According to mechanistic materialism, the world consists of masses in the Newtonian sense which are acted upon by forces and obey the laws of mechanics as they are formulated in the science of mechanics. There exists also the more general conception of materialism, according to which the universe consists of matter, the changes in which obey the laws of physical and chemical science. As we have learned previously, the Diamat introduced a “philosophical” concept of matter besides the physical one, and did not assume that this generalized matter under all circumstances obeys physical and chemical laws. The matter of which human bodies consist obeys biological and sociological laws which, according to Diamat, cannot be reduced to physical and chemical laws. The doctrine of the reducibility of the behavior of organisms of human societies to mechanisms is strongly rejected by the Soviet philosophy and is denoted as, one could even say “branded” as, “mechanicism.” However, the assumption that biological and sociological laws are not reducible to physical ones, but are “autonomous” laws is in some respects similar to the teaching of idealistic philosophers, and many philosophers working in Soviet Russia have uttered opinions that were branded by other advocates of Diamat as “idealistic opinions.” These “idealist deviations” have been described as “Menshevik Idealism.” This denotation ties these deviations to the political party of “Mensheviks,” who originally formed the moderate wing of the Socialist party, before the latter split into Bolsheviks and Mensheviks. During the first decade of the Bolshevik regime, there was a fairly lively discussion between the mechanistic and idealistic interpretations of the Diamat. Since, according to the Marxist doctrines, every philosophical conflict of opinions is connected with a political conflict, a government that does not tolerate opinions that are different from those of the government and the ruling party would not tolerate conflicts in the philosophical interpretation of science. In December of 1930, Stalin had a talk with the communist cell in the Institute of Red Professorship (Division: Science and Philosophy). In a paper, Stalin and Science (1939), Kolman writes about the result of this talk.

Comrade Stalin and the Central Committee of the party gave to the workers on the philosophical front concrete directions that helped them to correct mistakes and to guide their work into a path that fits the requirements of life.

The main point was, of course, to keep science on the narrow path between the deviations toward mechanism and Menshevik idealism. If we look into the Encyclopedia [note 1] under the heading “Philosophy,” we see that it is regarded as an important task of the government to keep scientists and philosophers on the right track. We read:

The victory of socialism in the USSR manifested itself even in the domain of ideology. Attempts to revise Dialectical Materialism were made under the hostile influence of the bourgeoisie and petty bourgeoisie. They found their expression in “Mechanism” and “Menshevik Idealism,” which were exposed and liquidated under the direct leadership of
In Mitin's textbook of Diamat which was prescribed in the Russian universities in the thirties, the mechanistic materialists of our century are accused of facilitating idealistic and spiritualistic philosophies, because by restricting science to mechanics the new phenomena of atomic and nuclear physics seem to defy the application of scientific methods, and to invite spiritualistic explanations. The same accusations against mechanicism have been launched, to an even greater degree, against its treatment of the individual and social behavior of human beings. The authors of Dialectical Materialism, Karl Marx and Frederick Engels, as early as 1845 pointed out [note 2] that the changes in human society cannot be treated by methods of mechanics. If the restriction to mechanicism is imposed on the scientist, social events are excluded from the application of the scientific methods and have to surrender to idealistic and theological arguments. Mitin writes, in his textbook [note 3] about our contemporary mechanists:

[all quote? see ms] They reduce the quality of autonomous laws (social, biological, etc.) to purely quantitative laws derived from mechanical laws, to the principle of equilibrium of forces acting in mutually opposite directions.... On the present level of evolution mechanistic materialism disorganizes the fight of materialism against idealism and facilitates the fight of idealism against us, by producing a cleavage between the discoveries of contemporary science and materialistic philosophy. Very frequently mechanicism is accused of leading ultimately to idealistic metaphysics, by training the objective laws of social evolution to the opinions of men, their views, and the ideas prevailing in a certain society.

[section break 2]
On the grounds of such considerations, the Soviet philosophy since 1930 has regarded mechanistic materialism as a major enemy. The official doctrine has been that in connection with the new stage of social relations and the new level of evolution of science, a new form of materialism has developed which rejects the reduction of biological and social laws to mechanical laws. To avoid this situation a new philosophy had to be built up—Dialectical Materialism. It is well known that scientists who are actually working by experiments or mathematical conclusions for the advancement of science are in general not very much interested in philosophy, and even look askance at it. This attitude, of course, has diminished the willingness of the Russian scientists to accept the new philosophy of Dialectical Materialism, and has made them susceptible to positivism and mechanicism. Hence, the "mechanists" are often blamed for cultivating among scientists the belief in the self-sufficiency of science and the uselessness of philosophy. The prominent Russian physicist Wawilov wrote [note 4]:

Dialectical Materialism in physics has to contend with three adversaries: with mechanistic metaphysical materialism, with idealism of all possible forms, and with philosophical indifferentism. (Modern Quarterly, 1939)

While most Western scientists believe that science is completely independent of
philosophy, and will eventually correct its own mistakes, the official Soviet Doctrine calls this type of science "bourgeois science," and teaches that science needs some guidance from philosophy. “Among the professors,” writes Lenin [note 5], “who are capable of valuable contributions in the special field of physics or chemistry, there is not a single one from whom we could trust one word when he speaks about philosophy.” With these words a fervent advocate of Thomistic philosophy would probably agree. About the professors of philosophy and the professors of science who write about philosophy, Lenin wrote:

There is hardly one contemporary professor of philosophy who is not, directly or indirectly, employed in overthrowing materialism.... They pretend now to refute materialism from the standpoint of “recent” or “modern” positivism, natural science, etc.... When the physicist, even the bourgeois physicist, works in actual scientific research, he is a common-sense materialist, he records the properties of and changes in “matter” in the common-sense meaning of this word.

One of the most prominent Russian physicists, Abraham Fyodorovich Joffe, [note 6] published a paper on the occasion of the twenty-fifth anniversary of Lenin’s book, saying in part:

Occasionally physicists like Bohr, Heisenberg, Schroedinger, etc. tell us in their popular writings about the philosophical generalizations of their scientific work. Then their philosophy is frequently the effect of the social conditions under which they live, and of the social orders which they carry out, consciously or unconsciously.

Therefore, Heisenberg’s theory is a materialistic theory: this means that it is the best approximation to reality which is possible today. [is this pgh part of previous quote?] It is instructive to note that a “materialistic theory” is here a theory that is in the best possible “agreement with reality,” while in strictly scientific language theory has to be in agreement with experiments and observations. This use of the word “reality” makes materialism a doctrine which is, in substance, near to Aristotelian-Thomistic doctrine, according to which a true theory is a picture of reality. Dialectical Materialism describes the relation between physical reality and human thought by the “theory of images.” Mitin’s textbook says [note 7, p. 171]

According to this doctrine, our intuitions and conceptions are not only produced by objective things, but they portray them. Intuitions and conceptions are not produced by self-evolution of the subject (as idealists maintain); they are not hieroglyphs (as agnostics think); but they are pictures, images, copies of things.... [O]ur cognition becomes more and more precisely, more and more profoundly a picture of the material world. There are not limits set to our ability to know the world, but there have been in every case, historically determined limitations to our approximations to absolute truth.

In order to have a well-rounded picture of the place of materialism in the philosophy of science that has been officially taught to Russian students of science, it is
perhaps helpful to quote some passages from a recent textbook of physics [note 8] that has been introduced in Russian universities:

The common-sense materialism of the scientists is not sufficient; the future scientists have to get training in genuine philosophy. The great majority of physicists have always been “common-sense materialists.” However, the weakness of common-sense materialism consists in its unconsciouness and in its inability to exert philosophical judgment about the experimental data of science. This lack has led to the result that a part of the bourgeois scientists, under the influence of the reactionary ideology of the ruling class, has attempted repeatedly to exploit physical discoveries for the confirmation of idealistic views. We meet such attempts particularly in periods of great new discoveries when the principles have to be revised and new ones are not yet sufficiently clarified, e.g., at the end of the nineteenth and the beginning of the twentieth century.

The students are further taught that these “reactionary” attempts were exposed and refuted by Lenin. [note 9] In particular, the students are warned against current interpretations of the statement that “matter disappears,” which has been used to describe the electromagnetic theory of matter at the end of the nineteenth century, and the conversion of matter into energy at the beginning of the twentieth century. The textbook says:

Only those properties of matter disappeared which had been believed to be absolute, unchangeable, elementary (like impenetrability, mass, inertia, etc.) and which now, it appears, are relative and lacking only to some states of matter. But the only property of matter which is relevant to the philosophical concept of matter is that of being an objective reality, to exist outside our consciousness.

Here again we see that philosophical “realism” is the fundamental doctrine of Soviet Philosophy which is, in this respect, close to Aristotelianism and Thomism; nominalism and positivism are their common targets.

[section 4]
When we stated that the Diamat dropped mechanistic materialism, but wanted to retain a more general type of materialism, we presented Dialectical Materialism by its negative characteristics, the abandonment of mechanistic philosophy. We now have to explain, in a positive way, by what type of laws the mechanical laws were replaced. The verbal answer is simply that the most general laws in nature are no longer mechanical, but “dialectical.” But what does this mean? In the realm of mechanistic materialism, physical, biological, and social phenomena should be described, in principle, by one and the same system of general laws, the laws of mechanics. But by changing this requirement, we have three types of laws: the physico-chemical, the biological, and the sociological—each of which is based upon specific experiences in these three fields. If, however, mechanistic philosophy is abandoned, there is no longer a tie between the laws that govern these three domains. The “dialectical law[s?]” introduced by Diamat are valid in all three domains and provide, as mechanistic materialism did, general
principles that are equally valid in the physical, the biological, and the social sciences. Hence, the dialectical laws became the new tie between the natural sciences, the social sciences, and the humanities; they replaced the mechanical basis that was the tie provided by mechanistic materialism.

The Diamat is based upon three dialectical laws: 1. the identity of opposites; 2. the transition from quantity to quality; 3. the negation of negation. For the scientist all these laws seem to be obscure and difficult to grasp, because they use a language which is very different from the language that is actually used in modern science. The best way to make these laws understandable to the scientists is perhaps the historical way. We must understand that the origin of these laws is in the idealistic philosophy of the great German philosopher, Frederick Hegel. [note 10] He started from the assumption that there is an exact correspondence between the system of concepts in the human consciousness and the system of concepts that can be used to describe the physical universe. Empirical philosophy has regarded the concepts present in the human mind as constructed for the deliberate purpose of systematizing the facts of human sense-experience. Hegel's idealistic philosophy, however, assumed that the conceptual system in the human mind can be constructed by logical methods from one fundamental concept without consulting experimental and observational investigations of the physical universe. This means that the conceptual system that underlies physical science can be constructed from a fundamental concept by logical methods. This fundamental concept is, according to Hegel, the "absolute idea," or the "absolute spirit." Since the physical universe consists of mechanical, physical, and organic phenomena, the fundamental concepts by means of which these phenomena are systematized are to be logically deduced from the "absolute spirit." In other words, the concepts of mechanical, physical, and biological science can and must be logically derivable from the fundamental concepts of philosophy, the absolute spirit. W. T. Stace's [note 11] book is perhaps the most lucid presentation of this philosophy. Stace stresses the point that, according to Hegel, the system of the concepts that is used for the scientific description of this physical universe can be logically derived from philosophical concepts, like absolute spirit, that we have in our minds. He writes:

The universe is (according to Hegel) nothing but the content of consciousness.... If we admit this, we are bound to admit also the objectivity of concepts or universals. For then the object is wholly and solely the object as we know it...and we know it only as a complex of universals. If we accept this view, we are committed to an objective idealism. The identity of "knowing" and "being" is, in fact, the basic principle of idealism.

By "content of consciousness" the idealistic philosopher obviously means the system of concepts that has been developed to systematize our common-sense experience. According to Hegel, from these concepts the concepts of science, like physics or biology, can be logically derived directly without requiring actual scientific research in these fields. In other words, the concept[s?] of physics can be derived from the concept[s?] of common-sense experience without making use of physical theorems in the modern sense. Perhaps the most famous example is the way in which Hegel derives the concepts of measurement, one of the fundamental concepts in physical science. [note 12]
Being contains the three grades of quality, quantity, and measurement. Quality is the character identical with “being,” so identical that a thing ceases to be what it is, if it loses its quality. Quantity, on the contrary, is the character external to being and does not affect the thing at all. Thus a horse remains what it is whether it be greater or smaller; and red remains red, whether it be brighter or darker. Measure, the third grade of being, which is the union of the first two, is a qualitative quantity. All things have their measure, i.e., the quantitative terms of their existence; their being so or so great does not matter within certain limits, but when these limits are exceeded by an additional more or less, the things cease to be what they are.

Hegel, however, strongly emphasized the point that the independence of quality from quantity exists only if the quantitative changes remain within certain limits. If these changes exceed these limits, qualitative changes take place, and he gives the following example:

The temperature of water, within certain limits, has no influence upon its liquidity; but with the increase or diminution of temperature of the liquid water there comes a point when this state of cohesion suffers a qualitative change, and water is converted into steam or ice. A quantitative change takes place, apparently without any further significance: but there is something lurking behind, and a seemingly innocent change of quantity acts as a kind of snare to catch hold of the quality.

According to Hegel, it can be deduced from the concept of being that from increasing quantitative changes eventually qualitative changes must result. Since this rule has its roots in the general nature of our concepts, it must be just as true in politics as in physics. As a matter of fact, Hegel writes: “The same principle may be applied in politics, when the constitution of a state has to be regarded as independent of the extent of its territory, the number of its inhabitants, and other quantitative points of the same kind.” He means, of course, that a quantitative increase in territory must eventually result also in qualitative changes, like a change in the constitution. A large state like Germany cannot be qualitatively of the same type as a small state like Switzerland.

The “transition from quantity into quality” was, in the idealistic philosophy of Hegel and his followers, a “dialectical law;” it made a statement about the system of concepts by which the universe is pictured. These dialectical laws are equally valid in physics, biology, and sociology, because all observable phenomena are systematized by the fundamental concepts of human knowledge: being, quality, quantity, measure, etc. In some way these dialectical laws played, in Hegel’s idealism, the same role as the laws of motion in materialistic philosophy. If we assume, as mechanical materialism does, that for all phenomena motion of material bodies is primarily responsible, the laws of motion must be valid, not only in what we call mechanics, but also in all physics, chemistry, biology, and even sociology. Hegel’s dialectical laws replaced, in some ways, Newton’s laws of motion as the theoretical basis that is common to all human knowledge. When it had become clear that Newton’s laws of motion were not fit to account for all observable facts in physics, biology, and sociology, Karl Marx and Frederick Engels gave to Hegel’s idealistic philosophy a “materialistic turn.” [note 13]

These two men regarded all objective reality as “matter” and interpreted Hegel’s dialectical laws as laws about material changes. As described previously, [note 14] the
“dialectical materialism” advanced by Marx and Engels did not attempt to reduce all qualities into quantities, as mechanistic materialism had done. On the contrary, the Diamat insisted that matter can undergo “qualitative changes.” The Hegelian law of the transition from quantity into quality was now interpreted as a law about the behavior of matter: when matter experiences quantitative changes without changes in quality, this will not go on forever. When the quantitative changes are sufficiently large, a sudden qualitative change takes place, a "jump" into a different quality. The most familiar example is the evaporation of water; the quality of liquidity "jumps" at a certain point into the quality of gaseousness. In contrast to the “mechanistic view” the behavior in the liquid state cannot be concluded from the behavior in the gaseous state, and vice versa. Different qualities are governed by different laws; but for every transition into another quality the dialectical law is applicable.

This general validity was particularly important for Marx and Engels when the dialectical laws were applied to the changes in the social and economic structure. In a society based upon private ownership, there can be great quantitative changes when the property owned by single proprietors increases, but the quality of the society (sometimes called capitalistic) remains unchanged. However, when the property belonging to an individual owner becomes larger and larger, according to the dialectical laws there must come a point when the society undergoes a qualitative change and becomes a collectivistic (communistic) society, in which property is no longer owned by individual persons. In this way Marx and Engels predicted the Communist revolution as a qualitative change in the society that has been based on private ownership. The idea of social revolution was linked with the idea of qualitative change in the natural sciences. While it has been obvious that it is not of great value for physics to formulate the law of evaporation as a "jump" from quantity into quality, it is of great value for shaping human behavior to advance a theory according to which the Communist revolution and the evaporation of water appear as two instances of the same general law, the dialectical law of transition from quantity into quality. The great value of such a theory for teaching a certain political behavior becomes clear if one considers that, according to this philosophy of Diamat, the communist society is qualitatively different from the capitalistic society, and no law that had been advanced by the economists and sociologists as valid for a capitalistic society can be applied to a communistic society.

In some ways, the value of a philosophy like dialectical materialism is of a kind similar to that of older metaphysical systems like, for example, Thomism. It will be generally accepted that Thomistic principles like "no body can move unless it is moved by another body," or "all uniformities in nature are due to genuine laws," are not very helpful for the understanding of mechanics, or, for that matter, physics or biology. They are, however, of great value for the demonstration of theological principles, like the existence of God. Since they are, on the other hand, not logically contradictory to any established principle of physical science, it is reasonable to accept the formulation of physical principles that is useful for indoctrination in sound religious and moral behavior.

Mitin, in his textbook on Dialectical Materialism which we have quoted repeatedly, points out that production in the Soviet Union is not only quantitatively larger than in the capitalistic countries, but that it is qualitatively different. He writes: [note 15]
“We have a tempo in the evolution of production that has never existed before, because the USSR represents a new quality in conditions of production.” The author emphasizes explicitly that the new order does not obey the same laws as the old order did. “The quality of a thing is inseparably connected with its very being.... The qualitative determination of a thing manifests itself by the specific laws which it obeys.” [p. 158]

He points out that, particularly, the mechanists deny the possibility of social revolutions and attempt to produce a tight link between the philosophy of science and political philosophy. “The mechanists,” he writes, “deny that qualities possess an objective character. But this denial implies, as a necessary conclusion, the denial of an evolutionary process by jumps.” (p. 162)

It is instructive to learn that Soviet philosophy has one feature in common with a great many physical trends; it also dissaproves the quantitative approach of modern science, and maintains that science has oppressed the most essential trait of nature, quality.

The belief in the practical value of the dialectical laws is so strong in the Soviet Union that practical statesmen and politicians will always attempt to advance their arguments in the form of dialectical laws. Stalin writes, in the History of the Communist Party, which has been the basic text for the indoctrination of party members: [note 16] “Dialectics does not regard evolution as a simple process of growth in which quantitative changes do not lead to qualitative changes, but as a transition from hidden quantitative changes to conspicuous qualitative changes.” Stalin refers here to the fact that, for example, in the evolution of the capitalistic society the changes are at first merely quantitative and remain hidden; but behind these inconspicuous changes other types of change are lurking that manifest themselves eventually as qualitative and conspicuous changes. The start of the social revolution develops inconspicuously within the body of the capitalistic society, and only becomes conspicuous when it has reached a change in quality. This presentation of the social revolution growing up invisibly to the untutored eye and manifesting itself eventually in a hidden jump reminds us vividly of the way in which Hegel presents the origin of qualitative changes, like the evaporation of water. In the same way, according to Marx, the coming change into collective property is lurking behind the appearance of private property[?]

In a recent issue of a Russian popular science magazine, in an article entitled “Mechanists, and the Servants of Imperialism,” we read:

Mechanism strives to explain all natural and social phenomena in terms of the laws of mechanics, denying the qualitative diversity of existence and reducing all differences among objects and processes to quantitative differences. Mechanism obliterates the borders between distinct spheres of natural order, which ought to be investigated by different natural and social sciences. It rejects the most important position of dialectics: the autonomy of matter; discontinuity of development; and the coming into being of new forms.

These objections sound in some ways similar to the requirements of Thomistic metaphysics, and several types of idealistic metaphysics, with their strict dividing line between natural and social sciences.