, the doctrinaire, dogmatic, sectarian old man that I am, I am going to make a similar attempt to the one for which I was vituperated at the congresses of the International, i.e. I want to overthrow this pyramid as well. Forgive me if I cross bridges, if I raise issues and discussions on topics that seem far apart, if I make very risky comparisons: these are links that are worth explaining because we have brought them together at the same meeting and they are put forward by the same people to the same listeners.

I said then in Moscow: Il faut renverser la pyramide. You have built the international proletarian movement by turning it upside down. It is true, we said, that the movement must be centralised; but we want the centre and the base to be able to communicate directly, that information and directives have a precise, established trajectory, not as now when everything rests on the summit in Moscow in unstable equilibrium.

Now, the banal mechanics, that of poor Galileo, of poor Newton, have proven to stand the test of time, if with their calculations one still sends manufactured rockets and satellites into space; I don't know what I can do to make Aristotle fit in. At school they taught me, as they taught all of you, that they were right. Now we no longer know what to decide. What seemed so solid, we are told, is no longer certain, everything can be called into question. Modern physics as a whole, with the study of quantum particles, is in the grip of the philosophy of doubt, of indeterminacy, of uncertainty. But what kind of science is it that no longer has certainty?

In any case, we are now making an attempt to overturn the scientific pyramid. Matter would then have in itself such particularities for which it takes a certain form. This is the Aristotelian theory of ilemorphism. And only when this potential faculty becomes an actual faculty do we witness innumerable phenomena. Thus it is not possible to explain motion without a relation to the external field. Motion is the change of place of a body: first it stood here, now it stands there; we have always related it to position, whereas Aristotle related it to the medium, to the air in which the body was immersed. According to the author of this article, however, it would be the case that Galileo and Newton had got it wrong, so that we could now rely on a new theory called 'exchange dynamics'. The way would have been paved some ten years ago by Segré, who,

transferring his attention from the studies of mathematical physics, in which he excelled, to the studies of experimental physics, would have established the following principle: a body, in order to keep itself in motion, must have 'exchanges' with the external field. In simple terms, it is not possible for it to move if no one spends anything on it. Now, as a result of all this research, our assumption of astral bodies travelling for free in the Universe would of course be overturned. I cannot, of course, explain or follow this author's rather arduous formulas without possessing the necessary mathematical and physical concepts required (when one has studied, if one does not 'update', ten years later one becomes a complete beast because they change everything and you are no longer sure of anything). However, I find it remarkable that, in order to give a demonstration of physics, the author himself resorts to an economic comparison: an exchange without a quid pro quo is not possible.

The Science of Don Ferrante

What is the conclusion I come to? I do not dare to say that [recourse to economic concepts] is a reason to prove that physical-mathematical reasoning is right or wrong; whether Aristotle will win or Galileo, Newton or Einstein will win again at the end of the conflict; because this is an issue whose solution we cannot arrive at at the moment, or even through long work. So I am not saying that we will get there, the communist society will obviously get there. Before that, it will not be possible to overcome [the contradiction between the various branches of science]. Capitalist society seemed to have abandoned the Aristotelian physics advocated by the Thomists and neo-Thomists to whom, in this article, homage is also paid. And it had in general adopted the new physics that allowed it to set up a philosophy that we could call scientific realism and that led to great achievements up to relativity and quantum mechanics.

Please do not move, I will soon let you go in order and discipline; if one moves, he sets an example and eleven others move. I see you stirring, you make me divert the course of ideas and it gets longer.

Now I say: bourgeois society at the beginning went through an explosive moment, that of its revolution, a great historical period which, intellectually, we can trace back as far as the Renaissance and, politically, as far as the time of the English Revolution of the 17th century and the French Revolution of the 18th century. With the Industrial Revolution and up to the whole of the last century, the bourgeoisie approached for a moment a science of reality, [demonstrating that] the possession of truth is arrived at through storms, thunder and battles of one part of humanity against the other part of itself. In each round of these fortunate flashes of history we are able to glimpse glimpses of the general perspective towards the truth that our species tends towards. This is why the bourgeoisie is particularly close to reality in those moments when, defying the consolidated force of ancient ideological dogmas, it must advance,

revolutionising the world against the remnants of the past. Imagine Galileo who, in front of the sanhedrin of priests, stamps his foot on the ground and says: 'Eppur si muove', defying the knowledge of the time and even risking burning at the stake in order to affirm a truth that was asserting itself by its own force.

Now we have a cowardly bourgeoisie, influenced solely by its economic doctrines. It has a conservative position, well demonstrated by the article, which uses metaphors related to the language of property and value, useless in a non-disclosure context, given that this is a publication reserved for a scientific audience, to which it wants to explain a problem of pure physics.

And here's why Aristotle would have been right: chemical combinations, physical phenomena, vital phenomena and mental phenomena would be those belonging to the sensible world, the world of antichena, the world of actuated matter that we perceive; instead, in the world of antimatter there would be all the non-actuated particles, all the bodies in their potential state, let's say. It would be a world of unenacted matter, which does not react, does not give rise to mechanical, chemical, electrical or quantum phenomena. Pure matter in potential and not yet form. This is why our author falls foul of the old conception of the philosopher of Stagira who established ilemorphism, on which mankind has reasoned and rambled until Don Ferrante of the Promessi Sposi (The Betrothed) who, reasoning precisely on Aristotle's constructions, demonstrates that there was no plague: things are substance and accident, and the plague was an accident. Manzoni, a good bourgeois, mocked him and, a few lines after letting him carry out his fine demonstration, let him die of the plague. This is how the defenders of conservation to the bitter end of bourgeois society will end up.

Double-Entry Physics

Now, these mathematicians, high-ranking scientists, knowledgeable in nuclear physics, able to have such a profound understanding of matter and form, of this world and its counter-world, the actual, real, palpable and visible one, in which we act, and of the other, of which we can only have a vague intuition; these mathematicians feel the need to use purely mercantilist comparisons. So it is evident that for these gentlemen, the truth lies in economics; it is from it that they draw the truths of physics and mathematics. Such changing physics adapts mathematics, places it at their service, [because mathematics is a language, and if with the different modes of production the language changes, the language of mathematics cannot but change as well]. The discovery of the principle of exchange, in the interaction between the body and the field that surrounds it, would occur with a balance sheet, and the balance sheet provides for income and expenditure - so it is written - and therefore it is necessary to do double-entry calculations, like accountants.

If you come to establish that there must be something to explain a movement for which you have to 'pay' a price, you come out of the enunciation of old Engels, who simply said: 'Movement is the mode of being of matter'. The principle of inertia is enunciated by speaking of stillness or motion, but in reality absolute stillness does not exist. All matter is in motion, the various parts of the Universe, from particles to galaxies move relative to each other, for free. Motion does not need an explanation because it is the first assumption that does not need a creative hypothesis. Now, however, motion would need an explanation. Why? Because an economic account needs to be settled, a quid pro quo given, a debt paid. And I could read you a few passages from the article to show you how many social-economic statements are used to explain the recent revolutions in physics and mathematics, which no longer correspond to the proverb: 'it is not an opinion'; today everything is debatable. But I do not even remotely want to involve you in this reading.

One of the contributions of Planck's discovery (that of action quanta) to modern physics is that matter, light, energy can be conceived of as discontinuous, formed of many tiny impalpable grains. After all, the idea had been introduced by Pythagoras, who thought that numbers were the essence of the Universe, in a literal sense, since for the Pythagoreans, numbers were what atomic particles are for us (and this should make one think, since Pythagoras had some problems with irrational numbers, which plunged him back into the relations between incommensurable quantities).

All modern mathematics is built on the continuum hypothesis, modern physics is built on the discretum hypothesis, so mathematics had to be, shall we say, adapted. Now, Planck's discovery, which he believed, hoped, could be absorbed into a general view of physics respecting the fundamental equations of the continuum, has expanded to the point of being used to shake the pyramid of acquired knowledge. Its physical and mathematical basis is called into question. We, who normally deal with the other pyramid, the socio-political one, want to break and overturn one and the other, treating them as one, as our adversaries admit is right to do, confessing that the one who rules in both is the ideology of property and capital.

There is no point in reductively discussing the transitions within scientific disciplines or society, participating in each of the debates about this or that discipline, this or that result. The truth is that you have to start at the top of the pyramid and turn everything upside down. Therein lies the problem, otherwise it would not explain why, on the part of those who make such bold assertions bordering on the incomprehensible paradox and perhaps even make an effective contribution to knowledge, examples of total subordination to the ideology of value and money come along. We do not deny at all that science and knowledge can proceed by paradoxes that are at first sight implausible. In fact, this even pleases us. We do not at all rule out historical recourses that show how results

from two thousand five hundred years ago are more in keeping with the explanation of nature than what has been asserted in the 20th century. On the other hand, we cannot dispute that this scientist lives in the meanders of a bourgeois society, that he is part of the bourgeois 'party'. It is logical that he uses the concepts of his society. I have said it before. It is we who must draw the conclusions.

Now let me breathe for a moment, without taking advantage to be naughty and move around like schoolboys. This one keeps sleeping instead...

I would like to find the passage in which there is a string of economic terms. Here: 'What action pays for the effects of a permanent change of place in uniform rectilinear motion?' I had shown you, swearing by Galileo, Newton and Einstein, that there is no need to pay anything for the motion of Sputnik because it corresponds to 'inertial' uniform rectilinear motion. There is no reason to pay anything. Instead, here it says: something must be found because otherwise what action pays the equivalent of a permanent change of position in space? It is a social concept that everything has to be paid for by someone. But it is precisely from this that humanity must emerge, and so we question what the scientist says, leaning on Galileo and all the company, including Aristotle, and saying that the truth is still far away. It is not for nothing that we propose to avoid the book-burnings, not always metaphorical, so dear to the bourgeoisie: we propose not to 'return' to philosophy, but to start building from the opposite extremes, from the future society that we see and from the past ones that we can now know without bourgeois prejudices.

The ancient philosophers may have been more right than today's scientists, but the error of philosophy necessarily stems from the fact that at a certain point in history it began to lock itself away in the individual's brain. It is the science of the collision of social collectivities, and not of individuals, that will give us the first trace of truth through which the species will know itself and the world around it. Not me, not you, certainly not the living men of today, but certainly not too many generations ahead, all of humanity will approach truth in the order of the most complex phenomena, that is, historical and social phenomena, and thus in the knowledge of the physical world, without the current ideological qualms. This is how we turn the pyramid upside down.

Can one swear that the shortest distance between two points is in a straight line? No, I cannot swear to it because I was taught that in non-Euclidean geometry it may not be true. But that mankind is heading towards communism, this I feel I can swear to, and I believe you all can swear to it with me on the basis of determinism. It is from this truth that we 'must' descend. Indeed, only when this truth has entered into factual life will it be possible to descend and explain what spirit, God, matter, form, the world, the anti-world, what the

relationship between all this was for previous societies and what new knowledge will be ours.

So who pays for the transfer of the body from A to B? Because if the body went from A to B, someone has to pay the expenses. The usual question of the bourgeois mentality: who pays? Who bribed the operator? High science boils down to this:

'In order for a body to express a relative movement (change of place) there are three conditions: that its mass accepts a certain amount of energy (acceptance of the energy correlative to the impulse); that the accepted amount of energy is changed by the mass into another and different energy currency; that the amount of new energy, of new currency, is poured into its mass, as a quantum pouring of the changed energy. The mediator of acceptance is the change of different forms in the field of quantum matter'.

Here we come to introduce the Dollar and the Pound into quantum mechanics. It seems to be understood: I, a particle, have a certain amount of energy; I knock on the counter of this mediating bank and say: 'Accept something in exchange for something else because I have to move'. I exchange the accepted energy currency; what I gave him in magnetism I receive in electricity, what I gave him in heat I receive in movement, and so on. Qualitative and quantitative conditions are subject to the exchange principle. And it is precisely the holy exchange principle that they want to inflict on us to explain the social life of mankind. As if to say: if nature works this way... then capitalism is the natural condition of humanity.

Capital, with the law of exchange (and with homage to Stalin and the Russians) claimed to enclose all future developments within the limits of this specific principle of his so that economies without exchange could not be conceived. We have broken this pretentious and primitive dogma in the footsteps of the explosive discoveries of Marxism, which a century ago explained instead how value, exchange and their laws must disappear from society, and how the revolution will only triumph when such laws no longer play. Now the laws of exchange are invoked to bring clarity to problems of physics that were born at the root of a major change in the history of knowledge.

Fruitful Destruction of Barriers

The basis of all science in modern society has been disrupted by quantum mechanics. Mountains of volumes of rational mechanics that mankind has been studying for three centuries, the foundation of physics and all related disciplines, has been called into question. Now all the important change is trivially explained by a question of currency, of exchange, is resolved [fully borrowing from bourgeois society its economic categories of value]. This allows us to say that the progress of knowledge is a lie and that those comrades who doubt our

corrosive critique of the scientific and technological achievements trumpeted by capitalist society are mistaken. We even deny that technology, engineering, the discoveries of universities and laboratories are useful in freeing man from ignorance and fatigue. We do not allow ourselves to be swayed by the sensational experiments of bodies launched into space, or particles bombarded by giant accelerators. Boorish, dollar-driven experimentation without theory is a regress, because the measure of progress for us is at the social scale, not at the scale of knowledge [which lies between academia, money-grabbing and circus publicity in favour of capitalism].

We should not be surprised when we conduct our denigration of all constructions of bourgeois thought and knowledge with stubborn party sectarian slant; when we deny progressivism, scientific continuity, the evolution of knowledge in this social formation; when we return to our revolutionary origins, to our school, to those who formed it, to the set of essential works of Marxism in which the revolutionary power of all humanity is condensed. Today it seems to be sleeping, but white, red, yellow or black, it must awaken. We want, on the basis of the laws discovered by Marx, to overturn the whole horrendous pyramid construction that rests on the summit of the dominant ideology, the summit at which the civil process and the science of the bourgeoisie say they have arrived, when in fact they have departed from it.

At the base of that pyramid are mathematical and physical certainties from which the so-called exact sciences are derived: [we have seen that every scientific certainty is but a step up to another certainty that encompasses the previous story. Therefore one does not tear down a certainty only to replace it with doubt]. In the article it is explained that the discovery of antiparticles could lead to enormous developments in the field of biology. Sensational experiments such as that of swapping the nature of chromosomes could be achieved. In perspective, genetics would also blow up, and consequently psychology and sociology. [And all this would be based on a science that has no certainties about the structure of matter? We cannot leave such power and, at the same time, such ignorance in the hands of the bourgeoisie, the future of the species depends on it].

All this construction we throw down. We want to rebuild the pyramid of knowledge on a new basis. We want to start from the truth of the richest, most difficult, most articulate, at first sight most incomprehensible complex, namely the complex of the present society and the laws of its becoming towards a new society. We believe that human knowledge will truly be such when humanity has brought and applied clarity within itself, in its social way of life. We believe that only then will truth begin to be reconstructed, starting from the complex and articulated, now understood through irrefutable axioms, and following the reverse path, to finally understand the 'multiplicity of the real', of nature. Everything will be reconstructed: psychology, sociology, physiology, biology,

chemistry, physics and mathematics. Humanity will achieve [its goal]: it will not make the revolution because it will have achieved the real, but it will achieve the real when it is able to complete the revolution.