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HUMANISM AND THE MODERN WORLD

Academician
P. N. FEDOSEYEV

Man as human being is developed by society, and, conversely, man's activity creates and remodels society.

The conception of "man" has been undergoing a series of basic changes in the course of history. If we apply to the history of society modern notions of man it will be easily seen that, as a rule, the idea of man was deliberately restricted throughout history, and big groups of population were denied even the right to be regarded as human beings. There was time when slaves or the lower castes were excluded from the concept of the human race. The adequacy of a human being was determined by sex characteristics and this resulted in the discrimination of women, the suppression and belittling of women's part in social life. The concept of a human being has been frequently restricted on grounds of religious beliefs, and a person of a different religion had been practically denied the inalienable right to be considered human.

Race was claimed to be a decisive criterion of human nature and, as a result, there developed a situation where the representatives of a certain race are persuaded of their alleged superiority over the representatives of another race and where this "theory" is used to justify wholesale annihilation of people, to justify, even in our times, humiliation of man because of dissimilarity in the colour of skin or hair. Up to our days certain scholars publish pseudo-scientific works and with a pretence of seriousness seek to provide grounds for the existence of certain eternal, insuperable racial principles of social inequality.

Such theories are not merely a product of their authors, individual inclinations; they originate owing to definite social conditions, which are responsible for their cultivation.

The principal social foundation of actual limitation of man and the basic social evil is the continued existence of exploitation of man by man, the well-to-do life of a handful of people made possible owing to the uncompensated appropriation of the lion's share of work done by millions of ordinary toilers, to the plunder of complete nations and countries, which are living in a state of colonial or semi-colonial dependence.

The concept of man is a product of the social theory of thinking. The social sphere, just as social theory, has always been an arena of bitter struggle of interests. This might explain the fact that history has seen most ridiculous theoretical distortions and misinterpretations of man's substance and nature, his rights and responsibilities.

Progress of Man and Humanity

The scientific definition of the concept of "man" has been developed in the course of a very long evolution of society and social thinking.

It is known that in the slave-owning society of the Mediterranean the very concept of "man" covered the freemen only. The Greeks considered the slave to be a mere body (soma). Plato, for instance, who created the teaching of the "ideal" slave-owning state, regarded slavery as a natural and immutable phenomenon. He accepted the statement that "slaves are like a type of beasts" (*Laws*, 777 B).

In fact, the Roman canons of law regard as man only the citizen of an antique city (slave is no citizen), or a subject of a sovereign (woman is not subject to taxes), i.e., they proceed from a deliberately limited notion of man. ("Servus nullum caput habet". Gaius Paulus 1.3, § 10. 4 5; § 4 J. I, 16). Roman law did not distinguish between a slave, an animal or a thing. Ulpian: "slave or any other animal" (si servus petitus vel animal aliud — 1, 15, § 3, D. 6, 1). Aquilius's law (approximately 237 B. C.) says that slaves have no legal capacity: "As for civil law, slaves are considered 'nobodies'" (1. 32, D. 50, 17; 1.8 pr. D. 28,8).

The actual limitations of man in the antique world were reflected in similarly limited theoretic notions of man. The concept of "man" was founded on class or tribal (national) characteristics; slaves or foreigners belonging to the so-called "barbaric" peoples were excluded from it. It is known that all these limitations grew more rigid with the aggravation of contradictions within the slave-owning society and with the decrease in the prestige of material, physical labour.

Owing to the crisis of antique slave-owning, there originated a tendency in the stoic and particularly in the new stoic philosophy, to carry the problem into the moral sphere; slavery has been asserted as "a bondage of human passions", alongside the assertion of the natural equality of humans (Seneca, Ep. mor. 5,47). The teachings which were current in that period of upheavals that shook the antique world included ideas of slavery as a product of forces inimical to man, reverses of fortune and the evil elements in man (Petronius, Juvenal and others).

With the downfall of the antique slave-owning society the concept of man ceased being limited to the freemen and fellow-tribesmen. The subsequent philosophical systems, however, inherited many aspects of the antique teachings on slavery, and in particular, the notions of stoic philosophy. Some influence had been gained by the teaching on the two states of the natural order — absolute and relative: if it is impossible to assert in the absolute sense that man is by nature destined to be in servitude, it is perfectly possible to say, in the relative sense, that one person is destined to rule, and another — to submit to his will: "hunc hominem esse servum, absolute considerando... nom habet rationum naturalem, sed solum secundum aliquam utilitatem consequentem..." ("hence, in the absolute sense the natural state does not imply that a man should be a slave, but this is possible though only in persuit of some gain..." (Sum. Theol., II; q. 57, a. 3, ad. 2).

In a number of teachings, slave-owning had been for a long time proclaimed as natural. According to Augustinus (De Civitate Dei, XIX, c. 15) slavery is the product of the original sin and once this is so, the limitations imposed upon man by providence are immutable and everlasting. Aquinas himself had declared, fully in line with his teaching: "slavery among people is natural", "slave is an instrument of his master... The master and his slave are linked by the special rule of supremacy" (De just, q. 57, art. 3 and 4). Many official documents of the church, such

as the rulings of the Grange Cathedral of 358 [1], are formulated along the same lines.

Neither serfs were regarded as human beings. In his well-known book *Customs of Beauvaisis* (*Coutumes de Beauvaisis*) a prominent French lawyer Philipp de Bomanuar (13th century) pointed out: "§ 1452. There are many states of personal bondage (servitudes).... Some of the serfs are dependent on their feudal lords in such a way that the latter can dispose of all their property and have in their power the serfs' life and death,they can keep them imprisoned on their own free will, no matter whether the serfs are guilty or not, and they are responsible to nobody but the God".

With the commencement of the European colonial expansion in the 15th century the limitations of humanism acquired a new form. "The native" in the "discovered" lands was treated in colonial practice as an unequal being. The new form of slavery, in the colonies, had the blessing of the heads of the Catholic Church — Pope Nicholas V, Pope Clement V, and the "theoreticians" of colonial expansion.

Several centuries had passed until slave-owning was condemned and abolished. Though there were separate statements made by heads of the Catholic Church against slave traffic, it was only in 1839 that Pope Gregory XVI had officially denounced it after it had been officially banned by many states. But even more than 100 years later, the Declaration of Human Rights, adopted by the United Nations in 1948, still had to mention slavery, condemning its existence in the 20th century.

Pope John XXIII in his Encyclical "Pacem in Terris" (Peace on Earth) notes among the main phenomena of the present epoch an increasing recognition of human rights for all people. This Encyclical recognizes that for centuries there had been a limitation on the concept of man: complete nations experienced for centuries and milleniums a "sense of humiliation". Racial discrimination can no longer be justified, "at least in theory".

The inequality of people of different estates or classes in the Middle Ages, the many centuries of serfdom led to

[1] "Curse upon him who under the pretext of piety instructs the slave to disobey his master and reject servitude, instead of remaining a servant imbued with zeal and reverence" (Canon 3).

a situation where the humanistic ideas associated with the concept of "man" failed to cover a considerable part of society. Essentially, serfdom was a mitigated form of slavery. With the abolition of serfdom and the onset of the bourgeois epoch the substitution of hired labour for extra economic compulsion was accompanied by a solemn recognition of human rights for all people without exception.

Thus, strictly speaking, the problem of man as such in the general aspect of humanism is rather recent.

The abstract notion of man as such has been developed only during the Renaissance and the subsequent epoch. Theoretically it was expressed in the concept of "Contract social". Its legal formulation has been given in such historic documents as the United States Declaration of Independence of 1776, the French Declaration of Human and Civil Rights of 1789. This constituted a formal proclamation of human rights founded on a concept of man discarding legal, racial or religious barriers.

The main question posed by history for more than a century is the question about ways of ascending from abstract man to concrete man; ways of enabling the entire mass of human beings in all countries to enjoy human rights actually, satisfy and develop their requirements; ways of providing every representative of the human race with safeguards for his personal dignity, life without destructive and predatory wars, without famine, poverty, and diseases.

This is another example of the dialectical law of ascending from the abstract to the concrete. While in cognition, the abstract is developed by way of penetrating into the depths of phenomena,by way of abstracting from specific characteristics, objects, things, and subsequently there occurs, as it were, a reverse course of ascending from the abstract to the concrete in all its diversity, in practice the abstract appears at a definite stage of struggle and resolves into the concrete in the course of this struggle for a real implementation of the ideals, for a radical transformation of life with the aim of attaining man's freedom and happiness.

The problem of man in our days by no means should be reduced to a mere proclamation of the humane principles of freedom of an individual, equality, fraternity: the crux of the matter is in the realisation of these principles.

The first declaration of real humanism was the *Manifesto of the Communist Party* by Karl Marx and Frederick

Engels. This history-making document had for the first time laid down a scientific formulation of the ways of transition to a society where the unhampered development of every individual is the requisite for the free development of all. The first legislative expression of socialist humanism was the "Declaration of Rights of the Toiling and Exploited People" adopted by the Soviet Republic in January 1918.

The problem of transition from merely proclaiming abstract principles of humanism to actual implementation of the humanistic ideals is topical because anti-humanistic social relations continue to persist in a number of countries. Capitalism has failed to resolve the problem of man. The basic evil which imposes limitations on the individuality of man is the exploitation of man by man which is associated with the existence of private ownership.

The legal freedom of a hired worker signifies in fact the right of a few owners of the means of production to purchase manpower freely. The formal proclamation of freedom for a worker signifies the "freedom of choice": either to accept hired slavery, i. e. to work for those who possess the means of production, or to lose the possibility of procuring means of subsistence. There can be no equal opportunities for all members of society while the latter is divided into owners of capital and the mass of people completely dependent upon them economically.

We are aware that the requirement of equality among people, nations, races, far from losing its import, is in our age—the age of the triumphant socialist revolution, of a powerful upswing of the national liberation movement and the downfall of colonialism — the motto of the progressive forces and is worthy of every support and encouragement. The spiritual potentials of every individual, every nation can be no longer refuted by anyone scientifically. Every person born into this world has formally the recognised rights of a representative of the human race — an heir to all the achievements of modern civilisation. Unfortunately, the recognition of this right of every individual does not ensure a real opportunity for every individual to enjoy this status. It is impossible to claim love for mankind and at the same time fail to see that half of the world's population is illiterate. (According to UNESCO data out of 1.6 billion people comprising the adult population of the

world — over 15 years of age — approximately 700 million are illiterate). It is impossible to consider oneself a supporter of the progress of humanity and at the same time fail to observe the upward swing of the toll of human lives, lost in past centuries in wars waged in the interest of the ruling minority: 3 million in the 17th century, 5.5 in the 18th, 16 in the 19th, and approximately 80 million killed and crippled in the 20th century. The anti-humanistic nature of capitalism, among other things, consists in the fact that it engenders wars.

Today this feature has become more dangerous than ever.

It is self-evident that human society has been increasingly successful over the past centuries in mastering the natural forces in developing science and technology. Scepticism towards progress, as a rule, amounts in our days to doubting whether visible technical progress of society is at the same time *the progress of man*? does man benefit from the development of technology or does the latter lead to man's spiritual impoverishment? "The tremendous shocks brought about by the latest technical development", declares E. Spranger, "have upset the emotional state of the people" [1].

It should be noted that such doubts, notwithstanding the subjective motives, reflect in a one-sided and distorted form a really contradictory foundation. The key to the solution of actual contradictions of history is not in the abstract formulation of the problem: technical progress is moral degradation of man, but in a profound study and elimination of the objective *social* contradictions, which in the long run *determine* so unnatural an opposition of man and technology.

More than 100 years ago Marx gave a striking picture of the tragedy of social antagonism in bourgeois society: "In our days everything seems fraught with its opposite. Machinery, gifted with the wonderful power of shortening and fructifying human labour, we behold starvation and overworking. The new fangled sources of wealth, by some strange weird spell, are turned into sources of want. The victories seem bought by the loss of character. At the same pace

[1] *Wo stehen wir heute?* Gütersloh, 1960, S. 22.

that mankind masters nature, man seems to become enslaved to other men or to his own infamy"[1].

A genuinely scientific investigation does not limit itself to a mere statement of fact. Accordingly, marxism-leninism has not only given a characteristic of manifestations of this malady of civilisation, but has uncovered its causes and found the means to remedy it. The counterposing of man to the fruits of his labour (primarily to the working man himself) is an inevitable result of the predominance of private ownership and exploitation of man by man. Therefore, it is no wonder that precisely capitalism, which had given a considerable impetus to the progress of the productive forces, has made so obvious the alienation of the progress of technology, science, culture, from the real makers of all these goods. One cannot fail to see the imperfection of the social system under which the achievements of human wisdom are turned against mankind. Anti-humanism manifests itself with particular force in the fact that the progress of technology is used mainly for military purposes, the products of human toil now turn against man, against the future of his children. The historical mission of socialism is to liquidate these contradictions. Unlike all those who complain of the conflict between the objective progress and the interests of man, noting only the superfluous aspects of the phenomena, and in fact justifying them, restricting themselves to abstract protest without taking the trouble of trying to solve the problem, Marxist humanism clearly perceives *the social basis* of these phenomena and *the practical way of overcoming them.*

This is why we answer the question as to whether there takes place the progress of man or only the progress of man's social "envelope" by giving an explanation of *the social* nature of man and the socio-historical origin of the contradictions of man's development.

It has been historically inevitable that for hundreds and thousands of years the progress of culture, science, technology, the wealth of society occurred through cultural impoverishment of the working masses, through the suppression of the individuality of the actual makers of this progress. Our epoch has for the first time developed the

[1] Karl Marx, *Speech at the Anniversary of the "People's Paper"*.

prerequisites for relegating this contradiction to the dustbin of history, so that, together with entire society, every working person could develop, progress and prosper.

Problem of Man: Ways of Solution

In the process of its advancement mankind has produced and developed a good many noble spiritual, moral values; however, the fundamentally inhuman social conditions had been obstructing their implementation of these values to the good of man. This is why the crucial issue of real humanity is to guarantee all the necessary conditions for the implementation of the principles of humanism. Marxism has posed the question of the individual; the socialist system solves this question in conjunction with the problem of *the liberation of society*, i. e., in a profoundly concrete way.

Our approach to this problem is based on simple and clear principles — there is nothing but nature and the man who applies his effort to transform nature, who creates the concrete body of civilisation from the natural material. Labour is the Father of all wealth, and the Earth is its Mother. This is an undoubted fact noted by many thinkers. It is labour remodelling nature that constitutes the foremost and decisive feature of man — his specific feature which has singled man out of the animal kingdom and turned the ape's paw into the man's hand, capable of turning a block of marble into beautiful statues, of converting deep-lying ore into parts of space rockets and proton synchrotrons.

Having perceived labour as the force responsible for man being a human, Marxism naturally concludes that a genuinely humanistic standpoint could not but give first priority to the problem of conditions of labour. The development of living conditions worthy of man consists above all in changing the conditions of his labour. Indeed, it is precisely the social conditions of labour that determine the degree of man's development as an individual and creator.

Labour has not only created man and has not only been the main criterion of his transition to human state in past history, but still is the basic proof of man's social maturity. Naturally one cannot regard a society as humane if it is ruled by the enslaving social division of labour and if it even fails to provide people with elementary opportunities

for displaying their natural requirements, their human qualities in labour, if it fails to guarantee full employment of the population in socially useful work.

This contradiction between man and the restricted social conditions for the manifestation of man's creative abilities as an individual in socially useful labour is, in the final analysis, a product of private ownership. Indeed, private ownership is not merely an economic category. It determines private ownership to the conditions of man's life and work.

In a society ruled by private property of the means of production, the proclamation of the freedom of an individual inevitably implies only the establishment of conditions for free development of a small number of private owners. Meanwhile, the majority of humanity — the working people—deprived of the means of production and giving their labour for the prosperity of those very owners, have no conditions for their own comprehensive development. Genuine humanism requires the abolition of private ownership to the means of production. To defend the idea of private ownership to the conditions of human advancement means to remain a humanist in the sphere of phraseology only, in the sphere of day-dreams, sometimes beautiful and sincere, but entirely impotent.

The illusive nature of this verbal humanism is due to the objective impossibility of solving the problem by using the means which are responsible for its existence and continuous aggravation. Private ownership underlies the abnormal division of labour and continually alienates the products of labour from their actual producers.

Socialism has abolished private ownership to the means of production and thereby destroyed *the foundation* which creates the anti-humanistic conditions of man's existence, and is *the principal* barrier which prevents the development of every member of society into an individual. Socialism raises every member of society to the status of an an individual, gives millions upon millions of people genuine freedom to develop their talents and abilities, provides all members of society with equal opportunities to work, to exert socially useful energy and to enjoy the fruits of their efforts.

If it may be said so, every member of a socialist household is a master of the commonly owned wealth, of the facilities for his own and society's advancement; thereby he becomes the master of his own destiny.

The truth prompted by entire history is that the perfection of an individual is a function of social perfection. This does not exclude the fact that in keeping with the dialectics the perfection of an individual has a reverse ettect upon the development of society. The pre-eminence of the social does not impose limitations on one's individuality, but constitutes the sole real guarantee of the abvancement of all members of society.

Whoever opposes the idea of collectivism, such a combination of the personal and the social with a predominance of the social interests, denies thereby all members of society, i. e. *everyone*, the right to be an individual. The entire history of societies founded on principles of anti-collectivism shows that the majority of members of such a society act not as individuals but as an impersonal, non-differentiated mass, as a certain pedestal for a few individuals. Humanism is torpedoed from within when the slogan of inviolability of human rights is used as a means of perpetuating the privileges of the minority. The abolition of private ownership, from the point of view of abstract humanism, is identified with violence in general, with suppression of an individual, negation of freedom, etc. In real fact the transition from treating an individual as a free owner to comprehending him as a human being who is a comprehensively developed individual, is the highest stage of humanism. If violence is used as a means of transition to a new society, the essence of this transition is the abolition of violence to an individual.

The representatives of abstract humanism reproach Marxists for supporting the class struggle of the exploited masses against the exploiters, and the national liberation wars of the oppressed peoples against colonialists. By doing so, these humanists reveal that their humanism is passive and essentially ostentatious. Genuine humanism cannot tolerate social oppression, cannot remain neutral in the struggle against overt and covert violence of minority to the majority of the population.

Marxism rejects the theory, according to which violence plays the decisive part in the development of society. Marxism exposes it as anti-scientific and non-humanistic. There is no place for violence in our ideal.

Humane social relations cannot rest on violence, though, on the other hand, they are not a realisation of some mystical absolute freedom. Neither is humanism contradicted by a reasonable limitation of the actions of an individual or a group of individuals for the sake of everybody, the collective, the society. The advocacy of absolute freedom of an individual, disregard of the interests of the masses of people, is in practice nothing but arbitrariness of the minority towards the majority, the imposition of the interests, outlooks and tastes of the wealthy upon the majority of society for whom absolute freedom remains absolute abstraction.

Absolute freedom is empty abstraction. Genuine freedom of *every individual* is possible only as genuine liberation of all, reasonable sharing by a free individual of the interests of entire society, liberated from arbitrariness of the minority.

Humanism which confines itself to the abstract proclamation of the rights of an individual in the conditions of private ownership, exploitation, oppression of dependent nations, is essentially aristocratic in nature as it singles out individuals from the crowd, from masses of people who have no opportunity to display their individuality.

On the strength of all this Communism demands the abolition of private ownership to the facilities of development of supreme human abilities, because private ownership is the foundation on which only the „elite" can devote their life to science and art and improve in these spheres of endeavour while the majority are obliged to engage in physical work only and are for all practical purposes deprived of possibilities to enjoy the achievements of culture.

The progress of society and comprehensive development of man where each child born into this world can freely develop into an individual keeping pace with modern culture in all its decisive spheres — that is the aim of the communist movement.

The democratic approach to the solution of the problem of the rights of an individual implies the liberation and elevation of the masses, the elevation of the individual by liberating the collective, the entire society.

The new stage in the development fo man implies providing each person with actual possibilities for becoming an

individual. In new society, which replaces bourgeois society, all the members of society rather than separate persons figure as individuals; each person, each member of society becomes an individual by overcoming alienation.

It is only along these lines that it is possible to solve the philosophical-sociological problem of "alienation". The problem of "alienation" itself in the theory of Marxism is treated above all primarily as the task of *eliminating alienation*. The solution of this problem consists in the revolutionary transformation of the world, in changing social relations by man and consequently in changing man himself. Only this approach makes it possible to treat the problem in a vigorous way. This problem is more important since it is extremely involved and though it is frequently referred to by Western authors, the latter, essentially speaking, do not comprehend it and distort it.

According to Marx, alienation is not the alienation of the absolute idea as was believed by Hegel, and therefore it is not eliminated through the act of cognition. Alienation is not an ideal and not a supra-historical relation but a concrete, material, historically-*transient*, social relation of production, inseparably linked with the class structure of society and the man — crippling division of labour. Alienation is the alienation of labour, on the basis of private ownership to the means of production; it is the conversion of the social conditions of a class society into an alien force which dominates man, it is the offspring and the reproduction of the relations of non-freedom.

It is the inversion and the perversion of human relations, but a *real* perversion, not an imaginary one, existing only in the imagination of the workers and the capitalists. Alienation of labour becomes extremely acute and aggravated by bourgeois society. This perversion underlies capitalist mode of production, not only its mode of distribution.

No theory, unless it takes this real, socio-economic, not only philosophical, ethical and aesthetical stand, is capable of pointing a way out from the alienation which is characteristic of the bourgeois society. Therefore, both the theological and the existentialist attempts of solving this problem invariably prove futile.

The practicable way of eliminating alienation, and the

most profound expression of genuine humanism consists in abolishing private ownership, in organising communist labour. Communism extracts the individual from the depths of a huge and complex social organism where the working man was just an insignificant pivot, raises very high his dignity and importance and puts an end to the debasement of the individual to a factor in the process of production of private profit. Communist labour is free labour for the benefit of the individuals and society, it is a means of free self-affirmation of man, the unfolding and development of all man's substantive abilities and creative potentialities. Precisely for this reason communist organisation of society implies the fullest and most comprehensive realisation the principle: "*Everything for man, for the benefit of man*".

The new society which replaced capitalism faces great and difficult problems which cannot be resolved by a single act. The matter at issue is a cardinal improvement of labour and life conditions of millions of people, the overcoming of barriers blocking the free development of man which had been put up by the many centuries of history of antagonistic societies.

Every trace of the ugly division of labour should be effaced, physical and mental labour should be brought closer together and merged, and is also necessary to eliminate unskilled arduous labour, so that subsequently all people regard work not merely as a means of subsistence but a paramount requirement of life, a pleasure. The effort of the entire society has to be summoned to abolish urgently substandard conditions of life of a part of the population, improve the living standards of millions of people, erase the traces of actual inequality of women. Struggle is waged for higher standards of education and culture for the entire society, for all previously backward strata of the population, particularly in the countryside and in the formerly undeveloped areas.

One of the difficult tasks of the new society is the overcoming of the left-overs of the private-property psychology and the aftermath of the old society in the sphere of morals. The most important factor in this respect is the alteration of social conditions, the influence of public opinion, persuasion and education. Only in extreme cases society is obliged to resort to punitive measures against the abusers of the interests and rights of citizens for the sake of their

own enrichment, against those who break the laws and the moral standards of socialist society, which forbids profiting at the expense of others.

The up-building of a new society is not an easy undertaking but it is the only possible and correct way of implementing real humanism.

Communism completely eliminates the "cleavage" of an individual, reinstates the wholeness of man. It may well be said that Communism is the supreme flourishing of the human race and of the individual.

A man whose own work enables him to master the world of objects and become a genuine maker of himself and of his culture without falling into any alienation — is a man of a new society.

To dream about the triumph of humanism without proclaiming the socialist remaking of society as the foremost measure of its implementation, as its most general requisite — is tantamount to dreaming about bread without ploughing up the field and sowing the seed.

The problem of "cleavage" cannot be resolved by adaptation to the existing situation. Modern non-Marxist systems are doing their best to resolve the problem of "cleavage", to find the connecting link between the individual and society, a bridge from the individual to society, but they fail in their attempts.

The majority of modern non-Marxist philosophical systems pride themselves in advocating the primacy, the pre-eminence of the individual. However, it always turns out that: 1) this "primacy" is illusory, merely declarative, moreover, it is always bound up with a formulated or implied dependence of the individual upon the supernatural or other forces uncontrolled by man; 2) this "primacy" appears at best as speculative expression of the double "cleavage" actually existing in bourgeois society: the "cleavage" between the individual and society and the "cleavage" within the individual himself[1].

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[1] Historically the "individual-society" problem has passed through three stages. The first stage — the primitive communal system where the individual is merged with the clan, and the individual has not been singled out as such. Actually, the "individual-society" problem is non-existent. At the second stage, with the development of private ownership individuals are progressively singled out

Thus the idea of the primacy of the individual in the general philosophical plane turns paradoxically into the idea of the individual being non-sovereign, for instance, in existentialism and Thomism.

Existentialism depicts man as a solitary, forlorn creature closely resembling a defenceless fly entangled in a web. Thence direct road to the transcendent. This road has been covered by religious existentialism, which perceives the justification of social life in supreme association with God. In this sense this form of existentialism is a natural culmination of existentialism as a whole. A typical illustration is the declaration that "ego" is capable of becoming an individual only through voluntary submission to the "supernatural". Thus, the idea of self-affirmation of an individual turns into its illusory affirmation through the transcendent. A similar conclusion is found in modern Thomism — a philosophical trend which is considered the antipode of existentialism. Notwithstanding its apparent optimism, its idea of "sociality" according to which man is a social and political animal, the affirmation of an individual in this case also occurs through the participation in the transcendent.

The unfoundedness of the views held by the aforementioned philosophical schools on the problem of the individual reveals itself in the inability of solving the dialectical problem of the general and the single, of the whole and part as applied to the "society-individual" relation.

The general is either counterposed to the single externally (the whole to the part) or their relation is conceived as being imported from without. The former we find in the existencialist, "anti-technicist" and other concepts treating society as a result of objectivisation, as an artificial product of technology and civilisation which is by nature mechanical, which is inimical to the individual, depersonalises him and reduces him to a nameless mass. This very existentialism, beginning with Kierkegaard, has been striving to solve the problem of the general and the single but being incapable of comprehending the issue as an integral entity, hesitates between the former and the latter. The matter culminates in the dissolution of an individual in the whole, which is understood either in a theistic or some other way but always absolutely unconcretely. The second approach is Thomism with its conception of a predetermined harmony of the individual and society. However, this artificial bond immediately breaks up into accidental, inexplicable and unrelated elements if we exclude the transcendental. Besides, the main thing in Thomism is the relation of the individual to God, not to society; the individual-God relation parcels into the background the individual-society relation, at any rate reduces it to a secondary factor, deprives the individual of the sovereignty and the social relations of their independent importance.

The cleavage between the individual and society finds expression in the evolution of individualism. While originally beginning with the epoch of Renaissance, individualism was progressive since from the social point of view it was a rebellion against the feudal - hierarchical social structure, which suppressed man, and from the philosophical point of view it was a protest against the stagnating domination of dogma, then today the profoundly pessimistic aspect of individualism attests to the intolerability of any further „cleavage" between man and society and shows that society has reached a stage when it is ripe for achieving harmony with the individual.

Comprehensive Development of Man

Marxists give priority to the objective conditions for solving the problem: the material, the economic conditions of life and development of the individual, regarding them as cardinal, all-determining and decisive.

This, however, does not at all mean that the comprehension and transformation of the „material", directly economic conditions of man's life and activity is an aim in itself for Marxists.

In our understanding, the purpose of theory and practice has always been *Man* — in other words, the development of such conditions within society which would provide ample

from society. All this finds extreme embodiment in the counterposing of individuals to society under modern capitalism. The third stage—liquidation of this alienation and "cleavage" culminating under Communism in the supreme flourishing of the individual, and his full harmony with society.

It is the second stage of this process that finds a striking illustration in modern non-Marxist philosophy.

opportunities *for every* individual to develop all his abilities and potentialities.

Marxism adheres to positions of realism. Precisely for this reason Marxism regards man not as a „spiritual monad", opposed to everything „material", which is viewed as something „inferior" and „unworthy", but above all as a real, living subject, producing material and spiritual values and thereby creating himself.

The „objective conditions" referred to are essentially nothing but products of human activity, the forms and methods of that same activity of man which developed historically in the creative process.

Generally speaking, man deals with nature, merely by drawing it into the orbit of his own activity, turning it into an object, a material, an instrument or a means of his labour. When a natural material is submerged in the „retort of civilisation", functions within it according to its laws, that material, generally speaking, becomes a factor of human life.

Even the stars, which motion is certainly beyond man's control, have begun to play a part in man's life ever since they became an implement of man's work, a means for his work — „the natural" time piece, compass and calendar.

The recognition of the primacy of objective conditions, far from belittling the subject and his activity, brings out his creative and constructive role.

Therefore, it is ridiculous to reproach Marxists for allegedly preferring to speak only of the „objective", „material" factors of human life at the expense of „subjective" factors.

Marxism specifically deals with man, with the „subjective" forms of human existence, the only essential difference being that in Marxist understanding the „subjective" aspect of the problem is not the fancy, illusions or phraseology, which man is capable of creating about himself, but the real, factually and objectively stated forms and ways of human labour, practical activity, transforming the natural material and expressing themselves in it.

The human factors in their true meaning are exactly the factors that Marxism has in mind. Marxism merely refutes the illusion that the problem of spiritual development, moral advancement of individuals comprising mankind may be resolved prior to and independently of a radical re-

shaping the actual conditions of life, which do immeasurably more in the way of educating and moulding man than all the most beautiful moral sermons.

Socialism, while ensuring an accelerated development of economy at an unprecedented pace, creates at the same time conditions for the intellectual development of the individual. In its turn the development of the individual is a powerful factor accelerating social progress. This dialectical interdependence of the objective and the subjective is an immutable law of socialism.

This law determines the continual growth of education and culture in countries of socialism. Thus, to satisfy the mounting intellectual requirements of people in the socialist world books are published in much greater quantities than in all other countries. The current annual rate of world publication of books is 5 billion copies. The average per capita rate is under two copies. As for the Soviet Union, the annual publication is 1,250, 000,000 books, i. e. the annual per capita rate is 6 new books, i. e. three times more than the world per capita rate. The number of books published in the U.S.S.R. is fourfold more than in the USA.

Demand for books is a proof of high intellectual standards of the people. It should be remembered that prerevolutionary Russia was a country with a semi-illiterate population. Now, the U.S.S.R. has implemented general eight-year education, and the transition to general eleven-year education is under way.

Communism ensures a comprehensive development of the individual, an integrated (intellectual, physical, moral, and aesthetic) development of man, the unfolding of all his abilities and talents.

Not infrequently our opponents depict socialism as a domain of all-round levelling. They represent our struggle against social inequality as a struggle for the unification of tastes, abilities and habits. In real fact the elimination of social inequality means precisely the creation of conditions for everybody to enjoy equal opportunities of developing one's individual abilities and talents. We eliminate social inequality, but we realise that people are not equal in their physical and spiritual abilities. We understand equality in the sphere of politics as equal rights, and in the sphere of economics as the abolition of class antagonisms and distinctions. This means that all citizens are

given an equal status in their relation to the means of production, that all citizens enjoy equal opportunities to till commonly-owned land, to work at commonly-owned factories and plants. Marxists have never thought of establishing equality of individuals in the sense of equal physical or spiritual abilities.

It is surprising that even today there are allegations that according to Marxists Communism seeks to eliminate the diversity of abilities and talents. The concepts of scientific socialism in this field had been clearly expressed by V. I. Lenin as far back as half a century ago in the following manner: when Socialists speak of equality, they understand always social equality, the equality of the social standing, and by no means the equality of physical and spiritual abilities of individuals [1].

It is impossible to make a genius out of every person and no one can promise that every child would make a talented artist, scientist or musician. However, supreme humanism consists in bringing social conditions to a stage where, as Marx said, each a potential Raphael should have a possibility to develop and unfold his talent freely.

Communism not only creates the conditions for the development of abilities, but it increases tremendously society's demand for the development of abilities and talents. This is an objective requisite of Communist progress.

Man's spiritual development is tremendously accelerated in a Communist society, which is built in keeping with the philosophy of dialectical materialism. Therefore, it is very strange when certain "interpreters" of Marxist philosophy ascribe to dialectical materialism the principle: "Man is what he eats". In fact this is a non-Marxist, vulgar conception of materialism, which was fundamentally criticised by Marxist philosophy more than a century ago.

Another rather current trend of commonplace thinking and typical even of bourgeois academic philosophers is that Marxist *materialism* interprets man as a natural and sensual thing, and treats all man's actions, ideas, and moral principles as being directly and immediately dependent upon the method and degree of satisfying the natural requirements of the human organism.

According to these narrow-minded concepts, any form of materialism should inevitably culminate in advocating an

[1] V. I. Lenin, *Collected Works*, 4th Russ. ed., vol. 20, p. 128.

unrestrained cult of pleasure, a cult of purely utilitarian consumption of things, biological and pragmatic approach to culture and morals.

Certainly neither in theory nor in practice it is possible to abstract oneself from the fact that man is a part of nature, a sensitive creature, subject to suffering and experiencing the effects of the material world. In order to satisfy his natural requirements, man can't help utilising natural things and objects.

Man, however, is not a biological species only or mainly. By nature, man is a social being, a member of society, and only in society does he reveal his true nature. All his requirements, passions, sentiments, inclinations develop and are satisfied in accordance with definite social and historical conditions, in keeping with the social, moral standards and principles. It is basically alien to Marxist philosophy to consider that the complex and many-sided problem of man's improvement can be resolved simply by increasing the objects of consumption for the satisfaction of natural requirements. Were this a fact, a well-to-do epicure would have to be recognised as an ideal of human perfection.

It is not accidental that certain states which have reached a comparatively high statistical level of per capita production cannot claim to have resolved thereby the problem of comprehensive development of the individual, his freedom and moral purity. Not, far from all is well in these "states of universal prosperity"... Besides the fact that material prosperity is enjoyed by a small minority only, there are a great number of people impoverished by this society. Indeed, even many of those who seem to be enjoying material opportunities for a well-to-do being and advancement are devoid of genuinely *human* sentiments and passions, of genuinely *human* pleasure. Thirst for profit dominates their minds and passions, suppressing noble human intentions. The attitude of man to man among these people is distorted and essentially reduced to the relation of one property owner to another or the relation of the owner of capital to a hired worker.

Certain philosophers believe that man is dominated by his "animal nature", that he is invariably enslaved by sinful inclinations to moral evil and degradation. Such pronouncements do nothing but obscure a major and self-evident fact: the capitalist social system is incapable of

creating conditions for a comprehensive development of the individual. This fact reveals itself with striking force, not only in those countries and at those periods where and when material want is particularly conspicuous. It is also characteristic of the countries and periods marked with indubitable economic achievements and yet in keeping with the paradoxical social law of bourgeois system such achievements lead to poverty amidst plenty.

It is precisely because man is a social being and can develop only in society, adequate conditions of social life are indispensable. A balanced material and spiritual progress calls for a social system where the relations among people are not based on rule and submission, on the principle of dependence, but are based on co-operation and mutual assistance. The new society which has come to replace capitalism is creating for the first time actually equal opportunities for all.

The ideal social system as perceived by our philosophy is one where all people enjoy an equal social status, equal conditions of labour and distribution, equal access to education, equal right to participate in managing social affairs.

Man Today and Destinies of Mankind

At present the problem of *man's responsibility* in human society has acquired a basically new character. The responsibility of man for the destiny of the human race as a whole has become much more immediate. Never before has mankind been overcast by a danger of military catastrophe of such magnitude.

The problem of war and peace is the cardinal problem of our time. The attitude to this problem, both theoretical and practical, is now *the principal criterion of humanism.*

One cannot fail to see that theories are still current which hinder the preservation of peace instead of assisting it. These concepts have a wide range of hues: from the advocacy of war as an element which improves and renews humanity, from the recognition of war as an eternal law of human existence, to pessimistic fatalism, passive submission to the inevitable evil of war.

The concept according to which the causes of wars are inherent in the nature of man, in his natural "pugnacity", "inherent aggressiveness", in the "military instincts" of

man, etc., is anti-humanistic and philosophically unfounded. Still current is the idea of keeping aloof from the problems of peace; under the existing conditions, the latter more often than not turns into actual acceptance and encouragement of the forces of war.

No doubt an ever growing number of Western philosophers begin to feel and understand the enormous danger of a world thermonuclear war and to advocate peace wholeheartedly. This meets the interests and aspirations of nations, corresponds to the humanistic principles, to the traditions of progressive social thinking.

Genuine humanism besides calling for the condemnation of war, presupposes efficient struggle against war menace. The finding of ways to tackle the greatest task of our time presupposes scientific comprehension of the fact that the fatal inevitability of war exists no longer.

While in our epoch the forces of imperialism are still active and spell an unprecedented menace to the world, the present-day reality at the same time brings the people the greatest hope which was unknown in the past. The main support of this hope is the continual increase of the forces of peace, progress and humanism. For the first time in history there exists a social system in the world which has inscribed on its banner and is practically implementing the motto: „Man is a friend, comrade and brother to other man". For the first time in the world, forces have appeared and are growing which are powerful and peace-loving and which are capable of *excluding war for ever from the life of society. For the first time in history these forces are stronger than the forces of war.*

One can be a champion of peace and humanism without being a Communist, but it is impossible to be a real Communist without waging a struggle for peace and social progress, for human life and prosperity. Communists are undoubtedly the most consistent humanists. Communism is real humanism. The philosophy of Communism does not tolerate any forms of anti-humanism, it shall never conclude any ideological truce with them. It calls upon all genuine opponents of war, champions of peace, fighters for the happiness and prosperity of man to unite in the struggle for the common cause.

The conscience of manking cannot reconcile itself with such anti-humanistic forms of people's life as exploi-

tation of man by man, as the oppression of one nation by another. To assume the responsibility of man in our days means to wage a struggle against all forms of social oppression, against economic and political subjugation, against diverse manifestations of colonialism.

Genuine humanism is inseparable from supporting modern progressive social movements, profound and ripe revolutionary developments, the liberation struggle of nations.

It is an urgent task of philosophy and social sciences to facilitate the detection and study of conditions and factors of social progress, to instil confidence in people that future is bringing them the triumph of peace and humanism.

A philosopher who is seeking a wise answer to the questions which disturb mankind cannot stand aloof from the problem of war and peace, particularly today when the menace of the most destructive war — a global thermonuclear war — is so real. We do not approve of those philosophers and politicians who are discussing the admissibility of application of some or other types of atomic or thermonuclear weapons. From the standpoint of humanism the discussion should concern complete and general disarmament, complete banning of nuclear weapons.

The wery atmosphere of war preparations, the raging of militarism are restricting the creative potency of human mind, silences the human elements in a man, turns man into a blind instrument of forces inimical to social progress, thereby holding up the progress of civilization.

Participation in the struggle for social progress, for the triumph of the principles of peace and friendship among nations facilitates the development of the individual and of everything lofty and human in man.

The first and foremost responsibility of the philosopher in the modern world is the responsibility for the present and future of man.

Philosophy cannot but consider as its main problems those which are the main problems for mankind. Philosophy should use a simple and common human language because it is only natural that human problems which bestir every man's mind should be the main problems of philosophy.

MAN AS AN OBJECT OF PHILOSOPHICAL INVESTIGATIONS

Academician
M. B. MITIN

I should like to start by expressing a great satisfaction with the fact that one of the main questions to be discussed at the 13th World Philosophy Congress is the problem of man, the problem which is very old and at the same time always very new.

Since ancient times man, his essence, his existence, his aims and actions, his past and future have been a subject of close attention of philosophers. "Man alone has succeeded in impressing his stamp on nature, not only by shifting plant and animal species from one place to another but also by so altering the aspect and climate of his dwelling place, and even the plants and animals themselves, that the consequences of his activity can disappear only with the general extinction of the terrestrial globe". (K. Marx and F. Engels, *Works*, Vol. 20, p. 357.)

Man has not only left an imprint on his environment, he has also developed himself both physically and spiritually. He has created history, rich in events and full of dramatic episodes, splendid culture, civilization, science, which has fundamentally changed his life conditions. All creations of man, his ascent into space, his material and spiritual culture — all these are amazing achievements of man. At the present stage of development when man has occupied such a prominent position in the world that he has never possessed before, and when all his achievements are exposed to an unprecedented danger of annihilation — we must admit that the main question of this World Philosophy Congress is extremely important and significant.

A wide discussion of the problem of man at such a

representative congress which has gathered outstanding philosophers from all over the world is sure to yield good results and contribute to the further development of the philosophical science, as far as its notion of man's essence, his aims and tasks are concerned.

* * *

Throughout the whole course of history all the aspects of philosophy: gnosiological, ontological, ethical, anthropological, and social ones dealt with investigation of man.

Even ancient Indian and Chinese philosophers brought forth in their philosophical discussions on the being of man some doctrines on the origin of man. They held that man was not the creation of gods, but originated from material substances: water, air, fire, etc. They denied an existence of non-material soul separable from the body. These doctrines did not pay sufficient attention to the spiritual aspect of man; they,however, attached much importance to problems of ethics, and correlation of man's soul and body.

In the world outlook of ancient Greeks, man becomes the centre of philosophical meditations. Socrates, Plato, and Aristotle elevated the investigation of man's nature, aims and tasks to a more important place.

Socrates maintained that spiritual aspect of man, his spiritual "Ego" is the subject of philosophy. The main role in Socrates's philosophy is allotted to ethics. The fundamental principle of Socrates's ethics is that morals are the innate property of the best few, of a social élite. This theory was a strongly pronounced aristocratic character. It constituted a theoretical basis of the ruling élite of the society of his day. The real centre for Socrates's philosophy was man, his spiritual and moral backgrounds. He maintained that philosophy of nature is not only superfluous but even dangerous. Socrates held that evidence of truth lies in man himself. Socrates did not consider theology to be independent, he used it only as a proof for his ethical principles. The main feature of Socrates's ethics is that he identified moral good with knowledge and reduced various virtues (wisdom, courage, temperance, justice — the four main virtues of ancient Greek thought) to the basic virtue, viz., *wisdom*. All these statements are characteristic of Greek rationalistic thought, which appreciated man's wisdom most of all.

Plato greatly concerned himself with the philosophy of man. His ethics was based on objective-idealistic world outlook. He, too, developed an aristocratic theory of morality. Plato held that moral life in its highest manifestation is a distinctive feature of the best few — aristocrates — slave-owners only. He was of the opinion that the masses of people (demos) possessed morals only in their negative meaning, that is to say, the morals of submission (virtue of sense, according to Plato's terminology). Plato did not treat slaves as men and did not think that they were able to live a moral life. The foundation of Plato's ethics is his doctrine of the tripartite division of the soul into reasonable, volitional and sensitive. Mind constitutes the basis of the main virtue, viz., wisdom. Will is the basis of courage. The basis of the third virtue, which is sense, is the ability to overcome sensuality. Harmonious interaction of the three virtues — wisdom, courage and sense — forms the fourth virtue — justice. Plato was keenly interested in human society. He wished to counteract evil, to correct secular injustice, avoid calamities. He failed, however, in moral perfection of man's nature by means of his spiritual revival. That's why he undertook to tackle the problem of reforming the social relations. This was analysed in his doctrine on state. Plato held "an ideal state" headed by aristocratic slave-owning nobility to be an embodiment of virtue and justice.

Much attention to a study of man is paid by Aristotle, the most prominent thinker of ancient Greek society. He considers the problems of ethics in connection with social life; this was a large stride forward in development of philosophical studies of man. According to Aristotle, ethics was a teaching of morals of man whom he regarded to be a social being — "a political animal". Though Aristotle's teaching of man was an advance over that of his predecessors he, too, was an ideologist of the slave-owning system.

In Modern Philosophy, one of the first thinkers which studied man was Francis Bacon. In contradistinction to the medieval scholasticists, Bacon considered man to be a corporeal creature. He created a theory of material "feeling soul" of man. This was, in a way, a materialist antipode of an "eternal" immortal soul of man advocated by religion.

Réné Descartes, an outstanding representative of rationalistic philosophy, maintained that man is a combination

of two kinds of substance: material substance, which forms a mechanism of man's body, and spiritual one, forming a rational soul of man. Descartes analysed life phenomena from the materialist-mechanistic viewpoint conceiving a body structure of animals and men to be a kind of mechanism He held, however, that there is an essential difference between man and animal. This difference is in that psychical functions of animals are response reactions of their body to external coercion whereas psychical life of man is a manifestation of the activity of his spiritual substance inherent in him. This resulted in insurmountable dualism of Descartes's philosophy and its some unscientific, idealist conclusions.

Immanuel Kant paid much attention to the problem of man. He created in his philosophy his own system of ethics. Kantian ethics was based on such abstract artificial prinlciples as notorious Categorical Imperative, a universal moral law, the freedom of the will, the immortality of the soul, the existence of God, etc. Kantian ethics was marked by an abstract features, non-inherent in real, living men, and was an ethics which countervailed man and was divorced from life. It looked like standard rules for man's conduct. The rigoristic moral of Kant was an outcome of conditions of development existing in Germany at that time. An abstract form of Kantian ethics contained moral norms which were actually aimed at teaching people to be patient and humble during their present life and hope for a reward in a life beyond, after death.

The essence of Kantian ethics was revealed by K. Marx and F. Engels who wrote in *The German Ideology*: "Kant rested content with 'good will' alone even if it remains without any results, he transferred realization of this good will, harmony between it and necessities and inclinations of an individual into the beyond" (K. Marx and F. Engels, *Works*, Vol. 3, p. 182).

Kant's views on war and peace should be treated as a positive part of his teaching on man. In his work *Zum ewigen Frieden* Kant criticized war adventures of the rulers and suggested an idea that peace between peoples should be established. He pointed out that war can lead to everlasting peace "only on gigantic cemetery for humanity" and urged people to strive for universal peace by means of agreement.He also expounded the conditions to be included in this agreement. He suggested an idea that "permanent armies would disappear in time" (I. Kant, *Zum ewigen Frieden*, Leipzig, 1954, S. 33).

A part of Hegelian philosophical system is his teaching on individual and social life of man which is called *Philosophy of Mind*. Though this teaching is mistified in its form, it contains many valuable dialectical ideas of historical development of social life.

According to Hegel, the essence of man is "mind". An individual man is "subjective mind". Hegel maintained that he who possesses spirit rises over biological nature and above his natural environment. Man has to continuosly confirm his superiority over nature, over and again realize it by his activity.

The fundamentals of Hegelian theory on man are practically within the confines of the two following ideas: 1) due to labour, in which thought is objectived, man develops into a self-conscious spiritual being; 2) liberation of man is possible only by spiritualizing his whole activity by means of religion, art, philosophy, but above all through the media of state. Engels pointed out that the achievements of Hegelian philosophy in the field of the analysis of man and society lay in the fact that Hegel "for the first time represented the whole world — natural, historical, intellectual—as a process, i. e., in constant motion, change, transformation, development; and the attempt is made to trace out the internal connection that makes a continuous whole of all this movement and development. From this point of view the history of mankind no longer appeared as a wild whirl of senseless deeds of violence, all equally condemnable at the judgement-seat of mature philosophic reason and which are best forgotten as quickly as possible, but as the process of evolution of man himself. It was now the task of the intellect to follow the gradual march of this process through all its devious ways, and to trace out the inner law running through all its apparently accidental phenomena" (K. Marx and F. Engels, *Selected Works*, 1955, Vol. II, p. 123).

In *Phenomenology of Mind* Hegel raised the question of the attitudes of the subject towards the object in the process of cognition of nature by men. He also developed a teaching on the phenomena of mind and forms of development of spirit. But he did all this in an idealistic, perverted form.

In connection with this K. Marx says that *Phenomenology of Mind* is a genuine source and mistery of Hegelian philosophy (See K. Marx and F. Engels, *Works*, Vol. III, 1929, p. 634).

The importance of Hegel's "*Phenomenology of Mind*" is in the fact that in it Hegel expressed his brilliant conjecture of logical and historical phenomena as forming a unity, and treated consciousness in the process of its development. "Hegel's *Phenomenology*, in spite of its speculative original sin, gives in many instances the elements of a true description of human relations..." (K. Marx and F. Engels, *Works*, Vol. II, p. 21).

But Hegel's system as a whole, however, is conservative. His philosophy contains an erroneous view that German constitutional monarchy, which was closely connected with feudal relations and rested on religious ideology, wasa system of a rational standard of social relations, which resulted from French revolution. Hegel claims the conventional standard conceptions of feudal society [Christian outlook on man] as his own, but estranged conceptions of bourgeois society. In other words, Hegel makes an attempt to represent the semi feudal German state organisation with its theological doctrine of man as the highest truth of bourgeois society holding the idea of "rational egoism" which has already started developing. Hegelian pure Absolute is *God*, whom he regards a *regulative standard of bourgeois bureaucracy*.

Right-wing Hegelians were very outspoken in expressing this outlook. They turned the Hegelian doctrine of Absolute into a new system of official Christian morals, adapted for regulating the conduct of man, who is already inwardly prompted by his abstract *bourgeois* interest. Young Hegelians *turn* the standard system of theologists inside out: they hold a contrary opinion on the Hegelian idea of the Prussian state organisation as a system introducing order and stability into the relations of people in "civil (bourgeois) society". They regard German regime as a self-fettering "natural", i. e., bourgeois order.

This main motif can be found against the background of the whole of philosophy of Young Hegelians when they criticize religion. As is known, the ultimate conclusion drawn by Feuerbach in *The Essence of Christianity* is that German theology is a system of concealing a genuine mystery of Christianity—love of "natural man" for his own self. In distinction to French enlighteners, who searched for a definition of a "natural man" beyond the predominant system of consciousness, Feuerbach tries to find these definitions exactly on the way of preparing, anatomical dissection of official theological and Christian spirit. "I wrote this book precisely as a spiritual investigator". Feuerbach writes in the preface to the second edition of the *Essence of Christianity* (L. Feuerbch, *Selected Works*, Vol. II, M., 1955, p. 18). And in some other place he gives a more exact definition, proclaiming theology as "psychopathology" of genuine religion, and himself a doctor who strives to cure Christianity of theological disease. Feuerbach regards himself to be a thinker, who pursues "*therapeutic*, or *practical* object" (ibid., p. 11), removing rational and moral censorship from Christianity and allowing religion to reveal its own "mystery" (the latter proves to be a "natural moral of a natural man").

"Speculation" Feuerbach writes, "makes religion say only what it has invented itself and expressed much better than religion.... I give the religion an opportunity of *having its own say*. I play a part of a listener, translator and not that of a prompter. It is not me but religion that worships man, though it, or to be more exact, theology, denies it" (ibid., p. 19).

The above makes it quite clear what these methods could really mean. In Germany, Christianity, theological in form, constituted a tool in the system of standard regulation, stabilisation, restriction of bourgeois relations which developed spontaneously. Restoring feudal superstructure official philosophy and theology (treatment of Christian dogmatism, history of Christianity and, above all, Christian morality) did its best to give it antibourgeois character, to make it an *alternative* of the instructive ideology of "natural man". Owing to this, Christianity, theological in form, changed itself into a *distorting mirror* of early-bourgeois conceptions: its "interactions" and "maxims" concealed a ghost of a "natural man". Accordingly, the remaking to which Christian tradition and history of Christianity were subjected in the hands of theologists was aimed at anti-bourgeois modernisation of the past. That is why as soon as former Christian views (especially those of early Christianity) and their theological modification

were made to confront with each other, they began to speak a language which was completely unnatural to them. "It is not me", writes Feuerbach, "but religion itself that rejects and denies such god who is not a man but only rational essence... I only exposed the mystery of Christian religion, tore the contradictory and false mask of theology off it... (ibid., p. 20). While Christ of theologists speaks inconsistently the language of pietist Schleiermacher, historical Christ of Strauss and Feuerbach should inevitably have spoken in the way Rousseau could have spoken had he been tongue-tied. Thus Young Hegelians simply turn theological illusions inside out. Practically they stick to the thesis, which was frankly formulated by Nietzsche half a century later on: "Everything that theologist senses to be true, should be treated as false: this is almost a criterion of truth" (cited from *F. Nietzsche* by Rogachev, p. 381).

So Feuerbach was a father of genuine anthropological philosophy. Man is considered by him to be the main basis of philosophy. He urged: "Contemplate nature, contemplate man! Here, before your eyes, you have mysteries of philosophy" (L. Feuerbach, *Selected Works*, Vol. I, M., p. 129).

Anthropological philosophy of Feuerbach treats the essence of man as unity differing, thus, from idealists who either identify the essence of man and thinking, or bisect it into spiritual and corporeal parts, which are alleged to be in conflict. Feuerbach continuously lays a special emphasis on the unity and integrity of man's nature. He maintained that man is a corporeal, physical being with a distinctive ability for contemplating the surrounding world and thinking.

Anthropological principle of Feuerbach's philosophy has eliminated the gap between the corporeal and spiritual aspects of man.

Feuerbach taught that man's body is a part of the world which is objectively real, the body constitutes a real foundation of man's unity. In his opinion, man alongside with Nature is a true and the most important object for a philosophical analysis. "Modern philosophy", he wrote, "makes man, including Nature as his basis, to a unique, universal and the highest object of philosophy, and, thus, anthropology, included physiology become a universal science" (ibid., p. 202).

Feuerbach criticized religion, especially Christian religion, from the position of his anthropological philosophy.

His book *The Essence of Christianity* enjoys a universal popularity. Engels wrote that it really "emancipated" the minds of the advanced representatives of the German intellectuals of that time.

Feuerbach's ethics was based on anthropology. Feuerbach set off against sanctimonious and ascetic religious morals the ethic teaching which claimed that all the actions of man are based on his desire of happiness, satisfaction of his needs; man strives for good and avoids evil. Feuerbach admitted that such morality is egoistic but he said that "that is wholesome, common, straight-forward and honest morality, morality which is human and penetrates man's body and blood, and not fantastic, hypocritical morality which is sacred only in appearance" (L. Feuerbach, *Selected Philosophical Works*, Vol. I, p. 624). Proceeding from the anthropological principle Feuerbach held that morality is based on love of one man for another. That is why he pointed out that a genuine human morality"... does not know any man's happiness without another man's happiness, does not know or does not want any isolated happiness which is detached from and independent of other people's happiness... it knows only friendly common happiness" (ibid., p. 624).

However, no matter how much Feuerbach loved man, his ethics was of an abstract character as it proceeded from "man" in general whose "nature" never changes, and not a concrete, historical, social man who belongs to a certain social class as is the case in real life.

This main fault of Feuerbachian anthropology and ethics was revealed by K. Marx and F. Engels. When estimating Feuerbach's ethics, F. Engels stressed that "it is designed to suit all periods, all peoples and all conditions and precisely for that reason it is never and nowhere applied" (K. Marx and F. Engels, *Selected Works*, Vol. II, p. 365).

Feuerbach's man, as Engels emphasizes, "...remains always the same abstract man who occupied the field in the philosophy of religion. For this man is not born of woman; he issues, as from the god of the monotheistic religions" (K. Marx and F. Engels, *Works*, Vol. 21, p. 295).

Feuerbach's man is an idea of God, which became a natural imperative in inter-personal relations, a simple standard of community, a link in every-day collectivity of relations between people. Engels says that Feuerbach focuses his attention on human relations "based on reciprocal incli-

nation between human beings, such as sex love, friendship, compassion, self-sacrifice, etc." (ibid., p. 293). According to the above, Engels gave two characteristics: (1) on origin of Feuerbach's "natural man" from religion (and not that of religion from "natural man" as Feuerbach himself believed), and (2) on reduction of all religious norms to norms of every-day community. These two characteristics already contain a complete definition of what anthropologism is like.

Arthur Schopenhauer gave in his philosophy a very subjective voluntaristic view on man which reflected reactionary attitudes of mind of most conservative circles from among German bourgeoisie. According to Schopenhauer, a human society is but an aggregation of individuals, the bulk of whom never changes. He disdainfully called the society a human herd. A human herd serves a foundation over which a "genius" rises. The "genius" lives at the expense of this herd like a head which lives at the expense of its body. In the ranks of "genii" according to Schopenhauer are people endowed with "creative" will as well as manufacturers, commercial people, etc. This characterizes clearly enough not only his viewpoint on man but also his philosophy as a whole.

Schopenhauer treated man as a vicious beast possessed by violent passions, which he is never able to satisfy, overpowered by gready desire of existence for existence's sake. Man differs from other animals in Schopenhauer's opinion, only in that he is still more vicious and envious. Life, according to Schopenhauer, is an existence full of suffering, torture and misery, whereas man himself is but an actor of a tragicomedy whose name is life.

Schopenhauer's ethics is based on the principles of voluntarism and irrationalism. Since the world is governed by blind, reckless, irrational will, man is powerless to change anything. He is compelled to meekly drag his existence full of suffering and misery, he must not think of or strive for better future; instead, he should indulge in pure contemplation and not think of how to satisfy his barest necessities. Thus, Schopengauer's ethics arrived at conclusions which are peculiar to any religion, especially so to Buddhism. Schopenhauer's view on man and society are profoundly misanthropic. His philosophy is anti-humanist.

Still more hateful and contemptuous with regard to man is the philosophical teaching of Friedrich Nietzsche, that

spiritual precursor of Hitler. Substituting for mind instinct and intuition Nietzsche proclaimed the only motive power of nature, society and human activity to be "grasping desire for manifestation of power or employment of power, making use of it as a creative instinct" (F. Nietzsche, *Works*, Vol. IX, M. 1910, p. 298). He regarded the striving for rule as "cosmic regular", as the basic law of any life, social life including, and, consequently, he justified exploitation and suppression as phenomena arising from the very essence of life. Such was the principles on which he based his ethics — "morals of lords", which was permeated with racism and beastly chauvinism. An ideal man of Nietzsche is a barbarian of an Aryan origin, a representative of a "selected" class and race, who march along the earth devastating it and spreading terror over all the peoples, especially over those who withstand and resist their will for rule. This moral of "lords' race" was used as an attempt to "theoretically justify" wars for world supremacy waged by German monopolistic capital.

No less reactionary or anti-humanistic were statements of Oswald Spengler in the 1920s. He prophesied: "Man is a beast. I shall always keep repeating it..." (Oswald Spengler, *The Return of the Caesars*, American Mercury, Vol. 31, p. 137).

If we turn to modern western philosophy we shall see that existentialism deals with the problem of human person more than any other trend.

"My philosophy starts where the problem of man's being begins and finishes where this problem expires", says Karl Jaspers in his work *Philosophy*. This is no doubt a statement of an adherent of an anthropological principle, for he maintains that man is not *one of* the problems of philosophy but he is its *only* problem.

Existentialism, thus, is likely to stick more steadily than any other philosophical trend to the principle which is characteristic of general features of an anthropological treatment of man. At the same time, existentialism, as will be seen later, clearly manifests the crisis, the desperate situation in which anthropologism usually finds itself.

Existentialism is in fact criticism on "social nature" of human existence as understood by modern Western sociology. "Social nature" on an individual, according to modern Western sociologists, is conformity of his con-

duct with the *values* prevailing in the society. Man is treated as a simple *aggregate* of roles (i.e., functions of an individual which became standard and stable in the social opinion). Man is social inasmuch his activity corresponds to patterns which already exist in an official consciousness, to model family man, good chap, honest worker, etc. It is through playing these roles, assigned to him in exactly the same way as a part in a written play is assigned to an actor, that an individual finds himself socially connected with other people. An individual himself is only a point where many roles cross or many models, which he represents well or badly, intersect.

The existentialists fight against this "sociological" definition of a man using the same methods which Feuerbach and Stirner applied in fighting against the theological version of "social" nature of man. They argue that man is not a total sum of the parts played by him, he is something which is whole in itself. Man can feel this wholeness in any act of self-consciousness by differing himself as simple "is" from what he appears to himself and to another man as "a social being" — from his role. True, in reflection we can discern us from ourselves as much as we please. Even a glass, be it self-conscious, could discern itself from a glass as a drinking vessel as it is one of its possible definitions. But — what is, in fact, the difference between a glass and a drinking vessel when it is used as a drinking vessel?

Existentialism also fails to give a clear answer to the same problem. According to all the rules of anthropologism, a reference to man "as he is", as opposed to what he is in society, should have meant natural definitiveness of man. But existentialism denies natural definitiveness of man. Is it possible that it deserts anthropologism in general and passes over — to counterbalance a conception of "standard order" — to discussion of social being of man in terms of his material relations in production? By no means so. A simple fact that material relations constantly and objectively differ man from those "roles" in which alone he appears to the consciousness of the bourgeois society as a social being, that very fact that man who only yesterday realized himself and was realized by the society as a "good trade unionist", "accurate taxpayer", "member of a charity sociey", etc., today — as a result of an economic slump, which turns upside down all models, roles, expectations

of a "standard order" — comes to comprehend his real being as that of a hired worker — this fact always remains beyond the field of vision of existentialists.

In contradistinction to earlier forms of anthropologism in which natural self-consciousness of man is associated with this sense of full life (Feuerbach, Wagner, even Nietzsche) existentialism, especially its German variety, holds that real natural being of man can be revealed only when illness or death breaks into it.

Speculations of illness occupies a very prominent place in Jasper's philosophy. A healthy man is sure to be a social busy man who has no spare time for realizing himself as he is, "blind with respect of his real "self", devoted exclusively to performing his "roles". Jaspers attributes great value to illness because it stops man's usual (conformist) conceptions of life, changes him into a non-social being (in other words, into an anthropological individual) and gives him for the first time a chance to "collect himself", "regain consciousness", see himself "as he is" (as existentia). We can see in these conceptions one of the illusions of anthropologism which is constantly repeated elsewhere: anti-standard (anti-theological, anti-social) consciousness is directly genuine consciousness. In fact illness does not endow an individual man with new consciousness, it only tones him up in a certain way, makes his usual conceptions move, acute, transforms them from "optimistic" modus into a tragic one.

Jaspers's assumption that illness makes our idea of life clearer and more intensive is illusive from beginning to end. The real essence of such an idea of life and health which arises as a result of illness can be derived from Nietzsche's superman with his peculiar brutality and his cult of cruelty.

In general, the same may be also said about the problem of death to which existentialism attaches especially great importance. According to Jaspers when man faces death, all the codes become wrecked, man clears himself from his social conditions, from the ideas of his own self, of his vital aims, of the nature of human community, which had been inculcated upon him.

No one knows what the dead thought before their death. As far as the expressions of consciousness and self-consciousness observed are concerned, dying as a form of conduct opens neither more nor less human possibilities than a usual

life. Never has anyone succeeded in detecting in a dying man any feelings that could not be veryfied as social ones.

The suppositions that on the threshold of death all the codes come to a ruin is quite absurd. Realistic literature has long ago stated the fact that the way of expectation of death, sufferings caused by such an expectation, the idea of death itself are a psychologically performed picture of the life the man lived through.

The same conceptions of illness, death, fear are also distinctive features of Heidegger's doctrine. According to Heidegger, man was thrown into the world where fear became the main situation of his existence. Again and again fear drives him from his everyday existence without a distinctive personality to his deepest "own-self". Heidegger maintains that man is "a final sinful being, closed between his birth and death, who is riveted by the rush to death" to the fulfilment of his most human possibilities, whose existence is "existence for death's sake...". (Hübscher. Thinkers of Our Time, 1962). Thus "Ego" of existential philosophy is an "abandoned being", a being in des pair, a being in grief, who is in a state of pessimism and hopelessness.

The French variety of existentialism is chiefly represented by Sartre and his disciples who adhere to all basic postulates of existentialism in general: subjective "Ego" of an individual marked by his anti-social trend, concentration on inward spiritual emotional experience of the subject, on the so-called "free choice", etc. But while the German variety of existentialism, presented by Jaspers, Heidegger, Bollnow and others, arrives at reactionary, anti-communist conclusions, and finally at a philosophical justifying of thermonuclear catastrophe of mankind, the French variety, of "philosophy of existence" presented by Sartre, vice versa, comes to a humanistic denial of war, struggle for peace, high estimation of Marxist philosophy, admitting that Marxism is a good ideological climate for development of philosophical thinking. Sartre holds that Marxism explains society correctly but it should be "supplemented" by philosophy of existence which is alleged to be the only correct interpretation of the subject, personality, his existence and essence.

Existentialism, on the whole, as a philosophical trend, at its point of departure and its conclusions, is a profoundly

pessimistic, irrational, nihilistic philosophy which leads to denying ideals, real judgements, possibilities and results of human activity.

One can't help classifying this philosophy other than one of despair, testifying of deep internal spiritual crisis of the present-day Western society.

The above brief historical survey shows that the problem of man received a many-sided investigation in philosophy — it was studied from all viewpoints, viz., gnosiology, ontology, ethics, anthropology. The afore mentioned teachings contributed to clearing up physical and spiritual nature of man, interrelation of material and spiritual aspects of an individual, ethical principles of his conduct.

However, this or that one - sidedness due to both social causes and theoretical refusal of materialistic outlook on social life prevented these teachings from dealing with the problem of man within the whole scope of it, they failed to show the true place and part of man in the world. While correctly defining and demonstrating many of the aspects of man's nature and activity, spiritual elements of his life they did not cope with revealing the true social base of man, his nature as a social being, social conditionality of his personality, character and conduct.

* * *

Marxist philosophy revolutionised the views on man and human society. Marxism-leninism has brought forth an essentially new viewpoint as regards man.

As the basis for a scientific solution of the problem of man and society, Marxists have taken the theory of historical materialism, which teaches that a society is a social body based on material production, governed by its own peculiar laws. Marxist philosophy with its consistent materialistic gnosiology, social and historical analysis is truly scientific philosophical interpretation of man.

Marx and Engels show that the so-called natural and eternal necessities of man which are taken as a criterion for estimating both the existing social relations and future social development by any anthropological conception, are in fact always a product of the existing level of development of production of material relations which already exist. Marxism determined the rational content of early bourgeois

conceptions: an idea that a universality of man, his essence is not something which is super-human or belonging to the beyond. However, Marxism made a decisive protest against an attempt of representing the essence of man as passive "suffering", "feeling" according to Feuerbach) source and found out a real definition of man in his object-practical *activity*.

Man, by no means, is an applicant who approaches the society with a list of his "eternal and natural necessities" which are always a mirror of his miserable state, nullity to which the existing social order drove him. Man does not need philanthropy. He himself is able to be a master of his own destiny and is capable of working miracles, of setting in motion gigantic powers if his labour and creative energy are released. The conception of the existing society as a system for usurpation of man's natural inclinations is substituted by Marx and Engels by a scientific notion of exploiting labour and connected their humanism with a demand to annihilate this exploitation. Marx and Engels emphasized that if we assume as a premise for conception on man his "nature" we shall willy-nilly take for a premise the existence which masses of people drag in the society of exploitation of man by man. It is the analysis of the objective process with the help of which man distinguishes himself from nature, viz., analysis of labour, and material production that should be taken as a premise for the concept on man and the starting point for the true humanism.

Marxism has put an end to a sentimental idea of man kind as a passive suffering mass. It went much more deeply into the epoch's paradoxes. The source of the existing calamities is in the fact that though man is potentially almighty, his own active forces and means of labour and many-sided social links brought to life by him during the process of labour oppose him as alien forces. Poverty and unfair treatment of masses had been vividly and eloquently described by many thinkers before Marx and Engels, but it was Marxism that proved able to detect a great reserved power and constructive source of historical process.

The internal powers of productive forces created by man exceed by far everything that could be enlisted as man's existing "natural" necessities. Tools and forms of social combination of labour created for producing this or that particular item contain much more possibilities than those

needful for making this kind of product. It was Hegel who has already written: "A plough is much more honourable than a seed which is produced with its help". When making notes of Hegel's *Logic* Lenin described this idea as a germ of historical materialism.

Release of all internal powers of material production, complete development of active creative forces of man — such is the only real base on which diversity of an individual and rich demands and inclinations of man can flourish.

Humanistic conception, which was eleborated by Marx and Engels in the 1840s and got the name of "real humanism", was no longer the expression of ideals of passive and suffering masses of people, as it was the case with the previous socialist, some bourgeois and radical doctrines. This conception made man-creator, man-labourer the real centre of their philosophy, and its adherents investigated in the first place the problem how to release his active, creative and constructive abilities. It did not treat a future man as something already ready-made, given by nature, that can be found within the existing society, isolated, kept apart from the society and made a model for the future historic development. To reason so was to make unfortune and mutilateness of the existing individual a criterion for progress. Transition from present to future is the process governed by objective regularity. It is only within this process, participating in an active struggle for reconstruction of the world that this man can come into existence. Anthropologic philosophy has thoughtlessly turned this man into a natural premise of history. Marx and Engels maintained that personality, his consciousness, an intimate structure of his "Ego" could be understood only when they are indissolubly connected with a specific social and historic process of decay of an old social structure and springing up of a new one. Thus, they overcame the conception that human essence is abstract, timeless and "natural". For the first time the question of an active historical action of masses of people was raised and this turned out to be a discovery of real foundation of which alone can facilitate the correct understanding of the problem of individual and personal freedom, a problem of all-round development of man.

The outset of marxist human philosophy was a live, concrete man, living and acting in a certain historical environment, but not thought-of, abstract person, divorced from

society and life. "In direct contrast to German philosophy which descends from heaven to earth, here we ascend from earth to heaven. That is to say, we do not set out from what men say, imagine, conceive, nor from men as narrated, thought-of, imagined, conceived, in order to arrive at men in the flesh. We set out from real, active men, and on the basis of their real life-process we demonstrate the development, the ideological mirrors and echoes of this lifeprocess (K. Marx, F. Engels, *Works*, Vol. III, p. 25). One cannot deny the fact that Marxism was the first in the history of philosophy and sociology to give a scientific explanation of nature and of the essence of man, to discover a real significance of spiritual aspect of man's activity, regarding man as a being changing the world consciously and purposefully.

K. Marx and F. Engels taught that "the essence of man is no abstraction inherent to each separate individual. In its reality it is the complex of social relations" (ibid., p. 3).

Marxist philosophy rests on that each individual is a social being. Hence every manifestation of his life, even if it has not an immediate form of a life in community with others, is a manifestation and confirmation of his social life. K. Marx and F. Engels maintained that individual and social life of man cannot be regarded as something different from each other though they have different forms of manifestation. They held that these two aspects of a human life are interconnected and that one of them manifests itself to a more or less considerable extent in the other one.

Proceeding from this conception, the founders of Marxism held that only in community with others can an individual achieve its full development. They wrote: "Only in community with others has each individual the means of cultivating his gifts in all directions; only in the community, therefore, is personal freedom possible. In the previous substitutes for the community, in the State, etc., personal freedom has existed only for the individuals who developed within the relationships of the ruling class, and only in so far as they were individuals of this class. The illusory community in which individuals have up till now combined, always took on an independent existence in relation to them, and was at the same time, since it was the unity of one class against another, not only a completely illusory community but a new fetter as well. In the real community

the individuals obtain their freedom in and through their association" (K. Marx, F. Engels, *Works*, Vol. III, p. 75).

Unfortunately, even nowadays people who know about Marxism only by hearsay, and do not want to study it, to think over its postulates and understand their essence, keep alleging that Marxism denies spiritual aspect in man's activity, spiritual world of human "Ego", gives up the conception of man, dissolves a person in the mass of people, in the community, does not acknowledge a human personality.

Allow me to take my chance of taking the floor at this World Philosophy Congress not only to put an end to such preconceived and wrong notions of Marxism, to such misrepresentation of Marxist teaching but also to prove that all the subjective, irrational, existential doctrines on man were completely inhuman in their essence.

Anyone who would take pains to make an unbiased and objective acquaintance with the works of K. Marx, F. Engels, V. I. Lenin and their disciples will easily make sure of the fact that Marxism attaches much importance to the part played by consciousness, thoughts, ideas, spiritual life of man. Marxism is especially concerned to clear out the significance of the social consciousness for development of human society. Marxism recognizes as inspiring and transforming the role of advanced ideas in life of man and society and their development.

Marxism also makes an allowance for relative independence and integral logic of development of various forms of social consciousness. At the same time it distinguishes from all forms and kinds of idealism in that it rests on the concept of the material principia material being as a fundamental constituent for all psychical processes. Unlike vulgar and metaphysical materialism, Masxism provides a dialectical, i.e., flexible and comprehensive treatment of the problems of psychical life of man. It flatly denies anti-scientific, vulgar-materialistic metaphysical identification of thinking processes, spiritual life of man, on the one hand, and matter on the other. In distinction to vulgar materialists, Marxists do not reduce psychical categories to physical or physiological, nor do they dissolve spiritual aspects in physical. Marxism admits that spiritual life exists but in doing so it stresses that the basis for spiritual categories is objective material being. It says: first goes matter, being

and then consciousness; consciousness is the other aspect of matter, a derivative of it.

Paying credit for thoughts, ideas, spiritual realm, admitting that these are of great importance for these or those accomplishments Marxism stands only one ground — the earthly origin of ideas, thoughts, spiritual world of man. We assume that it is Marxist philosophy that for the first time in the course of science gave a consistent scientific solution of the problem of man and human "Ego".

No pre-Marxist or modern non-Marxist philosophical system could raise to such a height the role and significance of man and his activity in the world, they could not understand or elucidate, from so many sides as Marxist did, man's role in remaking Nature, his boundless possibilities of cognizing and changing the world, his creative forces, possibilities for discovering the mysteries of Nature, going deep and far into the microcosmos and space.

No pre-Marxist or present-day non-Marxist philosophical systems could place so high the spiritual world of man, his great spiritual potentials, his spiritual activity revealing at the same time material, social bases of this activity, its meaning and significance. There is no problem of spiritual world of man, be it his emotional experience, joy or grief, creative successes, soaring fantasy or routine everyday occupations, sense of responsibility to the collective of people and, sometimes, feeling of loneliness, illness and fear of death, etc., etc., that could not or was not subjected to Marxist psychological, logical, social, moral analysis. And it is only on the basis of Marxist methodology that we can comprehend the scientific fundamentals of the spiritual world of man.

Whilst many modern philosophical trends go in for the so-called "marginal situations" by which they mean the fear of death, dependence on a chance, a conflict, sufferings, guilt, etc., Marxist philosophy opens up real prospects and favourite conditions, forms and opportunities for development of man's spiritual potentials. Marxist philosophy teaches and encourages man to think not of death, but of life, of remaking and improving life; to dwell not upon loneliness but think of the collective of people, of the good of the society and the whole mankind. Man who adheres to Marxist outlook does not feel or has any reasons to feel alone, doomed, condemned to vegetative life. Marxist

philosophy provides a scientific substantiation that he, man, is a member of a society, collective, master of Nature who perfects it according to the requirements of objective laws of matter development.

No pre-Marxist or present-day non-Marxist philosophical trend could cope with the task of solving the problem of man's free will. It is only Marxism that provided a scientific solution for this problem; standing on the materialist ground it proved that freedom is a realized necessity. Man's free will as understood by Marxism signifies that man in his deeds and acts follows the requirements of objective laws of development of Nature and human society, the requirements of historical necessity which people have learned to apprehend and are getting to know better and better. A man of the socialist society who has mastered Marxist philosophy is a striking example of a really free personality enjoying maximum of freedom as compared to people of former social structures.

A really free man is a champion, creator, citizen, active social doer. Such is a man who is inspired by the creative ideas of Marxist philosophy. He is a new Man, a builder of the most human and humane, the most harmonious social system in the history of society, a builder of communism.

K. Marx and F. Engels pointed out that the communist society where a true and not a sham collectivism will reign, where development of society will be restrained only by a level of development of productive forces and not by selfish interests of certain social groups, will open up new vista for development of a personality, contribute to showing originality of every individual, in other words, a truly complete personal freedom will be achieved. Marx and Engels wrote in *German Ideology* that "within the communist society, the only one, where original and free development of an individual stops being a mere phrase, this development is just determined by the connection of individuals, the connection which is partially governed by economical factors, partially by necessary solidarity of free development of all and finally by a universal character of activity of individuals on the basis of existing productive forces. Consequently, we deal here with the individuals at a certain historical stage of development and, by no means, with any casual individuals, letting alone the inevitable commu-

nist revolution which in itself is a condition for their free development" (Marx and Engels, *Works*, Vol. 3, p. 411).

It is not accidental, but quite natural that it was Marxist philosophy that served an ideological base for such grandiose social movements and changes, like the Great October Socialist Revolution and the victories won by people's revolutions in many a country of Europe and Asia, for construction of socialism and communism in the Soviet Union and countries of the world socialist system.

It is not accidental, but quite natural that Marxist philosophy also forms the foundation of the new Programme of the Communist Party of the U.S.S.R. which has been recognized by the whole world—both by our friends and opponents—to be one of the most important social documents of our time.

From this lofty tribune of our international forum it is necessary to reject the groundless statements that communism allegedly ignores the development of human personality. These statements are not true to life!

Just the other way about! The motto of communism is "Everything for man, for the good of man!" It is only in the communist society that man achieves a complete, all-round, harmonious development. His personality, his spiritual "Ego", his unique human individuality flourishes here best as compared to any previous period of world's history. We are well-grounded when stating that the position of man in communist society can be described as one of a free individuality based on the universal development of individuals and on turning their collective social production into their social fortune.

Man is the focal point of Marxist philosophy. In contradistinction to old classical anthropology of the Feuerbachian type, man in Marxist philosophy is not a man in general but a concrete, social, historical, creative man. In contradistinction to existential anthropology, this is not a man of death immersed into fear and illness divorced from social ties, theoretically enjoying internal "free choice" but actually being a slave of necessity of Nature and society — this is a man of life who transforms Nature and is its master, a man who is free with respect to laws of both Nature and society as far as he recognizes their necessities. If Marxist philosophy, when speaking of man, concentrates its attention on his social productive essence, it does so not to

forget about an individual, his internal world, his spiritual potentials and moral qualities but does it with the purpose of revealing his real and not illusory essence. If, according to Marx, philosophy was up till now busy with explaining the world, the thing is how to change it, with respect to man we may state that previous philosophy was up till now busy with explaining man while forgetting concrete conditions of his existence, the thing is how to change the conditions of man's existence both natural and social, to create for man paradise on earth and not in heavens. The whole Marxist theory of revolution, the whole Marxist programme of changing the social relations, the programme of building communism are entirely aimed at exalting man, creating normal conditions for his life, his existence, conditions which will really reveal his essence. In this sense, Marxist philosophy does away with and solves all the contradictions of old and modern trends of philosophical anthropology.

It is only from these positions that we are able to understand the meaning of the gigantic activity which is being carried out in the Soviet Union for man, for creating material and technical base of communism, for forming new social relations, for bringing up man of communist society.

May numerous philosophical schools and trends state that evil in man is ineradicable, that man is beast, that egoism is innate in man's nature and can be annihilated only by annihilating man himself—life makes laugh at such theories and will severly made a mock of them when the communist society will be built in the Soviet Union and other countries.

THE INDIVIDUAL AND SOCIETY

Professor
F. V. KONSTANTINOV

I

Man and society, their present and future, the trends of their progress—these are problems around which progressive modern thought is centered.

It is obvious that philosophy, if it is to serve the interests and well-being of humanity and champion its progressive ideals, cannot neglect this paramount problem of our time, which, therefore, occupies in the programme of our congress the important place to which it is entitled.

It is well in order to recall that the problem of man, new conditions of his life and new relationships between the individual and society has always come to the forefront of progressive thought at a time when the foundations of old, outdated social orders collapsed to make room for a new system of social relations. This was the case in the period of the Renaissance and in the stormy times of the Dutch and the English revolutions and also on the eve of the French Revolution of the late 18th century.

It is only natural that philosophic thought is focused on the problem of the individual now, i.e., in our revolutionary epoch, a period of profound social transformations and radically changing ways of life of many millions of people, at a time when we are witnessing a great scientific and technological revolution and a revolution in the spiritual life of humanity when everything is rapidly progressing and there is not a thing that remains unchanged.

This interest in the destinies of man and humanity is stimulated by certain specific features of historical development in the second half of the 20th century. The creative endeavours of the human genius have given to mankind a clue to the greatest mysteries of nature and placed at its service sources of energy which in the past were well beyond the boldest dreams. Humanity now has machines which can work miracles and make man's domination over nature much greater as never before. For the first time in human history man has successfully challenged the law of gravitation, has flown up into space and is steadily approaching the ultimate goal of conquering outer space. The time is not far away when humanity will translate into reality its bold and proud dreams of flights to other planets.

All these advances demonstrate the tremendous power that humanity wields now and testify to the miracles that can be performed by the human genius. However, the present situation is made dramatic and, indeed, tragic by the fact that the forces brought forth by man and by the spectacular progress of human thought nowadays turn on account of certain social conditions against man himself. The man of the 20th century found himself in the position of the magician who had invoked powerful and mysterious forces only to realise later that he was unable to control them and hold them in check.

It is sometimes said that all or many difficulties and contradictions are due to the so-called "demonic" nature of man, its sinfulness and inherent aggressiveness. It is also asserted that the situation is so tragic because the moral progress of humanity does not keep pace with its scientific and technological progress. If we are to believe some philosophers there is nothing extraordinary in what has happened as man's fear, despair, loneliness, and the indifference of society to his life—all arise from the fact that he is inevitably doomed in this world.

Unlike these philosophers we believe that the root of all evil and the cause of the contradictory position of man, of the individual is the social system based on class antagonisms.

It is quite obvious that under socialism which has put an end to antagonisms between the classes the problem of the individual and society relationship finds an entirely different solution. Socialism has its specific problems of the development of the individual associated with the creation and progress of a new society and with transition from socialism to communism. One of these is, for example, the problem of the all-round harmonic development of the individual and the creation of the optimum material and spiritual conditions for the attainment of this objective.

Socialist society does not know any problems of "forlornness" or of the hopeless and futile existence of the suffering man whose emotions are now interpreted from the point of view of existentialism.

However, alongside with cardinal differences between the position of the individual under capitalism and his position under socialism there are problems which are of concern to all men and women of our globe. Philosophers of all countries have ample ground for co-operation as they all endeavour to find a scientifically substantiated answer to the question how we can protect man's life, the lives of millions of people from the calamity which will befall the world if the great scientific discoveries of our time are used for other than peaceful purposes, how we can avert the disaster of thermonuclear war. To free man from the fear of war and the disasters it is bound to bring about is the common goal of all honest people. Progressive philosophers-humanists cannot stand aloof from this paramount problem of our time.

II

Anthropology and psychology, law and history and other branches of social science are concerned with specific aspects of the general problem of man. It is only philosophy that basing on these fields of human knowledge is able to treat the problem of man as a whole.

What is the essence of man, his nature, the meaning of his existence? What are the laws that govern his life and activities? Is it possible that man, who is endowed with consciousness and will may be independent of the objective laws of social and historical development? What are the conditions for the unrestricted development of the individual? Where can we find answers to these questions which agitated and agitate now millions of people, problems which are a subject of heated controversies? It is only scientific philosophy that can provide answers to these questions and does so. Varied as philosophic interpretations of man, his essence and nature are, one can distinguish three basically different approaches to the problem.

One of these asserts the spiritual nature of man. J. Maritain has this to say on the problem: "Man possesses within

himself a richer and more noble existence which is a purely spiritual superexistence in cognition and love"[1].

Man is a being isolated from the social environment and is detached from it. His spiritual world, his consciousness, will and actions are not affected to any important degree by the material world. On the contrary, the relationship between the individual and society manifests itself primarily in the subject "freely" moulding the social environment, creating and changing situations. The individual shapes himself guided by immanent spiritual stimuli of a subjective nature or by what is suggested to him by transcendent and mystical basic conceptions.

Thus, the proponents of one variety of existentialism claim that man is only what he makes himself. Man is first and foremost a conception which has a life of its own. Nothing exists before this conception has taken shape. Man becomes what he has conceived himself to be.

Neotomism, personalism and other idealistic philosophical trends also deny the role of the social environment in shaping the individual's personality and stimulating his actions. However, these philosophical trends do not endow him with absolute freedom as from their point of view the individual is associated with a "supermaterial soul" and is in the final analysis determined by this metaphysical conception. Thus, Christian personalism asserts that all "persons" are in the final analysis subordinate to the supreme "person", i.e., to God.

It should be noted that this spiritualisation of the individual culminates as a rule in the assertion that man is inherently incognisable. Thus, K. Jaspers asserts that man is, in effect, uncontrolled, incognisable non-subjective freedom which is an expression of his "self-being". Man, if treated not as an object of scientific and sociological investigation but rather as the "existence" of freedom, does not lend himself to any investigation. "Man", Jaspers writes, "is basically something more than he can know about himself"[2].

In contrast to the philosophic systems which tend to ignore the social environment and attach absolute impor-

[1] Jacquec Maritain, *Pour une philosophie de l'education*, Paris, 1959, p. 24.

[2] K. Jaspers, *Einfuhrung in die Philosophie*, Zûrich, 1949, S. 61.

tance to the consciousness and will of a detached individual, proponents of vulgar sociology run to the other extreme of totally negating the role of the individual. According to these philosophers the individual becomes as it were integrated with society as a whole and thus loses all possibilities of influencing society or of manifesting his "Selfness". The individual is thus viewed as a passive element of a whole devoid of any specific features of his own, in fact, as a cell of the social organism.

Modern Western literature not infrequently, although without any ground of reason, attributes to Marxism, to dialectical materialism this ridiculous approach to the problem of the individual. This is all the more untrue as Marxist philosophy came into being and developed in the struggle against subjectivism and voluntarism in the interpretation of the individual and society relationship as well as against the objectivistic and fatalistic underestimation of the role of consciousness and human will in social life and development.

Marxist philosophy regards man as an intrinsically social being. A detached, isolated and lonely man like Robinson Cruso is a product of fiction and of abstract speculation which has no foundation. In reality man always lives in society and his essence can be understood only if we understand the structure of the society he lives in and its system of social relationships and institutions. At any given moment the individual in some way or other bears the imprint of the social relations predominating in his society. What man and his nature have developed into, has been determined first and foremost by society, historical social development and historically established social relations rather than by some spontaneous, isolated development of the individual.

How can one analyse and discriminate between the peculiarities of the consciousness and behaviour of man in primitive communal society, slave society, under feudalism, capitalism and, finally, under socialism if one fails to take due account of the specific features of these socio-economic systems, forms of ownership typical of each system, social relationships between classes and so on.

In one way or another the social meaning of man, his social nature and spiritual world reflect, as a kind of a microsystem, the history of the human race, the history of

labour, customs, language, history of culture and social history as a whole.

If we assume for the sake of argument that man has been deprived of what he has acquired from society in the course of his social development he will then have only but what he has been given by nature as a biological species.

All human history testifies to the fact that man's essence is the entire complex of social relationships. It is these relationships that are primarily responsible for shaping his personality and determine his intellectual and moral individuality.

This treatment of the problem rejects an abstract approach to man or speculations about man as an abstract notion. The Marxist conception of the individual considers man in the process of his evolution and development and rejects the view that man and his nature remain invariably and intrinsically immutable. The conception of the abstract man is often used as a front for conservative and even reactionary ideas; and indeed, if we recognised that man is inherently individualistic and egoistical would it be possible to achieve further social progress and strive for genuinely humane relations between people?

The Marxist conception of the individual also rejects the mystical, spiritualistic interpretation of the meaning of man. It is not mysterious spiritual forces (internal or transcendent) that determine the nature of man. As has been pointed out earlier man's nature is objectively determined by the entire complex of social relationships.

People are born and live in a historically structured system of the social division of labour, in towns and villages, in homes with all modern conveniences or in slums, in palaces or huts, in industrial or agrarian countries, in capitalist or socialist states. They work, create, produce material and spiritual values under a specific system of relations of production.

Is it then possible to assert that man is what he makes himself? Are man's nature and existence so indeterministic?

Do the will and the desire of an unemployed man in any way determine whether he will become a Rockfeller or not?

The proponents of the subjectivistic and voluntaristic system seem to forget that the application of man's will,

his thinking and the choice he makes in a particular situation are also dependent on the attending circumstances and determined by the environment he lives in and social relations which man is not and cannot be free to choose at will.

Each new generation and consequently each man finds in the world a system of social relations established before they came into being. Each generation and each individual cannot but recognise this already existing system of social relations as the principal factor in all their activity. The detached, isolated, estranged individual of existential philosophy cannot put himself at will outside these relations and it is all the more impossible that he may be able to change them acting on his own.

Thus, it is society and the entire complex of social relations that determine the meaning and nature of man. Does it, however, follow that only society is active while the individual is a passive entity and an object of action and pressures by society unable to exercise any active counter-influence? This was the view held by old metaphysical materialism but this view is in no way shared by dialectical materialism. In his criticism of metaphysical contemplative materialism Marx wrote: "The materialist theory of changing the environment and of education neglects the fact that the environmental circumstances are changed by people and that the educator needs to be educated himself" (K. Marx, *Theses on Feuerbach*).

Thus, Marxism developed the philosophic theory of man which is free from idealism and subjectivism as well as from contemplative objectivism which becomes integrated, merges fatalism. The individual is inherently active and not only in thinking but also in practical creative activity. Labour is purposeful activity which has as its aim to change the environment for the benefit of man and is the underlying basis of the existence of the family of man. Man possesses consciousness, will and is responsible for his actions. Under certain conditions man's self-conditioning and self-perfection should play and does play a significant role. Man can and does make a choice in certain situations involving his actions. However, he cannot choose at will any social forms of his existence or his social status.

Marxism discarded the objectivistic, fatalistic negation or depreciation of the role of man, his consciousness and will and concentrated its analysis on conditions most conducive to effective actions of the masses and the individual. The effectiveness of these actions is the higher, the deeper insight man obtains into the objective laws of social development and the better he is prepared to meet the challenge of social progress.

Defining man and his nature as a complex of social relationships do not we depreciate the meaning of man, of the individual? Using this general notion to cover a very complicated and varied gamut of human individualities do we not overlook what makes one individual different from another? We also often hear this kind of criticism of Marxist philosophy coming from its opponents.

The Marxist definition of man as any other scientific, philosophic definition expresses the essence and the basic features of man, his nature which also determine his position in society and his future progress. It is only too obvious that no law or scientific generalization can cover the entire variety of the phenomena which it generalises. The Marxist definition of the meaning of man that we are discussing here cannot claim to cover the entire multitude of aspects in which man can be analysed. This definition does not exclude the necessity of studying peculiarities of people of different social classes, social groups and collectives. Neither does it ignore the natural talents of people, their individual past experience and individual destinies.

The outstanding importance of the Marxist conception of society and the individual lies in its sober and realistic approach and in consistently upholding the principle that the evolution of the individual, his progress and perfection depend on the revolutionary transformation of society by people themselves in accordance with the objective laws of history.

III

Marxism not only rejected the abstract approach to society and the individual but also proved that all attempts at deducing a stable, immutable and standard interrelation between them are organically doomed to failure. Each socio-economic formation gives rise to a new mode of interrelationships between the individual and society.

Under the primitive communal system man does not yet distinguish himself from the collective with which he is

completely integrated on account of the low level of social production. The early history of the human race, its hard struggle with the elements, a very low level of economic development necessitate such a degree of integration of the individual and the community he belongs to (family, tribe, clan) that a man individually is always represented by the collective rather than acts as an individual person. Man's personality, individuality did not yet take shape and he was practically unalienated from his community. Marx writes in this connection that primitive communities are based to a significant degree "on the immature development of man individually, who has not yet severed the umbilical cord that unites him with his fellowmen" [1].

At this stage of social development the problem of the relationship between the individual and society is non-existent or practically non-existent.

Division of labour, the emergence of private ownership of the means of production, development of products of labour into commodities were very important milestones in social development and in the evolution of man. However, this process was highly contradictory and antagonistic.

As a result of the division of labour and the emergence of private ownership, society that was once classless became divided into ruling and exploited classes with opposite interests and desires. The actual producers of material values were gradually losing all control of the means of production to finally find themselves dominated by those who concentrated these means of production in their hands.

In a society split into classes and based on class antagonism the rise, enrichment and greater freedom of one group of people entail downgrading, impoverishment and enslavement of others who make up the overwhelming majority of this society. It is a society made up of antagonistis classes that has been the birth-place of the maxims: *Homo homini lupus est*, everyone for himself only the Lord for everybody.

The whole system of such a society tends to degrade the dignity of the majority of its members, suppress their individuality and reserve the privilege of having individuality only for the well-to-do classes. As the social system of this society corresponds to the interests of the few, antagonistic

[1] K. Marx and F. Engels, *Collested Works*, Vol. 23, p. 89.

contradictions between society and the individual cannot, therefore, be eliminated.

In a society based on private ownership of means of production and on commodity and money relations the social interrelation between individuals is in a manner of speaking concealed from view. Social relations develop spontaneously, so to speak, behind the backs of people instead of being controlled by them. In this society social relations and laws of social development dominate over people as an external, alien and even hostile force.

"As collective activity itself begins spontaneously rather than a voluntary undertaking social forces appear to the given individuals not as their own joint force but as some external and strange power about whose origin and trends of development they have no knowledge; consequently, they cannot control this force, — on the contrary, the latter passes now through a number of phases and stages of development which not only do not depend on people's will and behaviour but, on the contrary, direct this will and this behaviour"[1].

This process of alienation from man of the products of his labour and of social relations established by people finds its climax in capitalist society where man himself or rather his labour becomes a commodity that is sold on the market and as any other commodity is affected by its spontaneously acting laws. Here "Capital is the power to command labour and its products. A capitalist possesses this power not because of his personal or human qualities but because he has capital. His power is the purchasing power of his capital which nothing can withstand"[2].

Many philosophers who consider the problem of the individual under capitalism divorce it from such factors as the domination of capital and the power of money which lay their imprint on all human relations in social, political, cultural, moral and other spheres. Ignoring such significant factors as the domination of capital it is impossible to see in their true light the relationships between society and the individual or appraise the influence of money on the social status of the individual and on conditions for

[1] K. Marx and F. Engels, *Collected Works*, Wol. 3, 2nd ed., p. 33.

[2] K. Marx and F. Engels, *Selected Early Works*, Moscow, 1956, p. 534.

the development of individual abilities, gifts and talents, its influence on human freedom and independence.

However, what is overlooked or deliberately ignored by some thinkers of our time was quite clearly seen by Shakespeare. In his *Timon of Athens* he speaks of the omnipotence and power of gold which can make

blask white. foul- fair, wrong right,
base noble, old young, coward valiant.

Capital, money, gold are a social force and embody and internalise accumulated social labour. However, in capitalist society based on commodity relations, social labour becomes a force alienated from society, privately controlled and dominating man, the individual and society itself.

The social force of money, gold becomes the exclusive force of its owner, that is, of an individual. As a result, this individual can buy everything: the talent of a scientist, the pen of a poet, the inspiration of an artist.

It is not personal abilities or talents, nor individuality that play a dominant role here but the social function and the social power of money, gold.

"I am feeble-minded but money is the real mind of all things — how can a man who has money be feeble-minded? Besides, he can buy people of outstanding minds, and is not a man who can command people of outstanding minds more clever than they are? With my money I can have everything for which the human heart may crave. Do I not have then all human abilities? And does not my money make any weakness of mine its direct opposite?" [1].

Gold, capital, is the socialised objectivised performed labour of man. With every passing year and decade this performed labour grows and dominates live labour and man who performs it.

The process of the further alienation of means of production from direct producers of material values, unprecedented concentration of social wealth in the hands of a very few, in the hands of Big Business, growth and aggravation of antagonistic social contradictions, more and more shackles which fetter an ordinary man — these are the facts that make up the true picture of the capitalist world no matter what its advocates may say to gloss it over and idealise. These actually existing social relations should not be

[1] K. Marx and F. Engels, *Selected Early Works*, Moscow, 1956, p. 618.

ignored if we are to have a proper understanding of the individual- and -society relationship under the system of private enterprise.

Various individualistic philosophic systems and existentionalism in particular give a distorted interpretation of the processes going on in a society based on private property at the last stage of its development: the menace of the degeneration of the individual, growing anxiety and fear of today and tomorrow, profound pessimism without a trace of hope.

One cannot but agree with Professor William Barrett of the New York State University who writes in his book *Irrational Man* that "Existential philosophy (like much of modern art) is thus a product of bourgeois society in a state of dissolution" [1].

Barrett draws a correct conclusion that the optimism of the age of Enlightement, that was highlighted by its search for knowledge, and confidence in social progress, have now given way to attitudes of an opposite nature. "Man", Barrett writes, "has come to fill himself an outsider even within his own human society. He is trebly alienated: A stranger to God, to nature and to the gigantic social apparatus that satisfies his material wants. But the worst and final form of alienation, toward which indeed the others tend is man's alienation from his owna self." [2]

Barrett, of course, makes a mistake when he attempts to find the causes, that have brought about a very complicated and highly contradictory situation of the individual in the Western world, in the limitations of the human mind which has allegedly come up against insurmountable obstacles. The reason for the situation should be sought not in the limitations of the mind but rather in irrational social relations which cause the products of man's labour to become their opposite. Under a system of outdated social relations a machine which has unlimited possibilities for making man's labour easier and immeasurably more efficient becomes a force hostile to man. It makes some producers redundant while the labour of others becomes stupefying, and a spiritual drain on their souls.

[1] W. Barrett, *Irrational Man. A Study in Existential Philosophy*, N. Y., 1958, p. 30.
[2] W. Barrett, *Irrational Man. A Study in Existential Philosophy*, N. Y., 1958, p. 31.

The gigantic growth of wealth is going on alongside the growth of misery and poverty and of fear of the morrow. Driven by its irreconcilable contradictions the last society of private property like Leviathan, the monster rises against the individual and strives to debase and trample him underfoot in the interests of omnipotent Big Business. Thus, this society prepares the ground for its final downfall and for the triumph of a new socialist relationship between the individual and society which is based on public ownership and eliminates once and for all contradictions and enmity between people, contradictions between public and personal interests.

IV

The economic basis of socialist society is public ownership of the means of production. This form of ownership does not draw people apart, or oppose them to one another but on the contrary, brings them together into one community.

Abolition of private property, of exploiting classes and exploitation of man by man puts an end to fictitious public interests. Socialism calls to life real public interests. All members of a new society are equally interested in building up public wealth because it belongs to the whole nation and everyone gets his fair share in accordance with the principle: from each according to his ability, to each according to his work. Under socialism there is no social equality yet but it is impossible for anyone to expropriate the products of the labour of others. The age-old contradiction between public interests on the one hand, which were in effect the interests of the ruling minority, and the interests of the individual on the other, has been eliminated which has ushered in an era of the harmonic combination of public and personal interests. People no longer oppose one another as antagonists, competitors, rivals. They till a common field and work for one cause in the spirit of friendship, fraternal mutual assistance and brotherhood.

The collective spirit and solidarity of workers that they have developed under capitalism in the struggle for their rights and interests assume in a socialist society a new qualitative aspect and are given every opportunity for free and unrestricted development.

Socialist collective, new relations between society and the individual and a new type of the individual — are all results of the evolution going on in accordance with the laws of history. No stimulating processes or casual factors could have brought about new social relationships, a new type of the individual or a new society-and the individual relationship. They were all historically necessitated by the entire preceding period of objective social development which has paved the way for them.

Throughout the whole of human history before socialism social relations developed spontaneously, so to speak, ignoring people's will and behind their backs. In the new formation these relations are developed throught conscious and purposeful efforts of millions. This great revolutionary process of creation is accompanied by perfection of society- and individual relationships and by the progress of the individual. The individual rids himself of the left-overs of individualism and egocentrism, left-overs of the morals of private property and of old habits and customs.

The greatest achievement in the record of the socialist countries is the shaping of a new man who embodies new humane and collectivist morals and who aspires to his personal ends only through working for the welfare of his society.

Much has been written in the West about the man of socialist society. Many of those who have written on the subject were compelled to admit the undisputable successes scored by the Soviet Union and the other socialist countries in economy, politics, science and technology, public education and in improving the living standards of the working people. However, the same authors would have their readers believe that the Marxists have failed to change the nature of man. Thus, K. Menert, West German journalist and sociologist, attempts to prove that in the Soviet Union "the sentiments and thoughts of people have undergone comparatively insignificant changes in the face of the long-term pressure of collectivism imposed on them" [1]

K. Menert and other authors of his king rely for their knowledge of Soviet man on hearsay or obsessed by wishful thinking attempt to convince the reader that the characteristic features of Soviet man are the survivals of the past

[1] K. Menert, *Der Sowjetmensch*, Stuttgart, 1958.

in people's consciousness which we in the U. S. S. R. criticise and overcome on our way to a communist society.

The outstanding exploits of multi-million masses of Soviet working people, their heroism and selflessness, devotion to their principles and ideas are well known to the whole world. The deeds and thoughts of over 2 million members of the teams of communist labour frustrate the fabrications of Herr Menert and his like.

Clarence B. Randall a man who is very far from communism and alarmed by the achievements of the Soviet Union, nevertheless, had to write the following words of truth: "I, for one, am convinced that we have made a great error in our appraisal of the motives for the behaviour of the Soviet people. They not only do not look like a nation driven on by coercion but on the contrary are forging ahead to their ultimate goal, apparently quite confident of success. The Soviet worker does his work with truly religous fervour not because he is coerced but because he is devoted to his cause. In today's Russia labour is a matter of honour and failure to cope with one's assignment is considered reprehensible".[1]

C. B. Randall makes no mistake. Love for free socialist labour is a very important feature of the individual of socialist society. In socialist countries people who work with enthusiasm enjoy great esteem and glory. A hero of labour — this is a new type of man in human history.

Professor G. Falk of the Berchmann Institute in Bavaria writes in his book *Basic Ideology of Communism*: «Communist humanism bases its appraisal of man on the benefit which he gives to the collective, i. e., to the state. The major factor is not man himself but his "socially useful labour". But can it be held out against Marxist philosophy that it regards as one of man's greatest virtues his work for the common good rather than his being a sponge or a parasite? And is it possible to contrast man and his socially useful labour? Is not the latter the supreme manifestation of man's activity and one of his most important features? Was it not purposeful labour that has made man what he is now? Was it not social labour that has created immeasurable material values on earth?

Deprive man and not just one individual but all people

[1] C. B. Randall, *The Communist Challenge to American Business*, Boston, Toronto, 1959.

of their ability for socially useful labour and where will then society and Professor Falk himself be?

Professor Falk's views are an expression of an aristocratic attitude to man and his labour.

In the life and minds of people living in socialist society individualism and egoism have been ousted by collectivism. Has man lost, as a result, anything of his individuality and personality? Just the opposite. Only in a collective can the best human potentialities, abilities and talents find their expression and application. Far from stunting the individual development, quite on the contrary, the socialist collective and socialist society provide every opportunity for his development. The creative advances of Soviet people in economy, science and technology, in culture, literature and art, in all fields of material and spiritual life give a powerful stimulus to the development of the talents and abilities of people in a multitude of varieties and aspects. The advances of socialist society and the flourishing of the talents and individualities of millions of people are organically interrelated and stimulate each other. Humanism is a characteristic feature of the consciousness of Soviet man. A man is a friend, brother and compade to man. This is a principle of humanism that has asserted itself in Soviet society and in the life and minds of our people. This fact is closely related to the Soviet people's love for peace, their hatred for war-mongers and champions of the arms race, for those who fill their pockets' on the production of terrible weapons of destruction and mass annihilation of people. All foreigners who come to the Soviet Union are impressed by this feature of Soviet man.

A very important feature of Soviet man's consciousness and world outlook is his internationalism, devotion to the idea of equality and brotherhood of all nations and opposition to the theory and practice of national and racial supremacy.

Soviet man is bitterly opposed to conservatism, dogmatism, stagnation; he is imbued with the revolutionary spirit and hatred for inertness and stale routine. He admires the creative and pioneering spirit and spares no efforts for all-round progress and new advances of science and technology. The social climate in the U. S. S. R. is one of the factors that have made possible the great achievements of Soviet science. Devotion to progressive ideas and ideals of

our time is one of the major features and traits of Soviet man's consciousness.

These and others features of Soviet man's consciousness embody all progressive ideals developed by humanity in its history and enriched by the new ideology and new practice.

The problem of the relationship between society and the individual is centred around the problem of the freedom of the individual, his dignity and conditions for the development and application of his abilities and talents.

The problem of the freedom of the individual has a variety of aspects: economic, political and moral.

A specifically philosophic interpretation of the freedom of the individual was developed as far back as ancient history as the problem of freedom and necessity and was often confined to the problem of the freedom of will. Two conflicting schools of philosophic thought: determinism and indeterminism were in evidence. The proponents of the latter asserted that freedom of the individual is in effect freedom of will, inner consciousness, self-observation, freedom of making an unrestricted and unconditioned choice. The assumption that man's psychics and behaviour are indeterministic leads in the final analysis to the proclamation of the absolute freedom of the individual. This is the line of philosophic development that starts as freedom of the individual and the role of the environment, or the individual and society are contrasted and divorced from each other. Methodologically this problem was always developed in the history of philosophy against the background of the general controversy between idealism and materialism, indeterminism and determinism which although not identical are logically connected with each other.

The interpretation of freedom depends on one's philosophic views in general and on one's understanding of the essence of man's nature in particular. If, for example, the meaning of man is understood as inner moral consciousness, then freedom is obviously interpreted as a set of conditions for "an absolutely free" choice, freedom of ethical decision (in the final analysis everything is reduced, as is the case with Sartre, to freedom "at the bottom of one's prison — soul").

If the essence of man is treated as logical thinking, then the problem of freedom becomes the problem of conditions

for, and possibilities of thinking, i. e., the problem of the freedom of thought.

Thinkers who adhere to this system may differ in their interpretation of the initial basic conception which constitutes man. Their findings depend on their world outlook and the intellectual and emotional climate of the period, and consequently they may arrive at different interpretations of freedom. However, all such interpretations isolate and place in contradistinction to others one of the historically developing human abilities while methodologically they are based on idealism. This presentation of the problem makes it impossible to see in its true perspective the progress of freedom in social development. Only by considering the role of social practice and the progress of man's domination ever nature and social forces as one integral problem, can one eliminate fatalism in philosophic theory and do away with neglect of historical development. Then it becomes possible to pose the problem of freedom in general and freedom of society and the individual in particular against a hisorical, factual background of man's development.

From this point of view freedom is seen as a historical phenomenon which emerges only at a definite stage of social development. Freedom of the individual has, therefore, close bearing on social freedom and develops only to the extent of the progress of the latter.

Marxist philosophy has its own materialistic understanding of the freedom of the individual and freedom of society as a whole. Marxism was the first in the history of philosophic thought to relate the problem of the freedom of the individual to the actual struggle of the masses for their emancipation. This enabled Marxist philosophers to take up vital problems of the freedom of the individual, nations and states, and other modern problems of great social significance rather than engage in a formal theoretical analysis of the problem of the freedom of the individual which is very indirectly connected, if at all, with the actual development of society.

Human freedom was thus proved to be not an attribute or property of the spirit, not freedom as such but a property of human activity and the activity of mankind. Social and historical practice used as a criterion, i. e., as a figure of merit for the analysis of freedom has made it possible to

interpret freedom as the continuously developing unity of the subject and the object and a definite coincidence of the objective and the subjective. Man is free if in his activity he is able to do what he strives to attain and if the goals he sets himself beforehand coincide with the objective results he achieves. In this connection it should not be forgotten that man alters his social being and sets himself specific realisable objectives only when appropriate material conditions have become available.

With the exception of situations in which absolute arbitrariness reigns supreme, freedom manifests itself in the practical utilisation of a cognised and comprehended necessity. One cannot live in society and be independent of it.

It has already been shown earlier that an isolated, detached individual is socially impossible. Man does not create freedom of his own will. Freedom is brought forth by the dialectical unity of the personal and social due to the interaction of one individual with others.

There is not and cannot be any freedom for the majority of people in a society split into antagonistic classes with one class expropriating the products of the labour of others. There is not and cannot be any real freedom for all individuals in a situation where the destinies of people are hinged on the market situation, on economic slumps and recoveries due to the regularities of economic cycles, in an economy dominated by spontaneity, lack of planning and anarchy in production.

There is not and cannot be any real personal freedom in a society where productive forces and social relations dominate people as external and hostile forces. As long as man and society do not realise the true nature of social forces and social relations they remain slaves of their social relations which dominate man while the situation should be just the opposite. In these conditions man remains at the mercy of blind necessity. Man and society become free vis-à-vis productive forces and social relations only after they have uncovered their true social nature and the objective regularities which these forces and relations follow. Man and society become free after they have transformed these forces and relations in accordance with their objective regularities.

Free enterprise proclaimed in the capitalist world as the basis for all other freedoms and liberties is freedom only for a handful of employers but not for those who directly depend on them and are compelled to work for them. There can be no true freedom for all, for the majority in a society where people are in the grip of poverty, starvation and ignorance. There is not and cannot be any true freedom of the individual in a society which discriminates against some of its members because of their nationality or race, the colour of their skin or for other reasons and which encourages in theory and practice the policies of racial and national supremacy.

There can be no real freedom in a society where people's minds are still dominated by phantasmal and fantastic ideas that originated in the human mind at the early primordial stages of social development. The contradictions and conditions mentioned above should be eliminated and done away with if true and real freedom of the individual is to be achieved, as these contradictions make legally proclaimed freedom a dead letter. An unemployed man is, of course,"free". He is free from a job, from employment, daily bread, from security. But this means only freedom to starve which has nothing in common with real freedom.

Real freedom for the individual and society commences only after society has abandoned the realm of blind necessity and poverty dominated by spontaneously acting social forces and has entered the realm of freedom based on reason and on appropriate economic, social, political and spiritual conditions of life, freedom to live and act for *all*, for the people and not just for the select few. It is this freedom that has been established in Soviet socialist society where political freedom for all citizens is guaranteed by the entire economic, social and political system.

V

Socialist society that has arisen in the U. S. S. R. is not yet communist society. From the standpoint of human history it has just emerged from old society and still has some of the birthmarks of the latter. We still have many problems to overcome on our way from socialism to communism.

A very difficult problem of this transition process is elimination of distinctions between people of mental labour, on the one hand, and people of manual labour on the other, the shaping of the new man of communist society, a man

of all-round and harmonic development who will not have any ideological or moral survivals or birthmarks of the old society.

Our creative efforts are, obviously, centred around man, the builder of communism, who comes before anything else. Everything is done for man, for the sake of his welfare and happiness. Every opportunity for everybody's development is a prerequisite for the unrestricted development of all. Such are the principles of Marxist philosophy, the philosophy of communism which guides the people who have embarked on the construction of a new society.

What is the meaning of the communist principle — every opportunity for everybody's development is a prerequisite for the free development of all? This principle means that a free communist society eliminates forever the restrictions on the development of the individual which were typical of all social formations before socialism, restrictions because of people's origin, material or political inequality, race, nationality or religion. In the new social formation all these restrictions will never go to return.

Under socialism and communism where physical and mental labour reigns supreme and people of creative labour have become rulers of their destinies for the first time in history it is only personal abilities and record of work that determine the position and status of man in society.

In a free communist association work will be a creative combination of mental and manual labour and will therefore become man's vital necessity, a source of satisfaction and pleasure.

Under communism, the individual, man, is no longer an instrument in the hands of others. He becomes not only in theory but also in practice the highest value among all values of the world. It is only under communism that the human being is given on an ever increasing scale assistance and encouragement for all-round development of his personality in its physical, spiritual, moral and aesthetics aspects.

The following examples may illustrate and prove how the Soviet Union creates conditions for the development of the individual, his abilities and talents.

Prior to the Socialist Revolution about 80 per cent of the Russia's population were illiterate. Now 45 years have elapsed since the Revolution the Soviet Union is a country

of one hundred per cent literacy. Over 40 per cent of Soviet workers and over 23 per cent of Soviet peasants have a secondary or higher education. At the present time the Soviet Union has over 22 million highly skilled workers. The country's universities and other establishments of higher learning have 2 million 945 thousand students.

All in all, various schools, higher educational establishments and courses are attended by over 56 million people which amounts to one quarter of the whole population of the country. Each year the Soviet Union gets 126 thousand graduate engineers while the total number of institute and university graduates exceeds 325 thousand annually. Women account for 50 per cent of all people with a higher education. The Soviet Union does not have and will never have unemployment and all graduates of secondary and higher educational establishments: teachers, doctors, engineers, technicians and so on, have, therefore, an unlimited field for the application of their knowledge, talents, they do not have to face the tragedy of unemployment.

In 45 years the Soviet country has traversed the path from a primitive wooden plough to space ships. This shows the scale and rate of our cultural scientific and technological progress which could not have been achieved if we did not have complete freedom for scientific development.

Those who speak about the levelling-off of people under communism and about would-be integration of the individual with the collective make an intentional or unintentional error of attributing to communism the theories which reflect the process of levelling-off now going on in industrial capitalist society with its mechanised production and standardisation in material and spiritual life.

In a society which has abolished expropriation of products of labour and alienation of the essence of man, which has put an end to exploitation of man by man, established planned control over its social relations and is making its domination over the forces of nature ever more unchallengeable, the possibilities for the development of the individual and the social requirements for this development undergo significant changes. The slogan of communism "from each according to his ability" to each according to his needs becomes a new standard for the appraisal of man. Under communism progress, prosperity and man himself are appraised by the extent to which human abilities have been

developed. The wealth of the abilities of the highly developed individual is regarded as public welth. The principal standard for the apparaisal of public wealth will not be material production but first and foremost the extent of the development of human abilities. Marx wrote: "Is wealth anything else but complete development of man's domination over the forces of nature, i. e., both over the forces of the so-called nature and over the forces of his own nature? Is wealth anything else but the absolute expression of man's creative abilities without any other prerequisites apart from the preceding historical development which makes an end all of his integrity of development, i. e., the development of all human forces as such, irrespective of any predetermined scale?"[1].

Planned development of social production carried on on a tremendous scale and purposeful reconstruction of the entire pattern of social relationships open new vistas to the individual and give him an unlimited field of action for displaying his outstanding individual abilities. As the appraisal of the value of the individual has undergone a cardinal qualitative change the very idea of an outstanding individual is seen in a new light. The new man acquires, so to speak, a new "public eye". Keenness of observation which prompts man that one thing or another should be changed for the common good, human will aimed at achieving the planned objectives, inspired and enthusiastic work for the sake of a bright future, sincere devotion to the common cause—all these qualities of man's heart and mind which seemingly are intimately personal, acquire tremendous social significance.

The new social order has given a greenlight to the outstanding creative abilities and talents of the people for which, as V. I. Lenin said, the sky is the limit.

As we have pointed out above, there have appeared new social standards for the appraisal of relations between individuals — new aspects of the social nature of man.

We realise that we still have a number of problems to solve and are fully aware of the difficulties in our way. However, we are convinced that ours is the only right way to a society that will meet the natural aspiration of people for peace and happiness.

[1] K. Marx, *Grundrisse der Kritik der politischen Oekonomie. 1857—1858*, Moskau, 1939, S. 387—388.

THE CONCEPT OF DIALECTICAL CONTRADICTION IN QUANTUM PHYSICS

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1. The Notion of „Complementarity" and Dialectics

Nowadays physicists, while creating theories corresponding to nature in progress of development, speak in the dialectic language whether willingly or unwillingly. Even those of them whose personal outlook differs widely from the dialectical philosophy recognise this in their own way. Thus Heisenberg states that enquiry into the foundations of the quantum theory, especially as it was done by Bohr, has features reminiscent of Hegelian philosophy [1]. And to quote Pauli, "dialectics is that mutual game of two opponents which is typical of the Copenhagen interpretation of quantum mechanics[2]". Bohr himself, while discussing the quantum theory, speaks of "profoundly true statements the opposites of which likewise contain deep verities" [3].

Notable in those statements made by eminent physicists is the link between dialectics and the notion of complementarity which lies at the centre of the Copenhagen interpretation of the quantum theory.

When in atomic-scale phenomena light (regarded by classical physics as a set of electromagnetic waves) was found to have corpuscular properties, and matter (regarded by classical physics as a discrete structure) displayed the properties of waves, the problem presented itself to bring the corpuscular and wave aspects of matter and field in unison

[1] W. Heisenberg, *Plank's Discovery and the Fundamental Philosophical Problems of the Atomic Theory*, Uspekhi Fisicheskikh Nauk, Vol. LXVI, iss. 2, 1958, p. 169.
[2] W. Pauli, *Wahrscheinlichkeit und Physik.* Dialectica, Vol. 8, N 3, 1943, p. 118.
[3] *Albert Einstein als Philosoph und Naturforscher.* Stuttgart, 1955, S. 150.

with each other and with reference to atomic processes. The solution of this problem in the frame of classical physics was hindered by the fact that no object could possibly be a particle (i. e., a body confined within a small volume) and a wave (i. e., a field spread in a space of large dimensions) simultaneously. This hindrance was to be overcome by the complementarity concept. Complementarity is understood by Bohr to be a peculiar relationship between the experiment data on atomic objects secured by means of different experimental set-ups. Such data, says Bohr, may seem to contradict each other when an attempt is made to unite them into a single picture, but as a matter of fact they complete all that we can learn of the object [1].

The use of classical notions in describing the atomic phenomena observed by experiment leads to contradictions which can be given the form of antinomies. Bohr shows this clearly by many examples. Here is one of them:

"Suppose, says Bohr, that a semitransparent mirror is placed in the path of a photon in such a way that the further progress of the photon is possible in two directions. Then of two photographic plates placed across these directions far apart from each other one and only one can record the photon. Now, if the plates are replaced by mirrors interference phenomena will be observed due to two reflected waves. Any attempt to represent the behaviour of the photon clearly will meet with the following difficulty: on the one hand, we should naturally state that the photon will always choose one of the two ways, yet on the other, it behaves as if it were travelling along the two ways simultaneously" [2].

Bohr overcomes this difficulty by means of the complementarity concept. The behaviour of the photon cannot possibly be separated from the conditions of the experiment in which it is observed: under some conditions the photon behaves like a moving particle while under other conditions it behaves like a wave. To generalise, Bohr's concept states that a study of the so-called complementarity phenomena requires the use of mutually excluding experimental set-

[1] N. Bohr, *Quantum Physics and Philosophy, in Atomic Physics and Human Knowledge*, Moscow, 1961, p. 144.

[2] N. Bohr, *Discussion with Einstein of the Problems of the Theory of Knowledge in Atomic Physics* in: Atomic Physics and Human Knowledge, p. 74.

ups and that only a complete set of phenomena affords a complete knowledge of an atomic object, which means, of course, that by adopting the complementarity concept we have the right to make two opposite mutually excluding statements concerning a single atomic object.

The philosophical meaning of the complementarity concept for a physical theory is the recognition of the logical necessity under the respective conditions to use opposite mutually excluding notions relative to a single object. In this way the formal statements of the quantum theory can be interpreted to agree with the experiment data so that no formally logical contradictions arise in theory.

Although recognising the dialectical nature of thinking, the complementarity concept is only the first step toward the solution of the contradiction between the corpuscular and undulatory properties of microobjects. In Bohr's concept this contradiction solidifies, so to speak, in the form of a pair of experimental set-ups opposed to each other, with which the "complementary phenomena" are linked up. While the objective nature of the quantum-mechanical description is emphasised by Bohr, he says nothing of atomic objects as regards their inherent contradiction between their corpuscular and undulatory properties. The complementarity concept fails to take into account the fact that atomic particles in experiments never behave exactly like "classical particles" or "classical waves". Because of this principal deficiency the concept suffers from a serious disadvantage. Instead of concentrating on the philosophical interpretation of the new notions of the quantum theory the attention is paid solely to an analysis of the limits within which old classical notions can be applied to atomic objects.

To solve the contradiction between the corpuscular and undulatory pictures displayed by the behaviour of atomic objects we must consider the corpuscular and undulatory properties of an atomic object as a unity of opposites. This is why the notions of the quantum theory while reflecting the dual nature of atomic objects cannot but differ qualitatively from the classical notions.

2. On the Dialectical Contradiction

The dialectical principle of contradiction, or the principle of unity and struggle of opposites, gives all the neces-

sary and sufficient prerequisites for the motion (and development) of the objectively real world to be expressed in abstract notions (and in a system of such notions). A logic which excludes the dialectical principle of contradiction, i.e. a logic with stationary categories (such are the classical formal and the modern formal, or mathematical, logic) is unfit to solve that problem. This could be inferred already from Zeno's paradoxes and Kant's antinomies, but the proof was given by dialectical materialism.

The dialectical principle of contradiction consists in recognising the opposite, mutually excluding, contradictory tendencies displayed by all natural phenomena and processes (as well as society and thought). Credit for the scientific formulation of this principle belongs to dialectical materialism, but in an underdeveloped form it was expressed by many thinkers of the previous historical epochs. While establishing itself it had to withstand countless attacks by the representatives of dogmatic philosophy (the philosophical relativism inclusive), and is attacked in our times.

In this connection it is worth while to dwell briefly on the arguments made by H. Reichenbach and S. Hook against the dialectical principle of contradiction.

Reichenbach, a neopositivist, tries to solve the problems of motion logic without the aid of dialectics. To this purpose he has introduced the notion of "genetic identity" which connects the various states of a single thing at different instants. Discriminating between "substantional genetic identity" (e. g., water particles) and "functional genetic identity" (e. g., water waves), he expresses himself against Heraclitus's dialectics. He believes that instead of asserting that no one can put his foot twice in the same river Heraclitus should subscribe to the notion of functional genetic identity which permits to say that the same river can be plunged into twice[1].

Yet a running river is not a set of waters stationary at the various instants, just as time is no set of different "nows": motion cannot be expressed in terms of genetic identity.

Even less founded are Hook's arguments against the concept of dialectical contradiction. He refutes the existen-

[1] H. Reichenbach, *Time Direction*. Moscow, 1962, p. 302.

ce of dialectical contradictions in natural phenomena and their reflections in thought, confusing dialectical contradiction with a logical contradiction due to incorrect reasoning. Resting on this confusion is Hook's statement that if all that exists is contradictory and thoughts are reflections of things, then consistent thinking should be invariably the mark of falsehood, and the sciences would be unable to make any progress at all[1].

Hook would have been right only if classical mechanics did not contain Newton's third law or Maxwell's theory were devoid of the notion of electromagnetic field, or special relativity, of the notion of interval, or the elementary algebra, of the notion of relative number, and so on. United dialectically in Newton's third law are action and counteraction, while the notion of electromagnetic field reflects the inseparable unity of electric and magnetic fields, the notion of interval, the unity of space and time characteristics of a moving body, the notion of relative number reflects the internal connection between positive and negative numbers, and so on. At the same time all of these theories are known to satisfy the requirements of correct thinking, such as definiteness, conclusiveness and consistency.

Thus, Hook's statement substitutes logical contradiction for dialectical contradiction. This logical mistake needs no comment. As a matter of fact, the unity of opposites does not coincide with logical contradiction.

Correct thinking, definite, consistent and conclusive, will lead to the knowledge of truth. Formal logic, either classical or modern mathematical, is insufficient by itself to ensure the definiteness, consistency and conclusiveness of thinking. This is because natural phenomena and processes display dialectical contradictions which must be and are reflected by thought, whereas formal logic with its principles of identity, non-contradiction and others considers notions and forms of thought as something settled, not connected with the contents of cognition and thereby transformed into void abstracts.

On the other hand, abstracts, though destitute of motion by themselves, are indispensable for gaining a concrete know-

[1] S. Hook, *Dialectical Materialism and Scientific Method*. Special supplement to the bulletin of the Committee on Science and Freedom, Manchester, 1955, p. 7.

ledge of the objective world, considered as unity of manifold processes, as matter in progress of development. The abstract is an indispensable step towards the knowledge of the concrete. From times long past has natural science ever used this thesis of dialectics. Considered under this angle formal logic serves to apprehend the truth unless the range of application of its principles and concepts is extended into a region where the motion of cognition must be taken into account.

Formal logic lawfully deals with different aspects and relations of an object when they can be considered separately although they are actually interrelated in the real world. Dialectical logic knows no abstract separation lines; it determines the applicability range of the concepts and principles of formal logic, and connects the opposites through simples intermediate links to form higher syntheses.

Let us now compare the classical formal logic, the so-called quantum logic and the dialectical logic with reference to the knowledge of truth.

Classical Formal Logic. Its statements imply the existence of only two valid values: truth and falsehood. These values are not connected with each other and their opposition to each other is absolute. Nor do they depend on the conditions under which the statements are used. In addition to the identity and non-contradiction principles the law of excluded middle is in operation. To put an example, of two statements: "The bullet which hit the board has hit it at this point" and "the bullet which hit the board has not hit it at this point" either the first or the second is true (either the second or the first is false respectively), a third possibility being excluded.

"*Quantum*" *Logic.* Implied in its statements is the existence of three valid values: truth, falsehood, and indeterminacy. The "indeterminacy" (or uncertainty) is not tantamount to "lack of knowledge", but rather describes a special kind of situation. Neither "indeterminacy" nor the other two valid values are interconnected, being abstract opposites. The law of excluded middle does not operate any longer, whereas the laws of identity and non-contradiction remain in force. Example: if an electron which passed through a diaphragm with two holes is stated "not to have passed through a certain hole" this statement does not imply absolutely that it has passed through the other hole.

There remains a third possibility: the electron may have passed through the hole "indeterminately".

Dialectical Logic. Its statements admit the existence of an infinite set of valid values, each containing an element of truth. The value of a statement is determined by the conditions under which the statement is used, i. e., the truth is concrete. Within the limits of these conditions truth and falsehood are opposites and the principles of formal logic hold true. Outside of these limits the opposition of truth to falsehood is no longer absolute, the statement is modified and filled up with new contents, assuming a new valid value, whereby the knowledge of the object to which the statement refers rises to a higher level.

Corroborative information and examples will be giben in the section which wollows while discussing quantum physics.

3. Sensual Apprehension and Abstract Thought in the Reflection of Nature by Physics

In a logically developed physical theory its object is reflected at once by sensual apprehension and by thought. Obtained by means of instruments are sensually apprehended data on the object under investigation, whereas the mathematical equipment of the theory (i. e. a system of mathematical abstractions) permits these data to be raised to the generalisation level, so that the law of the phenomenon studied can be revealed.

No physical theory, if it reflects (or should reflect) an objective reality, can obviate the necessity to connect its mathematical system with instrument records: in the absence of such a connection, i. e. without disclosing the physical meaning of the mathematical abstractions employed, there will be no physical theory. To put it on philosophical basis, nature with which physics has to deal is matter in motion, and we cannot possibly get any knowledge of matter unless matter is made to act on our sense organs (directly or through instruments).

Physical notions in the classical theory are usually direct generalisation of the notions arising in everyday experience; they are formed in this way as the physicist proceeds from instrument records to mathematical notion, connecting them according to certa in rules. For instance, from

practical comparisons of perceived solids with reference to length we have arrived at the notions of constant measuring rod and unit length, and further on have developed certain rules for bringing the measured lengths into correspondence with definite numbers. In this way the lengths of the perceived objects could be measured accurately, or, generally speaking, the notions of everyday experience and mathematical abstractions could be synthesised in physical notions.

It is also possible to go the opposite way round, proceeding from the mathematical abstractions used in theoretical equations to perceived instrument records. This way indeed is typical of quantum physics, as it investigates directly imperceivable phenomena of atomic and subatomic scale. Thus, the fundamental equation of quantum mechanics, first formulated by Schrödinger, contained the wave function most important notion of that theory, whose physical meaning was discovered later.

The rules applied to connect mathematical notions with observations and instrument records are different in quantum mechanics and in the classical theory. In the latter the instruments records are connected with the values of variables mathematically representing classical quantities. In quantum mechanics, on the other hand, connected with instrument records are the eigenvalues of (Hermitian) operators which represent the physical quantities of the quantum theory mathematically; the wave function characterising the state of the microobject under certain conditions permits the transition from the operators to the values of physical quantities observed in the experiment.

Corresponding to this distinction between classical mechanics and quantum mechanics is the difference in the mathematical tools employed by these theories: the equations of the classical formalism establish some relations between variables (numbers), whereas the relations established by the equations of the quantum theory formalism are between operators — mathematical notions more abstract than numbers, which do not necessarily obey the commutative law of multiplication.

Two circumstances should be emphasised: First, the quantum theory cannot avoid classical notions since they are necessary to describe the experimental data with which the notions entering into the mathematical system of the

theory are connected according to certain rules. Without this connection, as has been mentioned earlier, the quantum theory cannot possibly be a *physical* theory.

Secondly, the rules for connecting formal mathematical notions with instrument records are different in the two theories, each proceeding in its own way. Thereby is reflected the qualitative distinction of the laws valid in the macroscopic world from those governing the atomic-scale phenomena.

When we pass from the mathematical notions used in the equations of classical mechanics to observations (instrument records) no paradoxes arise or can arise because instrument records are described by means of classical notions and the equations are establisehd as a mathematical abstraction of a system of measurements of a set of classical quantities

In quantum mechanics the conditions are different. Here paradoxes inevitably appear when we pass from mathematical notions to instrument records (which is connected with the problem of reconciliation of the corpuscular and undulatory patterns in the behaviour of microobjects). Their source lies in the contradiction between the mathematical system of quantum mechanics and the description of instrument records by means of classical notions, the former reflecting the behaviour of microobjects whose dual corpuscular-undulatory nature distinguishes them qualitatively from macroscopic objects, while the latter have been developed by studying the macroscopic world.

The role of the mathematical system of a physical theory is not merely to reconcile instrument records; it reflects an objective reality though not directly in its abstractions but rather in their synthesis with observational data. Therefore, we may lawfully ask: how are the paradoxes of the quantum theory being solved? In other words, whether and how is it possible to express in notions the physical meaning of the quantum theory formalism on the basis of instrument records described by means of classical notions?

This question is discussed in the following section. Let us summarise: The sensual element and the abstract thinking element both enter necessarily into classical notions as well as in those of the quantum theory. Physical notions result from a synthesis of sensual and abstract knowledge of the objective reality.

4. Quantum Theory and Dialectical Contradiction

How to reconcile the corpuscular and wave patterns in the behaviour of microobjects seeing that they agree with experimental evidence and at the same time exclude each other when viewed in the light of classical concepts? Above was discussed the complementarity concept favoured by physicists, which is an attempt of such a reconciliation. Setting aside other systematised views on quantum mechanics, let us turn to the concept which recognises as a fact the dual corpuscular-undulatory nature of microobjects.

Many physicists have analysed the various aspects of this dialectical concept [1]. Its philosophical core has been distinctly elucidated by S. I. Vavilov [2]. On this concept, matter is neither a set of particles, or a set of waves as represented by classical physics. Nor is it a combination of corpuscular and undulatory properties united in some mechanical model. The corpuscular and undulatory properties of matter are opposite manifestations of a single entity, i. e., the properties of particles and waves are simultaneously inherent in matter.

Consideration of matter in this light gives a new philosophic sense to statements that in quantum physics both the notion of particle and the notion of wave are fundamentally different from what they are understood to be in classical mechanics and in the classical field theory, respectively. The limitations imposed by quantum mechanics on the classical notion of particle (they are expressed in the uncertainty relation) set no limit to the knowledge of matter, but rather refine the knowledge of its corpuscular properties by taking account of its undulatory nature. The statement that in the quantum theory a system of particles is described mathematically by waves in a multidimensional configuration space does not express the idealistic thesis to the effect that the observable universe is dissolved in mathematics. Expressed by this statement is the truth that a field is at the same time a set of particles, and a set of particles is at the same time a field.

[1] D. S. Rozhdestvensky, *Analysis of spectra and spectral analysis*. Uspekhi Fisicheskikh Nauk, Vol. XVI, iss. 7, 1936; Tamm I. E., *New principles of Bose-Einstein's statistical mechanics*. Uspekhi Fisicheskikh Nauk, Vol. VI, iss. 2, 1926; Blokhintsev D. I., *The Foundation of Quantum Mechanics*, Moscow, 1949; Fock V.A., *On the Interpetation of Quantum Mechanics* in Philosophical Problems of Modern Natural Science, Moscow, 1959.

[2] Vavilov S. I. *The Microstructure of light*, 1959; *The eye and the sun* see also his papers on the philosophical problems of physics, in the Collected Works, Vol. III, Moscow, 1956.

In quantum mechanics the distinction between particle and wave is considered to be of relative nature, these notions losing their abstract opposition to each other. Accordingly the notion of particle undergoes a change, receiving a new definition since in quantum mechanics the notions of particle and wave have a meaning only in their interrelation. This is in agreement with the fact that the properties of microobjects as revealed in experiments are never exactly those of a particle or a wave and it is only in the limit cases that microobjects behave like particles or like waves according to the conditions of observation. It will be obvious that in describing atomic-scale phenomena the experimental conditions (fixed by instruments) must be taken into consideration. This relation to observational means is a distinctive feature of a quantum-mechanical description, and it reflects the unity of opposite corpuscular and undulatory properties of microobjects.

Accordingly, the quantities entering into the so-called uncertainty relations of quantum mechanics differ radically from their classical analogues; they are quantities *sui generis* and cannot be reduced to classical quantities.

Nothing paradoxical remains then about the uncertainty relation. For instance, the uncertainty relation between the momentum and the co-ordinate is a paradox only if they are considered to be classical quantities. But as a matter of fact, the uncertainty relation in that case shows that the eigenvalues of the operators for the momentum and the co-ordinate are incompatible, i. e., tells of a law governing quantum quantities. It is just because a microobject is an entity of a dual nature, both corpuscular and undulatory, rather than a particle in the classical sense, that its momentum and co-ordinate have no definite value at the same instant. In other words, the impossibility to describe a microobject without recourse to the notions of probability and potential possibility lies in the very nature of this entity.

The question arises, why the statement of the unity of corpuscular and undulatory properties of matter is serviceable only in studying the phenomena of the microworld,

while a study of the macroworld phenomena requires the recognition of a rigid antithesis between matter (particle) and field (wave)?

The answer to this question is briefly as follows. The universal constant h connecting corpuscular and wave quantities together and having the dimensionality of action (described as quantum of action) is very small compared to those quantities typical of the macroworld phenomena which likewise have the dimensionality of action. So h can be neglected in studying the phenomena of the macroworld, i. e., the corpuscular and undulatory properties of matter can be considered separately taking no account of their unity. In this way the laws of quantum mechanics are modified to become the laws of classical mechanics. Why should h have the numerical value it has? This question is unsolved by modern quantum theory, which takes h for an empirically given quantity. Its solution requires a theory more profound than modern quantum physics.

In literature the question we have just discussed is often replaced by quite a different one: what does the unity of corpuscular and undulatory properties of microobjects essentially mean or, as it is put sometimes, what is the essence of the corpuscular-undulatory dualism? It is believed that the quantum theory fails to disclose this essence, leaving this task to a theory to come.

Now, this question has no sense just as the question of the essence and foundation of the atom has no sence for the atomist. In fact, the atom can have neither essence nor foundation since it is itself the foundation of all that exists. "The unity of corpuscular and undulatory properties of matter" is a principle which discloses the essence of microworld phenomena and lies at the basis of the quantum theory. This is why from the standpoint of the quantum theory, which reflects the microworld, the question as to the essence of this unity, which some new non-quantum theory is expected to come to disclose, has no sense whatsoever.

A different thing is the fact that modern physics is no logically complete system of theories. While some of the theories (for instance, quantum mechanics) are logically closed systems of notions, others (for instance, the theory of elementary particles) are but in the making, and search is going on for logical bridges between such theories as relativity and quantum mechanics, etc. Yet the tendency of modern physics towards a logically complete system of theories is obvious, and considering the philosophical aspect it can be safely said that the road to such a system will not lead through the "discovery of the essence of the corpuscular-undulatory dualism". Something quite different will turn up.

It must be borne in mind that "the unity of corpuscular and undulatory properties of matter" is an adequate expression in modern physics of the principle of unity between the discreteness and continuity of matter. In dialectical materialist philosophy this principle is invardly connected into a logical chain with the principle of space-and-time unity, and also with that of world unity and with the principle of development. Modern physics has still a long way to go for an adequate expression of the whole of this chain. Thus, in quantum mechanics the synthesis of corpuscular and undulatory representations of matter does not relate to fields; in the quantum field theory this synthesis is more profound, combining into one the notions of field and matter. However, in modern physics no organic combination has yet been established between quantum theory and special relativity (where the principle of space-time unity is expressed more completely than in classical physics). The start for such a synthesis has been initiated by Dirac's relativistic theory of the electron, but a long way lies still ahead. As for the general relativity, which has tied up the space-time continuum and the gravitation field into a single whole, it stands yet aloof from quantum physics, but for some ideas expressed by several different authors.

Thus, modern physics awaits a deep synthesis of its leading theories. Corresponding to this future synthesis is a union of the philosophical principles stated above. These principles, interconnected as they are, open philosophical prospects for modern physics to solve the theoretical problems which came up in course of its development.

Very often the idea of unity between corpuscular and undulatory properties of matter has been linked up with idealistic outlooks and represented in a distorted form. So it was at the time when quantum mechanics was assumingh its present aspect and so it is now. In Marxist literature and philosophy on modern natural sciences this point has been

cleared up thoroughly[1]. Here it will suffice at the end of the present section to make a brief remark on the statement that "the interaction between object and instrument defies any control in principle". On this assumption certain physicists believed themselves to have solved the paradoxes of quantum mechanics.

It was assumed that the uncertainties involved in a simultaneous measurement of the co-ordinate and momentum of a microobject are caused by impossibility in principle to control the interaction between microobject and instrument. Yet by subscribing to this statement we refute the objectively real nature of the unity between the corpuscular and undulatory properties of microobjects. The assumption naturally gave rise to idealistic conclusions that observations and measurements are a kind of source for quantum theory laws and that the microobject has a different „degree of reality" compared to the instrument, and so on.

"Interaction defying control in principle" is philosophically a wrong notion when applied to natural phenomena. In fact, all phenomena (and laws) of nature can be known and, accordingly, none of them is beyond our control in principle. So the notion is rather an incorrect expression of the truth that new forms of matter and motion have been discovered, which defied the attempts to bring them within the scope of cllassical theories, that the laws of microphenomena are irreducible to the laws of classical mechanics, which far from being absolute are confined to a certain domain of natural phenomena, and so on. The physicists which coined the expression did not assign it a definite meaning, and idealist philosophers used this circumstance against materialism.

Logical positivists subjected the idealistic views to criticism. Thus H. Reichenbach expressed himself against the statement that "the uncertainty is due to the object being disturbed by the observer". He criticised those who believed that "quantum mechanics called for return to idealistic philosophy, according to which" "ego" created the world, or at least the world could not exist without the „ego" that observed it". At the same time Reichenbach has come to the conclusion that "human knowledge of microcosmos

[1] See, for instance, Philosophical Problems of Modern Physics, Kiev, 1956; Moscow, 1958; Moscow, 1959; Philosophical Problems of Modern Natural Science, Moscow, 1959.

is bounded by the uncertainty principle"[1], and this is idealistic inference.

Because it considers the mathematical system of a physical theory merely to be a tool for establishing relations between observational data, logical positivism is unable consistently to criticise idealistic views in science and advocates in reality a subjective standpoint. A consistent criticism of the idealistic attitude towards the philosphical problems in physics comes only from dialectical materialism.

5. The Problem of Particles Elementarity

In the quantum field theory the synthesis of corpuscular and wave aspects is more profound than in quantum mechanics. Necessarily connected with this is a characteristic feature of the quantum field theory: raised to the rank of fundamental law in it is the interconversion of elementary particles discovery made by modern physics, while the classical theory could not even think of it. Accordingly, the problem of particles elementarity presents itself in a new light.

In prequantum physics this problem, as is well known, has been solved as follows: lying at the foundation of matter are unchangeable, structureless particles which form the structure of more complicated forms of matter. In chemistry this assumption juctifies itself to a certain extent: Prout's hypothesis that chemical elements consist of hydrogen has come to be essentially true, although the role of hydrogen is played by the charge of the atomic nucleus, which determines the number of electrons in the atomic shell and the place of the element in the periodic table. From the chemical point of view the chemical element is an "elementary substance"; yet from the standpoint of atomic physics the chemical element is a complicated system, consisting of different ingredients (the atomic nucleus and the electrons of the atomic shell).

Now that modern physics has found an abundance of elementary particles interacting with one another and exhibiting a set of varied properties, the elementarity problem has come up again. Can it be solved in a familiar way, as

[1] H. Reichenbach, *Time Direction*. Moscow, 1962, p. 302.

was done before the discovery of elementary particles, or is some new approach necessary? To clear up the situation, it is well to note that highly stable particles which will not disintegrate without external influence, such as proton, electron, photon and neutrino, should not be described as genuinely elementary to distinguish them from elementary particles which decay spontaneously and on this consideration are regarded as complex. No, the neutron is not composed of a proton, an electron and a neutrino, although free neutrons decay to liberate these three particles.

It may seem that the elementarity problem can be reduced to a certain set of divisions (or levels) of matter, each constituting simultaneously an "elementary" step for the next division and a complicated step relative to the division preceding it. This elementarity scale is embodied in Newton's concept of matter as a system of particles of gradually increasing complexity and, to a certain extent, in the modern representation of the structure of matter (...level of elementary particles, level of atomic nuclei and atoms, molecular level... the scale continuing toward macroworld and, possibly, toward microworld).

Will the scale-structure concept of matter really solve the elementarity problem?

Suppose the series of divisions to begin on the elementary side. The matter will be represented as a set of elementary particles and of systems (particles) of varying degree of complexity composed ultimately of the elementary particles. We are facing a variation of the old atomic theory.

Now suppose the scale of divisions of matter to continue indefinitely on either side, forming an infinite series of transitions from "elementary" to "complex" and conversely. On this assumption the "elementarity" is a relative notion, every object considered separately being complex. This will ultimately (I omit the reasoning) lead to the conclusion that there are no "elementary" objects at all, i. e., that matter does not consist of elementary particles.

There is one more approach to the problem. This is to discard the notion of purely relative elementarity while remaining at variance with the old atomic theory. As pointed out by Engels, the infinite scale of divisions of matter consists of different nodal points which account for the qualitative variety of forms in which matter appears. From this standpoint matter is no mere set of elementary particles and their combinations, neither is it all substance destitute of elementary particles, but rather presents a union of properties typical of the elementary and of the complex.

In the physics of the macroworld you can neglect the unity of the elementary and complex and consider them separately without coming to conflict with facts, yet in quantum physics the situation is utterly different. This is because the deeper physics penetrates inside matter, the stronger its theory depends on the interconversion of elementary particles. In modern atomism the notion of *transmutation* comes to the fore, and in this new aspect the problem of elementarity and complexity cannot be managed in the way it was dealt with by the classical atomic theory (where the concept of transmutation reduceds to the conjunction and disjunction of some immutable elements).

When applied to the microworld, the notions of elementary and complex lose their literal meaning and are no longer abstract opposites. Elementary particles are not elementary in the classical sense of the word. They are more like classical complex systems, but the likeness is by far not complete. As a matter of fact, they combine the properties of the elementary and the complex, presenting a higher type of synthesis. Accordingly, the word "consist" (or "be composed") loses its literal sense too, when applied to the microworld. It does not mean here that anything is composed of something different.

Even in nuclear physics the notion "consist" undergoes some metamorphosis. When the atomic nucleus is said to „consist" of neutrons and protons the word „consist" has not quite the same sense as in the statement that the sand in the box consists of sand grains. As is well known, the atomic nucleus is not composed of neutrons and protons. The notion „consist" is still further metamorphosed, when applied to the complex structure of the pi-meson, composed of a nucleon and an antinucleon (Fermi's hypothesis) Here the huge mass defect formed in the pi-meson reduces the nucleon masses all but to nihil. So the world "consist" in the statement of Fermi's hypothesis has a very arbitrary meaning.

Still More essential is the change of meaning suffered by the word "consist" when it is used to describe resonance particles, recently discovered, which are elementary par-

ticles with an extremely short life (under 10^{-20} sec.). One of these particles, for instance, the nucleon resonance N* can be formed and can disintegrate into a nucleon and a pi-meson. This does not mean, however, that this particle "consists" of a nucleon and a pi-meson.

These examples show clearly that transmutable elementary particles cannot be described as "elementary" or "complex" of themselves, i. e., without regard to the conditions under which the transmutation has taken place and with which their nature is connected organically. In experiments no elementary particle behaves exactly like an elementary entity or like a complex system. Only in some special cases elementary particles appear either as elementary entities or as a complex structure depending on the conditions of transmutation. Thus, the proton behaves like an elementary entity when colliding with particles having energies less than 100 Mev, but if the colliding particles have much higher energies, then proton may be considered to consist of hyperons and K-mesons.

Nere the word "elementary" does not describe a purely relative elementarity. If, indeed, we say of an object that its elementarity is purely relative, this implies that it is actually a complex thing. With the elementary particles the state of affairs is different. The proton, for instance, is neither elementary of itself, not complex; it cannot possibly be assigned either of these properties without having regard to the conditions of its transmutation. In other words, to describe a proton as complex has a sense only if the energy of its collisions is duly taken into consideration (whereas we can speak of the complexity of the atom without taking into accout its ionisation energy).

The relative nature of the "elementarity" and "complexity" of elementary particles is analogous to the relativity of the dimensions of a body and the duration of the process it is involved in, according to Einstein's theory, or to the relativity of the corpuscular and undulatory characteristics in quantum mechanics, although these relativities have different contents. Without the relativity used in this sense it would be impossible to apply classical notions, in duly refined form, to the description of such natural phenomena as refuse to enter the frame of the classical theories.

It will be evident that the elementary particles of the kind described, elementary and complex at once as they

are, cannot possibly be structureless objects. According to modern views, an elementary particle, for instance, the nucleon, is not conceived as a point, but rather has structure. (Hofstadter's experiments), though not a structure in the sense the world has been used in prequantum physics. When an elementary particle is said to consist of other elementary particles, which enter into it not in a real form but rather in a virtual state, this means that the words "structure" and "consist" have not the same sense in quantum mechanics as in the classical atomism.

The new meanings of the words "elementary", "complex", „structure", etc. are due to the mutual transmutability of elementary particles, which is the principal feature of modern atomism.

6. On the Strict Physical Notions

When quantum mechanics had established itself as a physical theory, it was generally recognised that the laws of classical mechanics hold only in the macroworld, breaking down in the microworld, and so are of no absolute or universal nature.

In quantum mechanics this apprehension of the laws of physics has been consistently applied to its mathematical system. Not so consistent is the attitude of different authors toward the rules of connecting mathematical abstractions with instrument records to give physical sense to these abstractions. All authors are not equally aware of the fact that the connection rules should not be the same in the classical as in quantum theory[1].

It is often stated in literature, indeed, that no new fundamental physical notions should be introduced in quantum mechanics and that the fundamental classical notions applied with limitations set up by the uncertainty relation should suffice. And attempts have been made to

[1] L. I. Mandelstam seems to have been the first to point out the necessity of using different rules of transition from mathematical notions to experimental data in classical theory and in quantum theory. (Lectures on the «Foundations of Quantum Mechanics», in Collected Works, Vol. V, 1950, p. 354. Academy of Sciences of the U.S.S.R.).

proceed further to the philosophical conclusion that the uncertainty relation imposes limitations on human knowledge.

That such statements are incorrect has been shown in this paper earlier. The qualitative distinction of the laws governing the macroworld from those valid in the microworld becomes apparent especially in the fact that not merely the mathematical tools but the rules of connecting the mathematical notions with instrument records are also different in classical mechanics and in quantum mechanics.

In modern phsysics this attitude toward the relation between the laws of classical mechanics and those of quantum mechanics is generalised to cover the interrelations between all fundamental physical theories. Recognised is the existence of closed systems of notions, definitions and axioms, each presenting the highest logical abstract of the respective theory which describes a definite domain of natural phenomena. The first system relates to *classical mechanics*, covering also acoustics, hydrodynamics, aerodynamics, celestial mechanics and several other sciences concerned with mechanical processes. The second system has been formed in connection with *thermodynamics*. The third system has been deduced from the studies of *electric and magnetic phenomena* (being built up by the work of Lorentz, Einstein and Minkovsky). The fourth system relates to *quantum mechanics* and is also serviceable to the theory of atomic spectra, to the conduction theory, etc. The appearance of a fifth system is possible in connection with the *theory of elementary particles*, which is yet in the making. And we can also speak of a sixth system, connected with *general relativity*.

These closed systems of notions reflect the existence of discontinuities (jumps) in nature and testify to the fact that the motion forms of matter, interconnected by transitions, differ qualitatively from one another.

As for the interrelation of these systems, this question, speaking generally, reaches far beyond the frame of the present paper. In the first place it may be remarked that classical mechanics is contained in special relativity and in quantum mechanics as their limit case. Similarly quantum mechanics and special relativity will enter as limit cases into the theory of elementary particles when it will be built

up. Secondly, the notions of classical mechanics and some of those of the classical field theory are necessary to establish the rules for connecting the mathematical system of the theory with instrument records. The second requirement is not realised distinctly in general relativity, where the mathematical aspect predominates.

Let us now see what the expression "a strict physical notion" means.

It has been emphasised above that in any physical theory a physical notion reflecting reality is neither an instrument record nor a mathematical abstraction, the two being merged into a single whole reverberating an objective reality. *Strict* physical notions are strict because they correspond to an objective reality (the correspondence being established by experiment).

The so-called *abstract* physical notions should not be set in opposition to the so-called *obvious* physical notions, as regards their relation to objective reality and their accuracy. Both the former and the latter so far as they reflect an objective reality (this question is ultimately settled by experiment), are accurate notions. Every physical notion is connected with some experimental data, but in the case of abstract notions the connection is effected through a more complicated logical chain of reasoning (implying a deeper penetration into the laws of nature), than in the case of intuitive notions. Therefore, both abstract and intuitive notions use terms of habitual language in their definitions, yet by far not to the same extent: in the definitions of intuitive notions you can easily trace their origin from experience (thus, the notions of habitual language, which may be regarded as the limit cases of intuitive notions, are immediately derived from experience), whereas abstract notions are defined by means of a system of fundamental notions and axioms, so that their connection with the experimental evidence is not immediate and often follows a rather tortuous way.

On the other hand, strict notions retain their *strictness* only within the limits of a definite closed system of notions. So they are only *relatively* strict there being no unified closed system in existence. It stands to reason that every relatively strict physical notion includes some sensual element, due to its connection with experimental evidence.

Therefore, the notions of a theory (as far developed logically as to have a closed system of notions) contain an abstract-thought element and an intuitive element. This is true of non-classical as well as classical theories in physics. Yet the notions of a classical theory are direct generalisations of experimental data (it can be said that the respective notions of the familiar language are raised in a classical theory to the first rank of abstraction), whereas the notions of the quantum theory are not; here the experimental evidence is generalised indirectly through the use of classical notions, which pass into more abstract, non-classical, notions.

Thus, we arrive to the conclusion that classical notions are by no means a priori statements (in a certain sense) relative to quantum theory; in other words, we cannot subscribe to the view that in quantum theory only classical notions are used with the respective restrictions. As stated above, quantum mechanics employs fundamental notions and principles of its own. Accordingly, its notions, though qualitatively different from classical notions, are not less accurate, definite and clear. In quantum mechanics there are new fundamental notions, such as "relativity to observation means", "probability as a measure of the potentially possible", and others[1]. This circumstance should be taken into account when considering the problem of accurate physical notions.

To illustrate, here is an example. Reflected in the classical notions of velocity and position, clear and accurate, is the fact that classical mechanics investigates the slow (compared to light) motions of the macroscopic bodies. In the oscillation theory, which investigates the motion of waves, quite accurate notions of phase velocity and group velocity are used, which must not be identified with the notion of velocity as used in classical mechanics. Even more complicated is the state of affairs in quantum mechanics since the electron does not exactly behave like a particle or a wave, but exhibits corpuscular and undulatory properties at once. Here we cannot speak of velocity and

[1] The essential theoretical significance of "new primary notions" in quantum mechanics has been noted by V. A. Fock. (Notes on Bohr's discussions with Einstein. Uspekhi Fisicheskikh Nauk, Vol. LXVI iss. 4, 1958, pp. 599—600).

position as independent of each other, so that new accurate notions are employed, which differ widely from the conventional classical notions, yet are still connected with them.

To conclude, let us dwell on a certain tendency observed in physical science which seems to run counter the tendency toward accurate notions just discussed.

The latter, indeed, does not ensure an adequate knowledge of nature. You cannot exhaust nature or any part of it. Accordingly, science, theories and notions in reflecting nature more and more fully and deeply cannot but change and develop indefinitely. Old notions (and theories) become inaccurate when applied to a new sphere of natural phenomena, new accurate notions and theories are developed to correspond to the new domain. Thus, when physics penetrates into a new domain of phenomena, the applicability range of its old nations and theories is defined and all along new notions and theories are developed. These two processes merge into a single process — that of the development of science: first the inadequacy of the old notions in the new domain is established empirically, whereby hindrances and paradoxes arise in the existing theory — the period of travail before the birth of a new theory; further on the development of knowledge leads to a strict definition of the applicability range of the old notions and theories, and this definition goes hand in hand with the development of a new system of notions, thus a new theory comes into existence.

The whole length of this road led to the quantum mechanics, which at present is a closed system of notions, and the same course is being followed by the modern theory of elementary particles. Here again the presence of hindrances and paradoxes tells of the necessity to develop in the main a new system of notions, or "mad ideas", to use the graphic expression of Bohr.

So we come to the conclusion that science, when in progress of development, cannot manage to go ahead with accurate notions only, and never could. Under certain conditions, when the new theory is still underway and has not yet developed its own system of notions, science cannot but use inaccurate notions without which the building of a rigorous, consistent and complete theory is practically impossible.

Thus, the tendency of a developing science to strict notions interlaces and merges with an opposite tendency, characterised by the use of loose notions. Every advance of science entails their employment; they disappear when a certain developmental cycle of science is complete, to reappear again at a further stage of development.

To summarise, quantum physics is permeated by dialectical contradictions. It implies the recognition of contradictions and oppositions in the very objects and phenomena of nature, their union and transitions into each other, the solution of old contradictions and the appearance of new ones.

MAN AND HIS ALIENATION

Professor
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The problem of alienation stands out as the first among the philosophical problems that have attracted the investigators in the last 25 years. It is universally known that the problem is not new: it can be found in the works of the Enlighteners of the 18th century and in those of German romanticists. It is the central problem in the classical German philosophy, especially in the works of Fichte, Hegel and Feuerbach. In their early works (1844—1845) Marx and Engels investigated a new, materialistic approach to the problem in connection with the analysis of the origin of private property and the contradictions of money and goods economy. In spite of the fact, however, that the problem of alienation occupied such a conspicious place in the philosophical teachings of the 18th-19th centuries, some 30 years ago the concept of alienation had actually no status in philosophical literature. Thus, for instance, we do not find the term "alienation" in R. Eisler's fundamental "*Wörterbuch der philosophischen Begriffe*" (1927-30). It is even more surprising that this term is given without philosophical explanation in P. Lalande's *Vocabulaire technique et critique de la philosophie* (Paris, 1956). The explanation probably lies in the fact that the concept of alienation does not belong to such traditional philosophic categories which are never left out by the compilers of philosophical dictionaries. On the other hand it may be explained by the fact that *alienation* is not a generally accepted term; it has almost no place in the neopositivism or new realism. But in the doctrines of existentialism, in neothomist philosophy, in modern protestantist theology and in the works of numerous critics of Marxism the problem of alienation is undoubtedly the problem of prime importance.

What inspired this widely spread if not universal concern for the problem? It has of course its roots in theory and is closely linked with the considerable influence the abovementioned teachings enjoy in the Western world. The crux of the matter lies, however, in our opinion, in the fact that the enormous progress of industry and great scientific achievements of the past fifty years brought about some rather negative and, as many people assert, unexpected consequences. As a result, some thinkers found themselves confronted with the question of whether such a progress of science and industry might not lead mankind to a catastrophe? Other philosophers did not confine themselves to merely stating the question but attempted to prove that scientific and technical progress threatens the very existence of mankind. In a sense their point of view was supported by the invention and perfection of nuclear weapons. Their sinister destructive force that indeed endangers the lives of all the people on our planet began to be regarded by some philosophers as the inevitable result of the development of human mind, the fatal consequence of scientific and technical progress and direct evidence of tragic discordance of human life.

Hegel's conception of alienation elaborated in *The Philosophy of History* contains already certain conjectures concerning the objective consequences of the fact that the conscious and useful activity of man is independent of his will and consciousness, concerning the contradictory and relative character of progress and the domination of social relationships over individuals. It is obvious that the contradictions of social progress which have found in our days actual expression in economic crises, wars, nuclear menace, are incomparably sharper and wider than in Hegel's time. This, we think, heightened the interest in the problem of alienation. The problem of alienation is now a problem of the contradictions between social progress and the diversified human activity.

A considerable part of Western philosophers who have devoted their efforts to the problem of alienation regard it as an anthropological problem independent of any historical conditions. From this point of view all objectification, all embodiment of human activity — whether it is material or spiritual — is alienation of human nature, a loss, deprivation, denial of oneself, an enslavement of

man by what he creates. Thus, for instance, the alienation of labour is regarded not as a consequence of certain historically transient forms of social production but as the result of any labour under any historical conditions. The concept of alienation thus becomes the main sociological feature of the subject-object relationship: since the man himself creates the social conditions of his life, he himself forges the shackles that bind him. It has always been and will always be so. Such is the anthropological interpretation of the sociologically established fact of the alienation of the elemental forces of social development over man. The anthropologist reduces the social to the individual, anthropological, and attempts to discover the source of all social cataclysms in the individual human existence; and even if no political conclusions are drawn here, it is perfectly obvious that the anthropological picture of the future of mankind is quite pessimistic: nothing, no social change can overcome alienation, self-alienation and the resulting tragic discord of human life.

The pessimistic interpretation of all objectification, of all embodiment of human activity leads some representatives of philosophic anthropology to pessimism in their view of the very existence of man. The existence of man being regarded as a certain individual existence, it is identified with alienated life that ceases with death. Death however, is not a solution of the tragedy of individual existence since it destroys existence itself. From this point of view the self-awareness of an individual is the awareness of alienation, the conception of reality is the apprehension of alienation, death is the inevitable consequence of alienation. Communication with other people, whatever its form or intensity, does not overcome alienation. On the contrary, it is one of its modifications. Even the fact that I am consicous of my difference from things that surround me, i. e., I am aware of the fact that I am not a tree, or a cloud, or an ass, is interpreted as the consequence of self-alienation, as life in alienation. Moreover, the very difference between subject and object is usually interpreted as evidence of priority and substantiality of alienation.

It is known that the concept of alienation was of universal significance for Hegel's philosophy. It played the same role in his ontology as did the concept of emanation in the systems of neoplatonics. With the help of the concept of

alienation the contrast between opposite entities such as thinking and being, subject and object, knowledge and its object-matter was overcome in Hegel's epistemology. In his philosophy of history the concept of alienation served as a basis for his claiming unity of the history of mankind and regularity of progress through the realization of freedom, that constitutes the substantial content of man and mankind. By means of alienation Hegel made an attempt to overcome the infinite contrast between man and God in his philosophy of religion. According to Hegel all development meant origination, negation and, finally, the revival of alienation in the form of negation of negation.

Feuerbach did away with the universal and absolute character of Hegel's concept of alienation and proved that this concept becomes meaningful only in respect to human activity. He was the first to announce that alienation was a human, an anthropological reality. That was an outstanding philosophic achievement. We think, however, that modern representatives of philosophic anthropology have deviated from what was right in Feuerbach's assertions. Notwithstanding the fact that they follow Feuerbach in emphasising the human, anthropological character of alienation, there exists a tendency among them (for instance, with existentialists) to deduce all and every reality, all and every being from "human reality". In this case the whole world surrounding us is transformed into objectification (alienation) of human emotion and feelings, among which they primarily mean fear, concern, despair and other negative emotions. As a consequence of such an anthropologisation of all existence the category of alienation becomes a basis of a philosophic system obviously subjectivist in its main tendency. We have here something like an anthropological interpretation of Hegel's system, of his doctrine of alienation. Such a position is the opposite of what was suggested by Feuerbach because it sets forth an idealist anthropologism instead of Feuerbach's materialistic anthropologism.

Some critics of Marxism assert that the Marxist approach to alienation is faulty because alienation is treated as an historically transient phenomenon, entirely superseded by the communist transformation of social relations. But in this case, according to anti-Marxists, the future of mankind must be conceived as entirely devoid of any contradictions,

of any vital tension. Criticism of this kind is flagrantly founded on a misunderstanding, for its starting-point is the anthropological concept of alienation according to which it is unsurmountable and permanent. From the Marxist point of view, however, alienation is primarily a definite social and economic fact, its origin and development being conditioned by objective circumstances. The adherents of philosophical anthropologism discover the alienation through an analysis of vital activity of the individual. From the Marxist view point alienation is a social relationship of a certain kind; it is therefore a question of alienated social relations, the destruction of which becomes possible and necessary owing to the development of the productive forces of communist society. It follows naturally that to overcome alienation in the development of the communist formation is by no means tantamount to doing away with contradictions, difficulties, tensions of social development. Communism does away only with antagonistic contradictions connected with private property and the existence of antagonistic classes, one of which appropriates the labour of the others. But under communism, too, so long as humanity exists there will exist contradictions between the new and the old, the subjective and the objective, etc. These contradictions, however, as well as the difficulties encountered by mankind in its subsequent development cannot be given the name of "alienation". The latter has a definite meaning which is lost if the attempt is made to make it absolute, universal and stretch it to cover all conceivable things.

When, for instance, a man builds a house for himself, he materialises his activity, transforms it into something that will exist independent of him. But this action in itself, when abstracted from social conditions in question, is not alienation or alienated labour. Labour is the natural and most important manifestation of human vital activity. Labour has been the most important factor in the anthropological consummation of man and in his subsequent development. And the man alienates himself not for the simple reason of doing work, but because of the hard labour, which takes up the greater part of his life, forced labour preventing him from developing the other sides of his nature. Alienated labour is an external necessity and not at all a longing; it is the means to live but not life itself. For the man whose labour is alienated, life begins where work

ends. This attitude of man to his work as to something alien, external, forced, is conditioned by certain historically transient factors: the low level of productive forces of society which had brought about private ownership of the means of production, social inequality and exploitation.

When a singer is singing she is far from alienating her own essence; she only realises and enjoys it. But it is not only singing and artistic activity but all the work (as a result of the scientific and technical progress and the necessary social reforms) that will become joyful creative activity, not alienation.

The concept of alienation includes not only the attitude of man to his activity but also his attitude towards the object, the product of his activity. During the whole course of the history of mankind alienation was most marked as alienation of nature on the one hand, and as domination of the product of labour over man on the other. From the point of view of the romantic critics of civilisation, critics of industrialism and urbanism, man, by changing, transforming nature, alienates it by maiming and polluting it, by depriving it of its primeval beauty. There is no denying the fact that production (in forms taken by it in the course of centuries) did bring about unwelcome, undesirable changes in nature. But there is no reason to believe that rapacious economy is the absolute law of production. It is alienated labour and not the labour as such that disfigures and pollutes the nature. Free labour even enriches, ennobles nature, embellishes it. Man is capable of transforming nature as an artist, as a master, but the required condition for this is to do away with alienation.

The domination of the products of labour over man is by no means a natural sequence of the fact that it is man who produces them. Nowadays quite a few philosophers, sociologists and writers indulge in disquisitions tending to expound the view that mankind has created monsters which, instead of serving it, have subjugated it. Industrialisation, automatisation and especially thermonuclear weapons — these are the concrete instances usually adduced to support this view. Some go even further and claim that by producing new objects men produce also new requirements formerly not existent. In this way man becomes more and more dependent on the products of his own labour. The objects created by men are, so to speak, a gigantic realm

of alienated human essence, which subjugates man and is likely to bring him to a tragic end.

There is no denying that elemental consequences of scientific and technical progress gave rise to such destructive forces as thermonuclear weapons. It is equally clear that the demands generated by the progress of production and culture can subjugate man, especially if these demands find no reasonable gratification. There is no reason, however, to claim that this power of things over men is a natural consequence of labour, of the fact that, being materialised, it acquires a relative independence in the form of things. In the society in which an abundance of material things has been created, these will not be able to dominate men. In future society social wealth will consist not of things; it will be the development of human capabilities, the capabilities of all the members of society. Social welfare is measured in terms of material possessions only in the society in which these possessions are scarce. The development of productive forces as well as a reasonable transformation of social relations will for ever put an end to the domination of the product over the producer, whatever its form. This, however, gives no ground for an idyllic picture of man's domination of nature in future society. It goes without saying that man, when he has subjugated, for instance, the nuclear energy, will have to behave accordingly and be fully conscious of the enormous power in his hands. Freedom in this sense, again is understood as a cognized and practically mastered necessity, no more.

Marxism finds the source of alienation in alienated labour, the common ground of all other forms of alienation — social, political, and ideological. The alienated labour, in any case, in its developed form, is connected with the private ownership of the means of production. In this way the Marxist view is diametrically opposed to the views of both Hegel and Feuerbach. It is equally clear that in contrast to the so-called philosophical anthropology Marxism does not consider the anthropological nature of man to be the source of alienation; it denies the existence of anthropological form of alienation altogether. The fact that every human individual has a particular fate of his own; that he is mortal, fears death, etc.— all this from our point of view has nothing to do with the problem of alienation. Does it mean that we attach no importance at all to the an-

thropological characteristics of man, that we underrate the importance of anthropological differences, that we "dissolve" the anthropological in the social? Certainly not. It would be most naive to underestimate the importance of differences of sex and age, to shut one's eyes to the obvious fact that with these differences are connected many specific problems; it would be opportune to remark that these problems are not only anthropological but also social ones: for instance, the status of women in society, pre-school education, old age pensions, etc. The actual human individual is always either a man or a woman, either old or young, etc. A woman may be a mother and it is very significant both for herself and society. Marriage, family — all the social institutes — are inseparable from the anthropological nature of men. Pedagogy and politics take into account the division of society into age groups. Medicine and care of public health would be inconceivable without taking into account anthropological characteristics of individuals. It must be emphasised, however, that so long as social inequality among men exists, their anthropological peculiarities and differences play a secondary, practically unimportant role. In future society which will create the necessary conditions for a free and many-sided development of each individual, the anthropological peculiarities and differences will become much more important and will be stimulated in their development. To sum up: we do not refuse to acknowledge the importance of the anthropological characteristics of man, but we think that the anthropological factors are inseparable from the social ones. Equally inseparable are the individual (the individual human being) and the personality (as a social phenomenon). This does not mean that human life is determined, conditioned by two qualitatively different factors — the anthropological and the social ones. The anthropological peculiarities of man, as well as the anthropological differences between men, are not the products of social development, but their concrete historical form, their evolution, is determined in the last account by the development of social production. Thus, for instance, differences of sex have been inherited by mankind from their animal forefathers, but the sexual emotions and sex relations, in their contemporary form at any rate are the result of social development. It follows from what has been said that the unity of the anthropological and

social factors is a complex interaction, a specific structure, with the social factors as the general groundwork. This explains why alienation, which is a social phenomenon, and has deep economic roots, may have, superficially, the semblance of an anthropological phenomenon. The fear of death, seen by philosophical anthropology as something not social, purely biological, has in reality a deep social background, though, of course, there would be no fear of death if man was not mortal.

Thus, the alienation of human activity and its products, the domination of materialised products of human activity, the enslavement of the men by elemental consequences of their conscious, purposeful activity, alienation of nature and man from man are social, historically-transient, surmountable phenomena. We are led to this conclusion by the scientific analysis of the contradictions of the social development, especially of contemporary epoch.

THE DYNAMISM OF OUR CENTURY

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The past decades of the 20th century have proved the most revolutionary ones in the records of mankind. In many countries the social relationships and establishments, that seemed durable and unshakable like the Himalayas, have fallen down. There have appeared new forms of human community, new systems of government, new spiritual values.

Once the rate of historical advance is to be measured by radical changes within a given stretch of time, then we live in the most dynamic century which is rushing forward at a speed known to no preceding stage of history.

Less than half a century ago the system of capitalist enterprise enjoyed an unshared domination on earth. Socialism had its modest place on bookshelves, it lived in the minds and dreams of men and nowhere did it trespass the border between possibility and reality. But at present the world system of socialism unites more than a third of humanity. Within historically short periods many peoples have embarked upon the road of a new social, political and spiritual development.

If one does not demand that a new social system reveal its advantages full — well as early as in the very first periods of its existence, if he evaluates that system not by the blunders and misconceptions of some of its leaders, but by its inner essence, by its actual achievements, then he cannot help admitting the universal and historical significance of the victory of socialism, its importance for the destiny of mankind, for the latter's movement towards its future.

Fifty years ago several states held under their rule the multi-million masses of colonial and semicolonial peoples,

forced the latter to work for them, never having a doubt as to whether such a way of life is natural and fair. Historical development has brought about conditions necessary for the abolition of the old colonial system of enslavement. The idea of racial and national equality of people, substantiated by the experience of socialist countries, has captured hundreds of millions of people and inspired them to fight against such a shameful and brutal phenomenon as colonialism. Our generation has become a witness of the decay of the colonial system. Over 1.2 billion people, who have gained their independent statehood, are overcoming their economic and cultural backwardness and commence to take an active part in managing mankind's affairs.

The past decades were the period of a fast elimination of the remnants of feudalism, of overthrowing the monarchical form of government in Russia, Germany, Austria and Hungary, Italy, Turkey and in many other countries.

Fifty years ago mankind was on the eve of the First World War which broke out as an unprecedented catastrophe. No sooner had mankind managed to heal up the consequences of that terrible cataclysm, than fascism precipitated the world into a new war which by its ravages, by its brutality and inhumanity outdid far the First World War. It seemed that there would be no end to wars and that humanity would be sacrificed to the fierce Moloch. Yet, radical changes have affected this sphere of public relations as well. The forces of peace began pressing and binding the forces of war. For the first time there have appeared real chances to prevent war and to bridle the forces of evil and destruction.

We have become eye-witnesses of profound changes in the intellectual and moral life of mankind, and of tremendous cultural progress. The great scientific and technological revolution of the 20th century is in full swing; the intra-atomic energy has been set free, and the first paths into cosmos have been paved. For the first time in history man has left the limits of the Earth and overcome its gravitation not in dreams, but in reality. It is known how much the great geographical discoveries of the 14th and 15th centuries broadened the human horizons for the mankind. So it is not difficult to guess what radical changes in man's outlook the cosmic discoveries of our age are fraught with.

The world has changed rapidly and goes on changing at an ever increasing rate. The distance between the present and the future, between potential possibilities and their realisation, between dream and reality decreases as ever swiftly.

Even the people noted for the most conservative way of thinking, the adherents of routine and of dead traditions are no longer able to deny the rapid course of modern history. Contradictions start there and then where and when it is necessary to express one's attitude towards the fact of the swift transformation of social life, to explain its causes and to determine the significance of this "universal fermentation", "instability and fluctuation" in society, and of its dynamism for the present time and for the forseeable future of mankind.

Those social strata which back the old system based on private ownership, on hired labour and on the principles of individualism, are afraid of any movement, particularly so if the latter is an accelerated one which impairs the world's status-quo they need. The most ecstatic representatives of those strata are inclined to identify the rapidly advancing mankind with a locomotive which is approaching at a crazy speed towards a point where the rails end....

O. Veit is accurate enough in depicting the situation when he writes the following: «The leit-motif of the modern history of philosophy is the idea of an apocalyptical outcome. Downfall, catastrophe, decline, dusk, end—all these words are met in every teaching on the history of culture. They are associated with the old social order, with the old economic system, with the entire system of values, or even more generally putting it with the Western Culture». (O. Veit, *Die Fluch vor der Freiheit*, 1947.)

Hundreds and thousands of books and articles portray picturesquely this «rush towards death» and deafen the world with funeral tolls.

K. Jaspers has emphasised that there grows the apprehension of an inevitable collapse, which is equivalent to the misgiving that everything worth to live for is doomed to disappear shortly (K. Jaspers, *Man in the Modern Age*, N. Y., 1933, p. 63).

"The twenty-fifth hour", echoes C. V. Georghieu after him. "It is not the last hour". It is an hour after the last hour. It is the Western civilisation at the present moment. It is

nowadays". (C. V. Georghieu, *The Twenty-Fifth Hour*, N. Y., 1950, p. 49.)

"We are entering an epoch", G. Bazin states, "which is comparable with the grimmest periods in mankind's history". (G. Bazin, *The Devil in Art, in "Satan"* N. Y., 1952, p. 366.)

These grim "apocalyptic visions" could only appear in the minds of people who identify the inevitable downfall and disappearance of the social establishments, which are near to their hearts, with the end of mankind, with a world-wide cataclysm, with doomsday.

Incidentally, such moods can be clearly seen also in the literature of the epoch of the decline of the slave-owning system and feudalism. It appears that in the perception of many ideologists of the slave owning aristocracy the world lost its colours and smells, its rational sense and right to existence. "All human is smoke, nothing", wrote Marc Aurelius, voicing his thoughts about the vanity of this earthly life, about its uselessness and corruption.

A similar picture is observed by a student of the epoch of the decline of feudal society. As the popular wrath against the brutal feudal exploitation grew stronger, the ruling circles tried and depicted any attempt aimed at the foundations of feudal absolutist monarchy as an attempt of an human society in general. Philosophers of the kind of Joseph de Mestre or Bonald sought to present the replacement of the feudal relationships by the bourgeois ones as a deadly menace to civilisation, to the further existence of humanity. As a matter of fact, each little bird, when dying, imagines that the whole nature is dying together with it.

Just as the social pessimism of the previous historical epochs was unable to stop the advance towards a new civilisation, likewise is the present-day social pessimism doomed to a complete failure.

Ideas that found themselves in a flagrant contradiction with the progress of life, with the laws of its development, cannot enjoy a lasting power of impact. Let us proceed to the actual situation. In an age when there have appeared premises for excluding war from the life of society, there exists a tendency to intimidate people with the fatal inevitability of a thermonuclear war and of the destruction of mankind. In an age when the mighty productive forces allow to create and distribute the abundance of the goods of all kinds in

a fair, way to defeat diseases and to prolong human life, the thoughtless theories about the biological degeneration of human kind are being advocated. Some are spreading empty ideas about the coming of the fatal limit of the adaptation of human organism to the promptly changing social environments.

The intimidating prophecies with regard to man and human civilisation and the predictions of their inevitable destruction make one feel alert. We know from the past experience that social pessimism does not incite the doomed social forces to a passive conciliation with the inevitable future, but, on the contrary, serves as an appeal for a incessant struggle for self-preservation, as an appeal to resist the progress of time.

And indeed, the present-day eschatologists when drawing — despite facts and logic most pessimis tic, dreadening conclusions out of the dynamism of our age, out of the swift transformation of the world, pursue sufficiently clear-cut objectives. They seek to justify measures for the "bridling of history", for braking the unwished social processes, for the conservation of the social formation to which the double-faced Janus has already turned with the face directed into the past.

The philosophical and political conceptions substantiating the possibility of an arbitrary elimination of objective historical processes and the possibility of halting or freezing the social development are based, certainly, on the principles of the pre-Copernicus period of sociological thought. They pretend naïvely that history is a sphere of the arbitrariness and incidentalness, where (unlike in Nature) there is no correct rotation, no regular repetition, no necesary connections and regularities.

This subjective philosophy of history, in making an absolute of an act of will, presumes that "the future of society depends largely on what we wish to see it like" (Rossi).

Modern voluntarists cannot grasp the truth that it is impossible even with the help of an atomic gun to fire off the absolute laws of history as the latter reflect the possibilities and aspirations of mankind to improve the conditions of its life, to achieve the maximum welfare for all and for everyone.

The developments of social life in accordance with the necessary, natural succession of social formations frustrates the subjectivist and voluntarist interpretation of history. No one can doubt that the feudal aristocracy wanted to see the world the way it liked it best. Much gunpowder and metal was spent to destroy the bourgeois system which was regarded by the crowned feudal despots as a "paradise of parvenues". Even more blood was shed to prevent peoples from taking a further step along the path of history and from establishing a socialist system. It has been proved time and again that violence has its limits in history, the limits of influencing the progress of events. Violence is not so omnipotent as to prevent mankind from paving the way towards a future which would be superior to the present reality.

In many books and articles by voluntarism-minded authors there is made an attempt to explain the events constituting the world's historical landmarks as resulting from occasional mistakes and miscalculations of those who upheld the "traditional" establishments. Thus, according to the deliberations of such "occasionalists" the October Revolution in Russia might have failed to take place, if Kerensky had been a cleverer man and if the leaders of the Entente had been more consistent and resolute politicians; socialism again would have failed to exceed the limits of the U.S.S.R. and turn into a world system but for the miscalculations in the foreign policy of the states that stood opposite to the Soviet Union; and the colonial system would have failed to decay if the rulers of the parent states had made some timely concessions to the „natives".

Certainly, incidents and mistakes affect the course of historical development, and sometimes very seriously. Incidents and errors speed up the destruction of a doomed social organism. But isn't it senseless to think that without them a decrepit organism could enjoy immortality?

The philosophy reflecting the moods and interests of the decadent social strata rises full-armed against the idea of ascending development, against the logic of history, against any possibility of learning the logic of progress.

R. B. Bailey in his book *Modern Sociology Faces Pessimism* drew up a comparative table indicating what remarkable changes have taken place in the 20th century, as compared with the preceding age, in regard to the evaluation of historical development. This is how R. B. Bailey presents the alteration of "the European spirit of time"

100 years ago	At present
Progress exists.	There is no progress.
Social evolution develops straight-linedly.	Social evolution is of a cyclic nature.
Western civilisation develops incessantly in both cultural and social fields	Western civilisation is in a state of decay and destruction
Sociology studies progress.	Sociology studies the decay of society.

(R. B. Bailey, *Modern Sociology Faces Pessimism*, The Hague, 1958, pp. 116-117)

The fear of history and of its laws and the thought about tomorrow, about new forms of human community lead to a funny struggle against the notion of progress. It is known how stubbornly M. Ginsberg endeavours to eliminate the idea of social *progress* and to replace it with the neutral word "*change*". "Up to now", he writes, "there have been found no laws of social development, hence no laws of progress. The idea of progress should be substituted by the idea of development" (M. Ginsberg, *The Idea of Progress*, London, 1953.)

In the age of the tremendous social progress there occur philosophers who undertake to prove that progress is not a scientific notion, but merely an ethical evaluation involving subjectivism inherent in all ethical evaluations.

Some are frightened even by the words "evolution" and "development". L. Vize, for example, when speaking at the Third International Congress of sociologists in Amsterdam in 1956, declared with relief that the term "change" had, allegedly, replaced completely the words "evolution" and "development". (*Transformation of the Third World Congress of Sociologists* Vol. I, Amsterdam, 1956, p. 4.).

Professor Mayo also hurries to join the "killers" of progress. He writes: "We have no proofs to the effect that progress is a universal phenomenon... In history we can observe both regress and progress". (N. V. Mayo, *Democracy and Marxism*, New York, 1955, p. 166.)

For the sole reason that historical development experiences, regressive movements, zigzags and retreats, Mayo would like to exclude the idea of *rising* development as the general trend of history. We must presume, however, that despite all the zigzags and retreats, far behind are the times when man employed stone implements and ate raw meat.

No less strange impression is produced by the deliberations on the impossibility of progress because progress is allegedly created by outstanding people, while in our age masses have suppressed the possibility of the appearance of such people. Putting aside these baseless statements about the hostility of masses towards outstanding individuals,— which do not become true due to their intensive repetition — let it be reminded that no other century can be compared with our age by the number of geniuses in all the spheres of human activity and thinking.

Well, Mr. Ginsberg and his proponents face too hard a task in trying to do away with the conception of progress. We are not apt to think that dynamism should be understood as "such a perception of the world and of the nature according to which all the actuality is a game of forces or of movement" (*Philosophisches Wörterbuch* begrundet von H. Schmidt, Stuttgart, 1957).

The notion of dynamism is connected not merely with movement and change. The world has not merely undergone changes. These changes not only proceeded at a fast rate but they also were of a strictly directed nature. The process of the improvement of all the aspects of mankind's life was in progress. Reactionary forces tried to slow it down, but they were unable to stop the ascent towards more powerful means of material production, towards a more reasonably, more equitably organised social life, towards a higher spiritual culture and moral consciousness.

The 50 past years have stressed particularly sharply that history, like time, has only one determining direction— forwards. Historical process is as irreversible as the course of time. This was clearly manifested by the failure of the fascist attempts to get nations back to passed historical stages by means of fire and sword, to revive slavery in a new form, to do away with democracy and to subordinate people to a system of unlimited despotism.

Historical experience has also rejected attempts at presenting the course of history as running along a circular line, with the perpetual repetition of the already passed

points. If it is so necessary at all to designate the progress of history with a geometrical line, then it is more appropriate to speak of a spiral running forwards though sometimes seemingly returning to the starting point. Each new historical stage, while rejecting all that was outdated and reactionary in the preceding stage, at the same time retains and develops the positive achievements of the previous generations. This precludes not only any return to the past, but any stagnation as well. There remains space only for an ascending development, for an eternal enrichment with new elements. One can conventionally compare historical development to a geometrical progression, or more exactly, to a rising geometrical progression. The entire history proves the above stated. As for the cyclic development involving permanent returns to the passed points, this idea is deducted not from a real historical process, but from religious, mystic constructions. It retains verisimilitude only at the cost of abusing arbitrary historical analogies. Its objective is to perpetuate the already passed stages of social development and to deprive people of confidence and conviction of a better future on earth.

The same objective is served for by philosophical, sociological and political doctrines which recognise progress only within the limits of the capitalist system, declaring that variety of progress limitless, and conceal the truth that capitalism is but a historically passing link in the endless chain of development from inferior to superior.

Our modern epoch is rich in various attempts at mispresenting progress as regress and, vice versa, at passing the most regressive and reactionary movements for vital and progressive ones. Noteworthy is also the false endeavour to save the old, the doomed, passing it for an integral part of the future society. This is also illustrated by the theories of a society with a mixed economy, by the theories of a single industrial society which unites both capitalist and socialist principles in a highest synthesis. All these lifeless social hybrids are a fruit of speculative thinking. The authors of these dead doctrines draw roads that lead nowhere. Mankind, on the other hand, effects its movement along a broad historical highway from society based on the antagonism of classes towards a classless society, towards socialism. In the present epoch the possibility of a peaceful transition to a new society grows ever more.

Thus we have seen that the real history of mankind, which is known to us, develops along an ascending line despite all the conjurations of social pessimists, of the advocates of social rotation, of conservatists and champions of routine. And this development has been gaining in speed with every passing year and decade of the 20th century.

Mankind has no reasons to fear this speed of historical advance, for it lessens the birth pangs of a new social formation and reduces the terms of the affirmation of a new world-wide system, of a new, communist civilisation. That civilisation will be genuinely humane, at last, and it will be characterised by a complete abundance of material and spiritual goods, by a full social and legal equality of all people and nations and by man's integral freedom. That society will know only one single cult—the cult of a universally and harmoniously developed human being.

The indisputable fact of the acceleration of historical process needs some explanation. The question arises: What necessitates this unprecedented rate of mankind's advance? What forces "spur" on history so persistently? Why did the primitive communal system occupy several dozens of thousands of years in the records of human kind, and the slave-owning system — 8 to 9 thousand years, and feudalism — about two thousand years, while capitalism existed in many countries some hundred years, and the transition from the first phase of communism towards its second phase requires but some decades?

History being a deed of the popular masses themselves, the answer to the question interesting us should be looked for in the peculiarities of the life and struggle of peoples under the present conditions.

The first, most striking fact is the numerous masses involved today in effective, world-transforming activities. At present, the peoples of all the continents are involved in the historical creative activities.

In contrast to previous epochs the female half of humanity has now applied hands to the wheel of history making it revolve quicker.

Yet, it is not only quantitative showings that matter. The activity of the new hundreds of millions of people no longer confines itself to the sphere of production alone. It embraces the field of political relations too. Ever more obsolete becomes the treatment of masses as just an "auxi-

liary force" in politics, that fought for the interests of classes which on winning a victory became a hostile force for their former allies from the popular masses. Mention should also be made of the decrease of the age qualification of people taking an active part in the struggle for progressive goals.

The story of "a lost generation" is a fiction. This was testified to by Jackson Stephens, a representative of Ghana at a youth forum: "No, our generation is not a lost one as some try to convince us. It approaches the solution of problems mankind is concerned about soberly and with a feeling of great responsibility.

"Without unnecessary modesty we can afford stating that our young people honourably carry on the relay-stick of civilisation and progress which the older generation handed over to them. We, young masters of the globe, are given the lofty right to uphold the best ideals of humanity, to struggle for the noble cause...We are to build a new life, to solve, together with all the peoples, the fundamental problems of social development; we are to reunite the world, which we inherited in a dissociated state, and to ensure that every human being in it could be happy".

Hence, we have the right to assert that the acceleration of historical process is caused by the upsurge of the conscious and organised struggle of an immeasurably greater number of people, of the broad popular masses. The existence of many political parties which express the vital interests of peoples, which are armed with the scientific theory of social development, and which advance towards their objective not groping but using an accurate compass, is undoubtedly another most important factor speeding up historical process.

These statements do not arouse any doubt, yet they are not sufficient to provide an answer to the question: Why is it precisely in our epoch that an active revolutionary and transforming work of so huge a number of people became necessary? Evidently, this process is necessitated by some specific circumstances characteristic of our time.

Such an approach to the problem is quite justifiable. The fact is that in no epoch of mankind's history has such an abrupt and complicated turn ever occured. Now it is not the replacement of one form of the private-ownership society with another that is in question.

Now the historical agenda features the task of transition from the last private-ownership society towards a classless communist society, from the prehistory of mankind towards its genuine history. That is why no previous social revolution can compare with a socialist revolution either by scope, or by importance, or by the complexity of the problems to be solved.

Once upon a time the poor development of productive forces predetermined the unequal position of people with regard to means of production, the unequal distribution of the goods produced, the division of society into hostile, antagonistic classes, the existence of state for the defence of the interests of the ruling class, the contradiction between mental and manual labour, between town and village, between the dominating nations and the subjected ones. The age-long existence of class society, the insoluble contradictions, the fierce competition, the validity which gave birth to the meanest selfishness, to an aggressive individualism, or to an indifference as regards the fate of fellow human beings— all this has deformed the human soul and converted man — the bearer of creative concepts, of sense and good- into a creature that either suffers badly or, on the contrary, causes immeasurable evil to others.

History has entrusted socialism with the task of putting an end to all these antagonisms, of integrating mankind, of uniting it into a single family, of extinguishing the feelings of hatred and evil in every heart, of making collectivism and humanism usual standards of every person's mentality and behaviour.

The construction of a socialist, of a communist society takes place in an atmosphere of the struggle of peoples for peace, for the elimination of the fascist danger, for the successful development of national liberational movements and other general democratic movements.

It is quite clear that the fulfilment of all the combination of these great epochal tasks necessitates the mobilisation of all the forces of the progressive humanity and involves new human reserves into a conscious and organised kind of historical creative activity.

Such is the "providence" of history that in its development, while setting forth ever newer and more complicated problems, it simultaneously brings to life forces able to solve them.

K. Marx's words have come completely true to the effect that "proportionally to the groundedness of historical action ... the size of the mass whose deed it is will also grow" (K. Marx and F. Engels, *Collection of Works*, Vol. 2, p. 90).

Such grounded historical actions as the liberation of enslaved nations, the struggle against the fascist danger, the defence of peace throughout the world, the construction of socialism and communism, have put in action the broadest possible reserves of popular masses and lent their movement a really incredible tempo and swing.

It is impossible to understand profoundly and comprehensively the dynamism of our epoch and the promptitude of substitution of new, progressive forms of human community for the out-of-date ones without taking into account the energetic potential of today's mankind, its mighty productive forces, and the greatest achievement of science and technology at its disposal in the 20th century.

As compared with the past century the acceleration of our advance is proportional to the superiority of the productive forces of our age over those in the 19th century.

We know excellently that in the conditions of a private-ownership society technology entails many social troubles; it turns to be harmful to man, it pushes out into the street millions of able-bodied people and becomes a source of dreadful threat to the existence of mankind itself.

Therefore, it is wrong to regard the swiftly growing technology as a deed of Satan, as a source of some "existential fright", as the cause of the "lessening of the value of an individual" and of the loss of "humaneness and cultural values", etc.

All these negative phenomena have been engendered not by technology itself, but by the social system of private ownership which converts any values into their antipodes by touching them.

The achievements of our century's technology are great benefits of a liberated mankind. Given a rational and equitable social formation, they make it possible within short periods of time to overcome the age-old backwardness of mankind, to promote the living standards of peoples and to promote their spiritual revival and prosperity. Under such conditions technology engenders not fright or confusion, but a profound confidence in the present and the future and facilitates the acceleration of movement towards a lofty goal.

The technological achievements of our age have perfected all the means of transportation and communication, brought all the sections of mankind closer together and enabled them to co-ordinate their actions promptly, to act purposefully and expediently. The improvement of the means of communication accelerates the exchange of experience among nations as well as the exchange of accomplishments in all the fields of activity.

Modern technology, enabling the intercourse of peoples has contributed to the consolidation of mankind and stepped up its rapid rush towards a new world-wide order.

There is no doubt that after the anacronical private-ownership relations have been eliminated the rate of ascent up the steps of social progress will grow even more. The tremendous energy now being wasted on the class struggle, on international wars and on the creation of the weapons of destruction will be switched over to the realisation of peaceful creative purposes in the best interest of the entire mankind. The power that thus will be released will give a new impetus to the acceleration of the course of history, will add up to the creative abilities of human being.

The elimination of desolate labour for one's masters, of the anarchy of production, of economic crises on the global scale, on the one hand, and the domination of free labour, the possibility of a planned and proportional development of the economy of a united mankind, as well as the specialisation and co-operation of the world economy, on the other hand, will open up new prospects and allow new tempoes in the development of human history.

Concluding our statement, we should like to touch upon a problem of general interest.

The tempoes of historical development which have increased immeasurably, raised particularly forcefully the problem of the personal responsibility of each of us to mankind, to its present day and its tomorrow.

It is common knowledge that quickly moving systems are particularly sensitive to the sudden, unforseen changes of the velocity and direction of the given movement. In other words, the velocity of movement imposes great responsibility, great commitments.

This is well known not only to those who hold control sticks in their hands or stand at steering-wheels.

Suffice it to imagine the consequences of a thermonu-

clear war in order to grasp our idea better. It is said that such a war in the present conditions can only result from an accident. Is this a great consolation to mankind? We do not think so. As a matter of fact, to face a necessary phenomenon is one thing, and to have to deal with an incidental phenomenon is quite another thing. Incidental is incidental for the mere reason that it either may or may not take place. To exclude such an incidental factor, to stop the hand trying to fling a cobble-stone under the wheels of a car running at a rate of 150 km per hour is a demand of human conscience, the supreme ultimate imperative of our times.

Our dynamic forward-bound age requires from everyone who wishes to match the level of the great tasks of nowadays to act energetically and purposefully.

In this connection may we recall the words, full of sense and generosity, pronounced by the great humanist of this century Romain Rolland:

"Always and in every case my activities were dynamic. I have always been writing for those who march forwards, since I myself have always been moving forwards. And I believe that it is only death that will make me stop. Life would have been nothing to me, should it not mean movement — movement forwards, naturally.

"That is why I am together with that people and that class that build a channel for the stream of human history, together with the organized proletarian masses, together with the Union of Soviet Socialist Republics. They are driven forwards by the irresistable rush of historical development". (R. Rolland, *Collection of Works*, Vol. 13, pp. 372-373.)

The philosophical conception which we advocate is just the conception of struggle and of the affirmation of the new, of the progressive. In its laws, categories and notions it reflects the actual process of ascending from inferior to superior, from simple to complex. Reflecting the actuality adequately, the philosophy of Marxism has formulated the principle of dynamism, of progress most fully. It has rejected all the varieties of pessimism, of distrust for the forces, resources and future of humanity. No wonder, that in all the corners of the world all the people of principle and honour are attracted by this philosophy of hope, the philosophy of optimism, the philosophy of science, the philosophy of revolutionary, world-transforming activities for the sake of truth and humaneness.

ON THE LOGICAL PRINCIPLES OF SCIENCE

Professor
G. A. KURSANOV

Each time when the development of science was at its turning-point there arose the problem of the logical bases for scientific investigations. By the turning-points of scientific development I mean periods when valuable and versatile material accumulated engendering new ideas and theories, on the one hand, and when it was necessary to outline new ways for further development of world cognition, on the other. And it is now at the period of the greatest revolution in cognition that these problems are especially urgent.

* * *

"*Organon*" of the great Stagirit is a grand and a second to none monument of the ancient epoch. "*Organon*" supplies us with logical, crystal-clear presentation of the entire process of cognition of the epoch which had reached its zenith by the 4th century B. C. in ancient Greece, by assimilating the best and most brilliant achievements of scientific development of Egypt, Babylonia, India, and, to some extent, of the far-away China. At the same time, logical ideas and logical laws of reasoning discovered by Aristotle's genius had become for many centuries the canons for every scientific investigation. They were used as a guide for construction of scientific systems. Logical structure of Euclid's *Elements*, which were created some centures later, is a "geometrisation" of the great ideas of *Organon*, or, to be more exact, the "*Elements*" are a "geometric version" of the *Organon*. The *Elements* are, of course, only a particular version of the *Organon*, which cannot compete with it in the wealth of logical ideas. Nevertheless, the fact that Euclid's *Elements* proved immortal is a good demonstration of immortality of Aristotle's *Organon*.

A new historic epoch, when scientic cognition of the world soared up, gave birth to new logical ideas and stimulated attempts to create a new logical synthesis of science—*Novum Organum*.

All this was incarnated both in Descartes' rationalisation logic and in Bacon's inductive logic, which was by no means free from rational methods either. As to history, we believe it important to draw your attention to the fact that both trends of new logic — rationalism as well as inductivism — had one common fruitful source, viz., ideas of the genius of science, Leonardo da Vinci. On the one hand, Leonardo developed principles which proved mathematical truth of science and became the logical foundation of science; on the other hand, it was Leonardo who enunciated the principle of an experimental and inductive investigation and proclaimed it to be the basic principle of natural science. He rejected all scholastic arguments for their emptiness and futility. Thus, we have a good reason to say that both Descartes and Bacon used Leonardo's ideas as a source for the development of their logical principles of science. Leonardo's brilliant dicta both on experience and on mathematics are common knowledge. I want to remind you of Leonardo's significant theory which contains the very idea of rational-and-mathematical and experimental-and-inductive principles of science.

"True science does not feed its investigators with dreams, it always gradually approaches its aim from the first true and cognisable elements by drawing correct conclusions. New mathematical sciences. which are called arithmetic and geometry, that is to say, sciences of numbers and measures, are a good proof to the fact." (Leonardo da Vinci *Selected Scientific Works*, published by the Academy on Sciences of the U.S.S.R., 1955, pp. 9-10.) Science rests of such elements after which nothing can be found in nature". You see how original Leonardo's ideas are from scientific and philosophical points of view.

Bacon's *Novum Organum* is an attempt to create a comprehensive system of logic of his time. the latter can be derived from Bacon's typical assessments of his organon, such as: "great restoration of science", "True instrution for interpreting nature", "instrument to help us to arrive at the truth". The underlying logical principle of Bacon's organon is a combination of rational methods and experimental data, which gives rise to a new, inductive logic as the logic of genuine science, and ensures "a correct interpretation of nature". The latter includes not only a system of experiments and observations carried out methodically but also detects real causes of the phenomena under study. Hence, the forms of logic: Bacon's tables, which were later on generalised by Mill to form special methods of inductive investigation. All these ideas are well represented in Bacon's aphorisms suchas: "Logic which is an art of discovery can perfect itself along side with the descoveries". This aphorism contains a deep thought on the unity of logic and the process of cognition, the thought which was developed and given a new content much later, viz., in Hegel's dialectical logic.

Bacon's principles enjoyed their triumph in the great results of experimental science of the 17th and 18th centuries, which not only made use of theoretical generalisations but would have been impossible without them. Galilei's mechanics, Newton's great investigations and discoveries, Hooke's works on physics, John Herschel and William Herschel's achievements in astronomy, and to a great extent, Lomonosov's scientific deeds, are based in the final analysis on the principles of inductive logic of Bacon's organon which became real and significant due to fruitful results yielded by scientific cognition of nature.

In this connection the following fact seems to us very important. The great scientists of that epoch consciously formulated certain definite logical principles underlying their investigation, nothing but principles of inductive logic. Newton's *Philosophia naturalis principia mathematica* contain special *Regulae philosophandi* which lay down principles of and rules for fruitful scientific investigations. These principles and rules are aimed at investigating real causes of phenomena, finding determinative common causes and common properties of different solids of nature which would enable the investigator to express mathematically all natural processes and detect mathematical basic *eo ipso* elements in them. These elements were to become fundamentals of philosophy of natural science. It is interesting to note that Newton's hypothesis non fingo is by no means directed against scientific hypotheses but against such hypotheses which are groundless *a priori*, and have neither experimental nor mathematical foundation. In this

respect, one must mention a remarkable work by John Herschel, "*Reasonings on the Study of Philosophy of Natural Science*", where he suggests a number of principles of and rules for scientific investigation based on Bacon's ideas and partly on Descartes' principles which should not be simply opposed to induction.

Lobachevsky's ideas, which resulted in the creation of the non-Euclidean geometry and marked a fresh stage in the history of mathematics, furthered the development of the previous general logical principles and were integrally connected with the process of scientific work. Idealistic philosophy has set forth a legend that creation of the non-Euclidean geometry is allegedly the best proof of the "free choice" and arbitrary rule in the development of mathematical theorems and conceptions. This legend has no scientific foundation whatsoever. Working on the creation of new geometry Lobachevsky raises a logical problem recognising primacy of the objective physical world. First of all he criticises the starting points of Euclidean geometry, precisely from the standpoint of whether they agree or disagree with the "nature of things". Secondly, he consistently develops his idea that mathematics is to have in its foundation "truths which are doubtless for us, which are our first conceptions of the nature of things", "and the foundations of geometry must be exactly like this". Thirdly, he develops profound ideas of the connection between geometric properties of solids of nature and their physical properties, and, thus, anticipates the most important achievements of the theory of relativity, which are logically based on this most important principle of cognition. There is no doubt that the creation of non-Euclidean geometry was greatly dependent on the requirement of the inherent logic of the development of mathematics itself. This called for solving the historically originated contradiction existing between the 5th postulate and the rest of the postulates and axioms of the Euclidean geometry, or, as Lobachevsky put it, it was necessary to bridge the "logical gap" in the parallel lines. But this aspect, a logical one as it is, does not deny but implies the primacy of such scientific foundations which, according to Lobachevsky, are determined by their "concord with the nature of things".

All this convincingly proves the insolvency of Kantian conceptions that geometrical concepts are *a priori*. They rested on the belief that space is *a priori* and that "pure metaphysics" can exist. The fact that Kant elevated Euclidean geometry to the position of absolute made an obstacle to human knowledge, preventing man from cognising the versatility of geometric properties of real space.

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The physics of this century has completely revolutionised our concepts of the world surrounding us. The latest physical theories have deeply penetrated the dialectic essence of natural phenomena. Grand vistas have opened up before mankind not only in the field of cognition but also in the realm of practical application of powerful forces of Nature for man's benefit. It is but natural that the most prominent scientists of our day could not, nor did they, ignore the gnosiological fundamentals of science. They could not help making attempts to establish these or those principles applied for scientific investigation without which no significant theoretical conceptions would be possible. In fact, we should note that the outstanding scientists who have created the latest physical theories have always attached much importance to the gnosiological problems of science.

Albert Einstein always laid a special emphasis on the logical components of the theory of physics. His particular theory of relativity is based on two determinative principles: 1) the laws of Nature are equal in all inertial systems of count (particular principle of relativistic theory) and (2) speed of light in vacuum in all inertial systems is equal (the principle of constancy of light speed). Both these principles undoubtedly generalise human experience and express the objective laws of Nature. While creating the general theory of relativity Einstein had to make a still more profound and comprehensive analysis of the logical backgrounds of science, and especially, the principles and basic conceptions of science. His last work, Meaning on *Relativity*, which expounds Einstein's latest idea of complicated problems of his theory, specially poses a number of gnosiological questions: the essence and origin of the conceptions of space and time, the conception of physical body, in particular that of solid body, the relation between our notion and experience, the connection between geometry and experience, properties of physical solids, etc. An ana-

lysis of these gnosiological problems logically precedes the basic conceptions and categories of the theory as a whole.

What we want to specially emphasise here is a great heuristic significance of correct gnosiological principles of science.

On connection between geometry (G) and physics (Ph) Einstein says in his famous lecture "Geometry and Experience" that he would have failed to create his theory of relativity but for such a connection. This is one of the highest credits paid to the part played by and significance of materialistic philosophical principles for creactive development of special scientific theories.

Niels Bohr has been thinking hard for more than four decades on gnosiological problems which inevitably arise in the course of complicated and contradictory development of atomic physics. Of great significance in this case is the fact that Bohr has always turned to logical fundamentals of cognition at every turning-point of development of science on atomic phenomena, i. e., when much difficulty was involved in the science itself and when it was quite necessary to analyse its logical fundamentals as a premise for its further fruitful development. Such was the case when Planck discovered the universal quantum element of action which called for taking a new stand and rejecting "conventional principles of natural science"; such was also the case during the preparation of a new theory of atomic phenomena which demanded a breakdown of the principles of causality and continuity; and it was especially so at the time of elaboration of the quantum mechanics which gave rise to a number of problems of logic of physical science posed in a different way. The latter fact was repeated by emphasised by Bohr himself. With regard to the above especially interesting and significant are the memoirs of Bohr, *Quantum Physics and Philosophy*, which were first published in Russian. In this Bohr deals in a general form with the problems that prove that quantum mechanics is an indiscrepant and complete scientific system; he also points out that it is needed to "reflect the fundamental properties of matter" is science, which he considers to be a gnosiological principle. Bohr stresses the necessity for an accurate definition of most important theoretical concepts and calls for their good division. He specially dwells upon an analysis of "logical conceptions" in science — "in various

branches of knowledge", i. e., he actually puts one of the problems of the logic of science as a whole and does not confine himself to quantum mechanics.

All this is significant and proves that logical problems are urgent and important for the present-day science.

Werner Heisenberg, an eminent physicist of our day, strives for establishing a profound connection between physical and gnosiological problems. He specially deals with the problem of reality in physics, with problems of space and time in microphenomena, with the problem of causality. An exclusive stress is laid in Heisenberg's works on a problem of the correlation of mathematical and physical properties of matter, on a question of the essence of mathematical concepts and laws, and, in this connection, on the role and significance of the mathematical principles for physics. At the same time, he has always taken much interest in the problem of the unity of the natural-and-scientific picture of the world which is logically connected with his intention to work out a theory of matter which would constitute a scientific entity. As far as the problems dealt in this paper, are concerned, Heisenberg's famous essay, *Planck's Discovery and Fundamental Philosophical Problems of Atomic Theory*, is of interest and significance. The essay, read by the author on April 25, 1958, in Berlin, opened with the words "On connection between particular natural discoveries and general philosophical problems", which is worthy of note. He spoke, of course, of such discoveries which refer to "a scientific method or basic premises of natural science in general".

Still more momentous is the fact when the problems of the logic of science are raised by the scientists who adhere to the position of the truly scientific philosophy — dialectical materialism. In this connection, I should like to point out, in the first place, very interesting and still very important speeches made by S. I. Vavilov, outstanding Soviet scientist.

For more than a quarter of a centnry S. I. Vavilov had been making a comprehesive study of problems explaining the substantiation of science, its logical basis; he analysed the determinative factors of development of scientific discoveries. While occupying a high post of the President of the U. S. S. R. Academy of Sciences, S. I. Vavilov not only directed the work of research institutes and institutions

but also theoretically substantiated the development of the Soviet science, formulated its tasks as ones serving the cause of building socialism and communism. In this connection, his speeches "30 Years of Soviet Science" and "Paths of Development of Natural Science" are especially prominent.

When analysing the philosophical and logical basis of science, of physics in particular, S. I. Vavilov considered appropriate philosophical premises to be extremely important for fruitful research. This is especially strongly stressed with regard to physics. He said: "Philosophy and physics were indissolubly connected in scientific activities in Galilei, Gassendi, Descartes, Kepler, Newton, Lomonosov, Mendeleyev, Umov, Planck, Einstein, as well as any physicist if only he was capable of displaying a broad outlook". He was very right when he said that philosophical premises are far from being unimportant in regard to conclusions and to elaboration of trends for further development of science. This is precisely what he stated: they (philosophical premises) may prove either an obstacle to or, vice versa, a stimulus for the development of science. From this point of view, of much importance are Vavilov's speeches in which he demonstrated how significant Lenin's ideas expounded in *Materialism and Empiriocriticism* are for the development of physical science and how important are the ideas of dialectical materialism for science as a whole. Alongside with this, he furnishes convincing arguments to prove that the idealistic and mechanistic outlooks and concepts are not only inconsistent with science, but also do a direct harm to research by impeding and entangling it. Finally, we should not overlook the ideas Vavilov held as to the place occupied and role played by most common laws of science for working out scientific theories and developing scientific research in general. To cite an example, when speaking on the importance of the universal law of conservation and transformation of matter and motion, he pointed out that this law «serves as a good guide in disclosing the misteries of Nature». And it is the universal character of the law that supplied it with the function of a theoretical *instrument of foreseeing* which is a mighty factor of cognising new, previously unknown natural phenomena.

All this goes to prove that the mere fact that Vavilov raised the problem of the logic of science proceeding from

the philosophy of dialectical materialism was very fruitful and promising.

Outstanding Soviet scientists have been for years concerned about the philosophical questions of present-day natural science, in particular in the field of physics, mathematics, astronomy, biology and physiology, and about general principal questions of science. Among such scientists the following should be mentioned first of all: M. V. Keldych, D. I. Shcherbakov, N. N. Semyonov, L. A. Artsimovich, V. A. Fock, A. F. Ioffe, L. D. Landau, D. I. Blokhintsev, A. N. Kholmogorov, S. L. Sobolev, A. D. Alexandrov, S. A. Yanovskaya, V. A. Ambartsumyan, V. G. Fesenkov, B. V. Kukarkin, A. I. Oparin, N. M. Sisakyan, etc. Their profound, interesting speeches and statements deal with a number of general philosophical problems of natural science of our day as well as with many special questions concerning the logic of science.

* * *

To conclude this paper, I shall briefly dwell on the main principles of the logic of science which have been established with the aid of the cognition theory of dialectical materialism and on the basis of generalising the "history of world cognition". And it is quite natural that most valuable ideas suggested by the great thinkers of the past and present are duly appreciated and accepted by dialectical materialism.

Rinnanien philosopher A. Zhozha has formulated the task of working out the logic of science as a historic task of creation *Novum Organum Dialecticum*.

We find this expression very apt. It goes without saying that to solve this problem would call for work of a whole generation. As I have already said, we can present only a diagrammatic sketch of fundamentals of such Organon, outline only the most important principles of the logic of science from the position of dialectical materialism.

I. To construct scientific systems one is first and foremost to acknowledge the decisive role of practice for scientific cognition, which manifests itself in many-sided versatility: (α) as a basis and motive for cognition, (β) as the main object of congition process, (γ) as the only criterion of the objective truth of congition.

II. The essence of all theoretical postulates of scientific systems lies in their reflecting the objective properties, ties and relations between the objects of material world. Man creates a scientific picture of the world as a cognising subject during his creative activity, and not as a result of "free play of spiritual forces", but as a result of objective and true reflection of laws and properties of moving matter in his consciousness.

III. A scientific system is an orderly and consistently developing relation of basic ideas, principles, laws, concepts and categories, which express in a concentrated form the essential properties, signs and relations of material objects.

IV. A scientific system includes *a versatility of innate logical connections* between all of its theoretical components—concepts, judgements, deductions, laws, hypotheses, arguments and other logical forms. Various forms and kinds of these logical relations are to be specially analysed in the logic of science, including the employment of the methods available for modern logical analysis.

V. Scientific systems should not be treated as self-contained and perfect. They always express a concrete historical stage of cognising the infinite and eternally developing matter. It is on this path of cognition of man that great revolutions take place in science which stimulate its further advance. This is why the most important task of the logical analysis of science is finding the dynamic (dialectic) essence of scientific systems and *discovering the ways for further fruitful development of scientific cognition of the world.* We are deeply convinced that this task can be solved from the positions of the truly scientific philosophy of dialectical materialism. Solution of this task will mean a triumph of the philosophical and logical thought of man.

MATERIALIST DIALECTICS IS A LOGIC OF MODERN SCIENTIFIC DEVELOPMENT

Professor
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The term "logic" has several meanings of which each one is connected with a certain historical tradition, as well as with the trend in investigation of the laws and forms of thinking. Therefore, we would like first of all to define in which sense the materialist dialectics is a logic.

Usually the term "logic" implies a science which deals with the proof the validity of which depends only upon the form of premises and conclusion. Naturally, if it is only this that is implied in the term "logic", than it must be confined by what now comprises the subject of modern formal logic with all its branches. But the notion of logic has always included investigation of the method and forms in which human thinking advances to the truth. Such was the logic of Aristotle, F. Bacon, B. Spinosa, R. Decart, I. Kant, and Gegel. This trend in logic is further promoted by materialist dialectics, first of all by its founders — K. Marx, F. Engels and V. I. Lenin. When we raise the question about dialectics as a logic of development of science, we by no means imply that dialectics must replace formal logic as a teaching about relation between the elements of syllogism which condition the compulsion of conclusion. Formal logic has retained its significance, and its progress is necessary for development of modern science. But it cannot claim to play the role of a logic of progress in modern science, as in its theory of thinking it is abstracted from any development, knowledge including.

A formal apparatus of thinking which is dealt with by formal logic, helps to realise the nature of modern scientific theory and plays a certain role in advancing from one theory to another which reflects its object more exactly and fully.

But it cannot explain natural development of scientific knowledge.

What is characteristic of modern science in gnosiological respect? Firstly, uncovering of most mysteries of nature, social life and thinking proper. Successes attained by science strike even those who possess most highly developed creative imagination. Moreover, the notions of modern science, despite their apparent abstract nature are more objective in their contents than the notions of 18th and 19th centure science which seem to be more concrete.

Objectivity of content of notions and theories of modern science is proved by their practical application to technology, in successful space research, in remaking flora and fauna for the sake of the needs of national economy, and in reorganisation of social life of people.

But objectivity of scientific notions and theories goes along with their fluid nature, mobility, flexibility and mutability. We constantly witness how a scientific theory once shaped and settled dies away to be replaced by another one though not yet hatched, formed and settled.

An amazing unsteadiness of notions and theories of modern science seems completely incompatible with the admission of objectivity of their content. Rational thinking connects objectivity with immobility, absoluteness with immutability, but it cannot connect the objectivity of knowledge with its development. However, both the objective truth of scientific theories and their quick replacement and development are proved equally true. What is necessary is such a logic which could explain: how and why is this possible? what are the laws governing the development of scientific knowledge? what is its main tendency?

Then modern scientific knowledge is characterised by application of the notions and methods of one branch of science in the field of other science, closer contact of different sciences alongside with the going on process of their differentiation. Different branches of modern science are becoming amazingly close to one another (for example, biology effectively employs physicochemical methods for researches of living beings), but this fact does not at all deprive each of the science branches of its specific features connected with the peculiarities of the object under study.

And, finally, modern science has come to create theoretical prerequisites for practical control over the thinking process proper, for imparting its functions to manmade material systems. In gnosiological respect this means that science has attained a high degree of self-cognition and self-conscience. A portion of direct analysis of the content of notions and theories proper in the content of all sciences irrespective of what they are busy with is unceasingly growing. In a certain sense of the word, all modern sciences are exploring the thinking process with respect to their needs, thus becoming applied logics.

The above-mentioned peculiarities of modern scientific cognition emphasise the necessity to study the logic of modern science. Besides, they put forward certain requirements to it.

There are no divergences of opinion among philosophers as to the urgent necessity in elaboration of philosophical problems and, in a narrower sense, the logic of modern science. Divergences, rather substantial as a matter of fact, start as soon as they come to speak about the essence and method of this logic, about its principles, laws and forms.

Facts prove that materialistic dialectics is the logic of development of modern science.

One may ask the following question: Why is it the materialist dialectics that can and does perform this function, and not any other epistemological theory?

The general form of reply may be as follows: materialist dialectics can provide a scientific explanation to peculiarities of development of modern scientific cognition, correctly define its tendency, forms and methods of acquiring new results.

What is it that enables dialectics to be the logic of modern science progress? In the first place, it is objectivity of its laws.

The goal of human cognition is to acquire such knowledge, the contents of which depends neither upon man nor upon humanity; cognition strives to comprehend an object in all its objectivity. Logic must guide thinking just in this direction. But it can do this, only when its own laws are objective in their content.

The laws of materialist dialectics are in conformity with the most general laws of movement, self-development of phenomena of objective world. In this connection, while following these laws, in its notions and theories, science con-

ceives an object as one existing irrespective of the perceiving subject.

It is not a rare case in foreign literature that the logical method is considered as a kind of procedure followed by the subject in treating the object under investigation. Here, the logical method is confined by the limits of subjectivity, while its scientific value acquires a mere pragmatical nature. For example, Sidney Hook is in perplexity as to how dialectics may be the science of the laws of objective world and logic at the same time. "If it is asserted", he writes, "that dialectics is a theory of scientific method, then its "laws" would not be laws of nature but rules of valid scientific procedure"[1].

The laws of objective world and the logical method are regarded as two parallel series. The latter is similar to the rules of card games or traffic regulations. Materialist dialectics serves as a logical method of thinking progressing to the objective truth since it guides thinking in accordance with the laws of the object proper. Success and effectiveness of a method depend on the laws it is based upon, as well as on how fully and adequately this method reflects these laws. Besides, dialectics serves as a method of logical thinking of not only individual scientists who adhere to the position of dialectical materialism, but also of modern science as a whole. Even those scientists, who reject dialectics subjectively, are forced spontaneously (due to objective content of science notions and theories) to follow dialectical laws and categories, since otherwise they cannot effectively work in the field of science.

The advantage of dialectics as a logic of science lies in its ability to connect objectivity of content of science notions and theories with their mutability and fluidity. Moreover, dialectics proves that it is impossible to obtain objective truth beyond development. Modern science is in need of a logic which would discover the laws of the knowledge process as a process of conceiving an object by means of a thought. It is materialist dialectics that can be such a logic.

Foreign phylosophical literature often gets busy with criticising the laws of dialectics. When so doing, the following "arguments are put forward:

(1) universality of principal laws of dialectics is doubtful;

[1] Sidney Hook, *Dialectical Materialism and Scientific Method*, Manchester, 1955, p. 24.

(2) anthropomorphy of dialectical laws in which abstracted are only the laws of separate stages in development of human society;

(3) it is supposedly impossible to make scientific prediction on the basis of dialectical laws, and they have no heuristic validity. In this work we are not going to indulge in detailed refutation of the above arguments, instead an example will be given here to show what a powerful instrument are the laws of dialectics in explaining the facts of knowledge development.

As is known, in any branch of science knowledge development includes advancing new ideas which serve as a basis to build up a theory. Transition from one scientific theory to another initially is not strictly logically grounded. Neither the experience in itself nor a strict deduction in conformity with the laws of formal logic can prove the necessity and validity of a new theoretical supposition. Here is an example from the history of science. In the beginning of this century, the physicists, striving for explanation of atom structure, brought forward a hypothesis which said that the atom was a complex system consisting of a positively charged nucleus and electrons rotating around it. The consequences ensuing from this hypothesis contradicted to the Maxwell-Lorenz electromagnetic theory. In particular, from the viewpoint of the electromagnetic theory, radiation frequency of an electron rotating around its nucleus must have been equal to the frequency of its revolutions per second, i. e., it must incessantly change while approaching the nucleus. This means that radiation must have a continuous spectrum. However, it was well-khown that all atoms provide linear discontinuous spectra. Having come across these contradictions N. Bohr found an original solution when he took for a initial point Planck's assertion that radiation proceeds in certain quanta equal value hv. He introduced discontinuity in the case where the old (electromagnetic) theory assumed only continuity. The atom radiates or absorbes energy only when the outer electron jumps all of a sudden from one stable position to another. A quantum of energy radiation or absolution must be equal to the difference in the energy of the atom in the initial and final state. Were there experimental data available by that time to support these propositions? This question is answered negatively. May it be that these propositions are

a strict deduction from a more general theory? Here, too, the answer will be negative.

This is a typical example to illustrate that development of thought based on solution of contradictions occurring in science, includes a leap, a break in continuity, leads to results devoid of either formal-logic or empirical verifiability at a modern level of science. Without making such a leap, science cannot move ahead.

Not a single epistemological conception, except materialistical dialectics, can give a scientific explanation to these facts of development of human knowledge. Intuitionalist and other similar conceptions suppose that there is something that goes beyond reason to some sphere connected with irrational, and in so doing such conceptions slip off the position of science, being indulged in speculation of a mystic nature.

Another extremity consists in the attempt to present development of knowledge process as a formal-logic deduction to reduce the thinking function to the operation of drawing conclusions from the knowledge attained earlier. In such a case, thought can never go beyond the limits of known theoretical propositions.

So, it turns out that if the intuitionalist point of view is to be adopted, then it is implied that development of science must be explained by the factors that lie beyond the limits of science and reason. If we hold the position which says that the knowledge progression takes place following the rules of strict formal-logic deduction, then we shall keep away from explanation of actual facts from the hystory of science, the facts that prove that a real development transition from one theoretical proposition to another is effected by going beyond our former ideas, by advancing scientific conjectures and hypotheses which originally have no strict experimental and logical verification.

The laws of materialistic dialectics provide an explanation of the knowledge process as a developing process which necessarily includes leaps, breaks in continuity, obtaining principally new results in cognition process on the basis of solution of contradictions that occur in the process. Dialectics does not simplify the process of scientific thinking, does not reduce it to logical deduction, but it leaves no room for irrationalist speculations, and proves that to overstep the limits of formal-logic deduction does not mean to be

beyond the limits of the reasonable, rational. Scientific cognition, likewise any development, includes a leap, contradiction, a break of (continuity) gradualness.

Revealing complexity and contradictoriness in development of scientific knowledge process materialist dialectics elaborated a number of categories which convey the laws of this process. The subject and object categories are considered to be primary. The knowledge process is originated as a result of co-operation of the subject and the object. In this co-operation an active part is played by the subject that exerts influence upon the object and transforms it. Objects of material world exist independent of man, but the latter cannot be passive in his attitude to them, he considers them to be objects of his practical activity. This is what guides the scientific knowledge which strives to clear out the object's objective nature for the sake of the object's transformation. Here we encounter the main contradiction of the knowledge process — the contradiction between the subject and the object. The subject — a creator, a knowledge holder—must reach the results which in their content do not depend upon the man proper. This seems to be paradoxical, but it is so. To master the object in practice and in theory, the man actively intervenes in the course of objective process with the help of his tools and instruments. In this sense he makes the object subjective. But the more subjective is the object, the more objective will be our knowledge of it, and the object's properties, which do not depend upon any subject, will be perceived more fully and more deeply.

Modern science, and natural science in particular, testifies to the fact that the subject's activeness in the knowledge-getting process grows. Provided with instruments and equipment, science intervenes in the object under study and, so by, it makes the object still more and more subjective. Quantum mechanics can serve as an example, in so far as it establishes that when an investigator studies the microworld, he employs macroscopic instruments which co-operate with elementary particles. This process is perceived by those scientists who do not comprehend dialectics of the subject and object, as the loss of possibility of cognition of the object proper. In this connection, they speak about amalgamation of the subject and object, elimination of any difference between them.

Materialist dialectics faces no unsurmountable difficulties here. In the course of practical co-operation between the subject and the object a process of transition of subjective into objective and vice versa from objective into subjective takes place constantly. Human ideas, theories are materialised in practice, are brought into reality and become an objective reality which existes already independent of the subject's conscience. On the other hand, the objects of objective reality are appropriated by man, get humanized and become a reinforcement and an extension of natural human organs.

Let us take a modern electronic computer as an example to consider its attitude to man. As is known, the man—machine problem nowadays has started again to attract attention of both phylosophers and specialists in other provinces of science. In this particular case, what we are interested in is only its gnosiological aspect.

A cybernetic machine is not a fact of human conscience, but it is an objective reality opposing him in a certain sense of the word. Some people even assert that it will devour the man and humanity. But this machine is such an object which is subjective from its beginning to end, since it is a representation of materialized man's ideas, aims, theories. It may be considered as a continuation of the man proper, reinforcement of his natural organs and particularly of such an important and complex organ as his brains. The electronic computer especially vividly manifests the unity of subjective and objective, their transition into each other as a result of development of human knowledge and practice.

Attaining an objective truth in the course of knowledge-getting process is a prerequisite of practical mastering nature by man. Primarily the subject and object coincide theoretically, the object is transformed into the content of cognitive image. Increase of the subject's activeness, his intrusion in the course of objective process are indispensable conditions for full and thorough reflection of the object in the cognition as such that exists independent of human conscience.

To conceive the laws of the scientific knowledge progression towards objective truth, materialist dialectics employs such categories of its own as sensual and rational, empirical and theoretical, mental and reasonable, abstract and

concrete, logical and hystorical, absolute and relative, probable and valid, etc. Each of the above pairs of dialectic categories express a definite side of a complex and contradictory process of modern scientific knowledge. We shall briefly dwell upon such categories as empirical and theoretical, mental and reasonable, since these categories acquire special importance for clearing out the features of modern scientific knowledge.

Any knowledge process (both empirical and theoretical) is a unity of sensual and rational. Human knowledge is always rational both in form (results of cognition are presented in the form of judgements, notions and theories), and in its content. On the other hand, human cognition on any level of development does not lose its connection with sensuality first of all in form (the system of abstraction is always expressed in sensually perceived signs) and source (in its final result our knowledge goes to contemplation). Therefore, empirical and theoretical notions are distinguished not because one is sensual and the other is rational. They are distinguished by how and from what side they present the object, in what manner and method they obtain the main content of knowledge, what serves a logical form of its expression and, at last, by practical and scientific significance of knowledge.

In the empirical knowledge the object is reflected from the side of its external connections and its manifestations accessible for imaginative contemplation. A logical form of empirical knowledge is an individual judgement stating a fact, or a certain system describing a phenomenon. Practical application of empirical knowledge is limited, and scientifically it serves only as a certain material in building up a theory.

Theoretical knowledge relefcts the object from the side of its inner connections and progression laws conceived by means of rational treatment of empirical knowledge process. Its logical form is a system of abstractions which explains the object. Practical application of theoretical knowledge is almost unlimited, and in scientific respect-building up a theory is a certain final result crowning the knowledge process.

Two levels — mental and reasonable — can be differentiated in theoretical knowledge. They present different levels of the theory proper. Let us start with the charac-

teristic of reason which is the highest level of theoretical comprehension of reality.

Reasonable knowledge implies first of all operation of notions and inquiry in their own nature.

Reason does not merely mechanically operate notions, rearranges and regroups them, but it perceives their content and it operates the notions in accordance with this perception. Hence, reasonable knowledge is to a certain extent self-cognition.

The problem of analysing knowledge faculties of man and his notions has been posed by critical philosophy but its investigation of the nature of notions is an end in itself, but not a means of a deeper perception of the laws of objective world. Dialectical materialism raises the problem for science to investigate the nature of its notions so that science should accomplish its primary purpose to conceive its object more successfully.

At last, reasonable knowledge is featured by its purposefulness. Reason conceives world not in contemplation, but imaginatively, actively. It reflects the object in necessary forms of its existence and progression, it perceives it not only in the actual form, but also in the form which it may assume in the process of its development and under the influence of man's practical activity.

Mental knowledge also operates abstractions but it does not investigate their content and nature. Mentality is characterised by operating abstractions within the limits of prescribed scheme or any other pattern. Reasoning activity only serves an assigned purpose, and therefore reflection of reality by mentality is, to a certain extent, of a dead character. The main function of mentality is dismemberment and calculation.

This peculiarity may be denoted as automatism of mentality. Most vividly the characteristic features of man's reasonable thinking are manifested in the so-called «machine» thinking in which reason automatism is brought to a mature and classical form.

Mental activity has a kind of three levels: its elements in higher classes of animals, man's intellect, and replacement of man's reasoning faculty with a machine. In the latter case, reason is presented in its pure form, it is not obscured with any other factors and strikes the man with its accuracy and speed in accomplishment of definite operations perta-

ining to thinking. In this respect, machine as a form of thinking is superior to the mentality of an individual.

To perform its paramount goal — to reflect phenomena of objective world and laws of their progression in the fullest and deepest way, thinking must be rational and reasonable at the same time.

When devoid of reasoning activity, thought is ambiguous and uncertain. Reason makes thinking systematic and strict. By striving to turn scientific theory into a logically harmonious formal system, it makes the results of thinking accessible for understanding and perception. If thought is not brought to a system inside of which one can move in conformity with definite logical laws, then in effect there is no thought as a form of objective and true knowledge.

But if we make thinking only reasonable, then it will be dogmatic. Thinking must possess another quality, it must be able to change its system so as to reflect the investigated object more exactly and more deeply. One system once created is broken and a new one is built up. This transition from one system of knowledge to another is carried out by means of reason which creates new ideas beyond the limits of former systems. If it were not reason, progress and development would have been impossible, with exception of movement only inside some systems created beforehand, but the latter could not appear without reason either. The power of reason consists in its ability to put forward completely new and seemingly absolutely incredible ideas which radically change the old system of knowledge.

That reason goes beyond rationality is relative. Reason goes beyond the limits of a definite established system of knowledge, but it inevitably turns out to be in another system. It is reason that creates fundamentals for creation of such a new system. Einstein and his theory left the limits of classical physics, but on the basis of his ideas a new theoretical system was formed. Lobachevsky's geometry is beyond the system of Euklid's geometry, but it is also a harmonious system. In general reason does not go contrary to any systematisation of knowledge, but it is against absolutisation of one certain system of knowledge.

Reason requires creation of such system of knowledge which would contain at the same time the ways to go beyond its limits into a new system. Any scientific theory

is considered reasonable if it comprises contradictions, which cannot be solved within the frames of this particular system. Reason discloses these contradictions and advances ideas which serve as a basis for appearance of a new theoretical system.

If ideas of reason do not lead in the long run to building up a system of notions, then they possess no scientific validity, and in fact they will become mystic. Mysticism escapes scientific system of knowledge. It piles up one idea upon another without scientific substantiation. Reason without rationality may lead to mysticism or sophistry which are absolutely alien to harmony and systematisation.

New ideas of reason appear as if intuitively in the sense that initially the subject does not realise how he has come to new results.

Correlation of reason and rationality in the development of theoretical thinking is also expressed in that the rational thinking must be necessarily transformed and ended with reasonable and the latter when reaching a definite degree of maturity, becomes rational. Transformation of rationality into reason takes place in various forms of which most typical is to go beyond the limits of an established system of knowledge on the basis of advancing new ideas. Reason is transformed into rationality by way of formalisation of a system of knowledge that came into being on the basis of the idea of reason, in accordance with definite principles. Each time when human thinking functions are communicated to the machine, we encounter such transformation of reason into a calculating rationality. A prerequisite of such communication is creation of algorithm, i. e., an exact order presetting the calculation process.

Action based on algorithm is rational (order is present in the form of a combination of some symbols), but the algorithm proper is a result of not only rational but reasonable thinking. It is known how long and tenaciously science struggles to solve the problem of working out certain algorithms. A new algorithm proposes a new idea or new aspect in considering the object. For instance, solution of the problem of machine translation involves elaboration of translation algorithm, which has become possible as a result of appearance of a new scientific branch (mathematical linguistics), applying mathematical methods to language analysis. Creation of mathematical linguistics means that a new system of scientific knowledge (with new ideas) distinguished from the former, classical linguistics came into being. In our age, theoretical thinking is rapidly developing in both directions; reasonable and rational. In every branch of scientific knowledge we see advancing of new ideas breaking old established systems of knowledge. But at the same time, on the basis of these new ideas a process of formalisation of knowledge accumulated before takes place. This formalisation reaches as fas as to create algorithms which enable the machine to solve problems. High degree of reason is combined with the most perfect rationality. The viewpoint that development and perfection of calculus rationality and communication of its functions to the machine will make human reason unnecessary, is one of widely spread errors of our time. On the contrary, the prerequisite of development of calculus rationality is worked out by highly organised human reason which is indispensable in creation of new formal systems. Perfection and development of rationality, communication of its functions to the machine releases human reason for new flights of thought into the unknown and uninvestigated. Therefore, it is equally erroneous to attempt to restrict development of calculus rationality, to set limitations to it, to find such theoretical structures which will never be mastered by it. When setting such limitations to the calculus rationality, we in fact put restrictions to human reason whose development serves a prerequisite for rationality to master still new systems of theoretical knowledge.

Some branches of modern bourgeois philosophy (intuitivism, existentialism) strive to depreciate reason and subject human thinking to criticism. In so doing, they first reduce its activity to rationality. Criticism of rational thinking is utilised to prove the necessity of intuition which is contrary not only to rationality, but also to reason, and is of a mystic nature.

Logical positivists reduce thinking faculty to rational definitions describing the object. The entire thinking is reduced to peculiar calculus. But intuitivism and logical positivism are linked together in their attempt to belittle human reason, substituting it either by mystically misunderstood intuition or calculus rationality.

Materialist dialectics as a logic, its fundamental laws and categories are intensively elaborated by Soviet philosophers. Investigations on the problem are conducted in three directions. First, a number of works is devoted to revealing the content of materialist dialectics as a logic, to discovering its peculiarities, general principles and problems, to criticising logical conceptions opposing dialectics, to establishing the relation of dialectics to various formal-logical systems. The following works may be pointed out here: Rosental M. M., *Principles of Dialectical Logic* (Sotsekgiz, Moscow, 1960), Kopnin P. V., *Dialectics as a Logic* (Kiev, 1961), Cherkesov Y. I., *Materialist Dialectics as a Logic and Theory of Knowledge* (Moscow, 1962), two books published by the Institute of Philosophy of the USSR Academy of Sciences and edited by Kedrov B. M., *Dialectics and Logic* (The first one is *Laws of Thinking*. The second one — *Forms of Thinking*, Moscow, 1962), etc.

The second direction in elaboration of this problem is investigation of individual categories of material dialectics as a logic, forms and methods of modern scientific knowledge. In recent years a number of monographs of this direction has been published in the Soviet Union: Ilyenkov E. P., *Dialectics of Abstract and Concrete in Marx's "Capital"* (Moscow, 1960), Gorsky D. P., *Problems of Abstraction and Formation of Notions* (Moscow, 1961), Alexeyev M. N., *Dialectics of Forms of Thinking* (Moscow, 1959), Kopnin P. V., *Hypothesis and Cognition of Reality* (Kiev, 1962), Sivokogn P. E., *On Origin and Philosophical Significance of Scientifical Experiment* (Moscow, 1962), and some others.

At last, the third direction is connected with analysis, on the basis of laws and categories of materialist dialectics, of development of knowledge in different branches of modern science, revealing gnosiological and logical content of some principles of natural sciences, and studying the logic of scientific discovery. Notable works in this direction are first of all the works by Kedrov B. M., *Development of Notion of Element from Mendeleyev to Our Days* (Moscow, 1948), *Day of One Great Discovery* (Moscow, 1958, and others), Kuzuetsov M. V., *Conformity Principle in Modern Physics and its Philosophical Significance* (Moscow — Leningrad, 1948), Bransky V. P., *Philosophical Significance of Demonstration in Modern Physics* (Leningrad, 1962), and others.

Philosophical analysis of scientific data shows that materialistic dialectics is a logical system which corresponds to modern level of development of scientific knowledge, serves as an instrument of man's penetration into the secrets of nature, social life and the thinking process proper. It enforces no apriori scheme upon the development of scientific knowledge, does not confine it with structures alien to knowledge development, but changes its own form in conjunction with successes of human knowledge process.

Ability to incessant development on the basis of generalisation of new data of science and social practices, makes dialectics an ever new instrument of logical analysis of development of human knowledge.

PROGRESS IN SCIENCE AND TECHNOLOGY IN RELATION TO ART

Professor
M. N. RUTKEVICH

The 20th century has been called the age of science. Indeed one of its most salient features is a continuous and accelerating advance in our knowledge of nature which is accompanied by the advance in technology and engineering. The middle of the century witnessed a new revolution in science and technology which brought about radical changes in production and everyday life, conquering nature on our planet and venturing into the outer space. The advances in science and technology in the age of automation and electronic brains, nuclear energy and artificial satellites exercise a growing influence on all aspects of social life, including the development of art.

How does the advance in science and technology influence art? Does this progress promote the flowering of art or, vice versa, does it carry with it the seeds of its future decay? In particular, is the growth of the significance of science in life compatible with the growth of the social significance of art? These and similar questions are not new. They attracted the attention of thinkers as early as a century and a half ago, at the dawn of mechanised industry. In our days these questions are being discussed with increasing intensity by students of aesthetics and of nature, writers and artists, sociologists and philosophers. For instance, the 4th International Congress on Aesthetics in Athens (1960) discussed the problems of the future of art mainly in connection with the progress in science and technology.

The interrelation of the two most important components of human culture—science and art—is a problem not only of aesthetics but also of sociology and gnosiology, i. e., philosophy. Herein lies the justification of presenting this paper at the Congress.

Having no possibility to cover all the aspects of this problem in a short report, the author will limit himself to the question: is there a sociological and gnosiological basis for regarding the progress of science as a modern Minotaur—the monster destined to devour art?

The pessimistic view of the destinies of art is a special case of historical pessimism which denies the progress of society altogether. The progress in science and technology in the 20th century has been so evident and spectacular that it could not but greatly influence the general attitude to the idea of progress.

While the bourgeois philosophy of the 18th and partly of the 19th centuries as a whole accepted the advance of humanity, the beginning of the 20th century (especially the period after World War I) saw a considerable spread in pessimistic views. "The pink idea of progress is dead" Bertrand Russel wrote in the 20s obviously not referring to Marxism.

The pessimistic conception of history has always been alien and hostile to Marxism, which regards the entire history of the humanity, and especially in our times, as ascending, following in general the path of progress.

The situation somewhat changed during the last decades. The ideas of the growth and progress of society, using the words of the well-known British sociologist M. Ginsberg, «now come to the fore again as a result of social changes connected with enormous advances in technology and socialist revolutions of our time». Pessimism comes in for more and more criticism, and not only by Marxists. In the West, someones speak about the necessity of developing "a conception of progress... entirely devoid of communist ideology" (biochemist R. Potter, U. S. A.). One of the well-known conceptions of the kind was suggested by W. Rostow and got wide publicity at the World Sociological Congress in Washington (1962). It is the degree of the development of science and technology that W. Rostow regards as the criterion of economic progress. Similarly, R. Heilbronner considers the progress of society to be mainly expressed in "amassing technical know-how and scientific knowledge".

Thus the progress of science and technology by now has influenced the sociological thought of the West, having in a considerable degree turned it to its former positions, i. e., to the acknowledgement of progressive development

of human society. But the modern bourgeois theories of progress still radically differ from Marxist understanding of social progress. The progress in science, in productive forces inevitably brings about progress in social relations, replacement of private property by common property, of capitalist society by socialist society.

Such is the lesson of history and the doctrine of Marxism, whereas the above-mentioned authors, while admitting progress in production, science and technology, suppose that it will pace without any radical changes in social relations.

Hence all the resulting differences of opinion. On the basis of predictions by Marx and Lenin as well as the development of the Soviet Union and the other socialist countries we state that the progress of society is universal, i. e., is not limited to science and technology, production and consumption. Along with the changes in production there are the changes of all social relations both economic and political, a change in people themselves, their minds, their nature, their morals and their art in which the personality of man is reflected. Socialist society, while delivering the working people from oppression and exploitation, securing genuine social freedom, creates the possibility for a rapid cultural growth of all its members, thereby opens a highway for the progress of social morals and the flowering of art on the roads of socialist realism. The poetry of Mayakovsky and the prose of Sholokhov, the music of Shostakovich and Prokofiev, the choreography of Moiseyev and the films of Chukhrai have overstepped the boundaries of our country; they are widely known in all countries of the world as living examples of the power and might of Soviet art, its truly popular nature, its tremendous upsurge.

Thus, the historical experience of the Soviet Union, and by now of the other socialist countries as well, proves that universally accepted advances in science are wholly compatible with the flowering of art.

But now let us take another step: even in the conditions of capitalist society, in the countries of the West, there is no ground for regarding the progress of science as the cause of any kind of morbid phenomena in art. These phenomena do exist. The revelry of violence and pathology, the predominance of sex in films and on the TV, the tremendous spread of third-rate literature of the same kind, et., hit the

eye and cause justifiable indignation of many people of widely differing political views. In our opinion abstractionism in painting and sculpture, dodecaphony and similar tricks in music, and senseless poetry also represent the crisis of art. No wonder that in these conditions the thoughts and feelings of many people, connoisseurs of art, are riveted to eternal masterpieces of classical art, from ancient times to the end of the 19th century.

One hears from these people, who are disappointed in modernist art, that the peak of art is somewhere behind us, in past centuries, that nothing good awaits art in the future and that the blame for it lies with science and technology, impersonating the spirit of our epoch. That was symbolically expressed by René Young, who called upon the participants of the Congress on Aesthetics in Athens to "ascend the Acropolis" and save Art from "modern Minotaur", i. e., science and technology, which allegedly threaten the existence of Art.

The ground for this conclusion is *a shallow juxtaposition*: science rapidly advances, while art, at best, marks time, and, consequently, science supercedes art, causing its degradation. In this connection the views of Guido Callogero (Italy) are noteworthy.

In his paper presented in Athens he claims that the progress of society resulting from the progress of science and technology creates conditions for the spreading of art in masses, for the increase in *the consumption* of art. But *the production* of art values will nevertheless decrease as a result of the advance of science, so that the growth of "consumption" of art will be realised through the piled-up stock of the classical art. Thus allowing for progress in consumption and understanding of art Professor Callogero definitely rejects progress in production of art values, in artistic creation. And it is science again that is to blame.

But a simultaneous growth of one factor and decay or stability of another do not necessarily warrant the conclusion that the growth of the former be the cause of the decay or stability of the latter. Suffice it to recall the various accusations addressed to science in the course of the last decades!

One of the Prime Ministers of the French Republic blamed science for the great economic crisis of the early 30-s. There were attempts to shift the responsibility for the use of the A-bomb against the people of Hiroshima and Naga-

saki in the days when World War II was practically over, on the shoulders of science and scientists. Today science and technology are held responsible for the increase of unemployment (for instance, as result of automation) and for the danger of nuclear destruction which loomed over hundreds of millions of people in the days of the Caribbean crisis last fall.

These charges against science are so serious that beside them the charges of "stifling" art seem trifling.

But all of them miss their point. Science, the child of human reason, taken by itself, is guilty neither of the economic crisis, nor of unemployment, nor of the ashes of Hiroshima, nor of the danger of nuclear destruction. One must discriminate between science and the uses it is put to. It is common knowledge that the application of scientific achievements to production in the Soviet Union does not lead either to unemployment or to crises. As for the use of science for purposes of war, the way out of this danger has long been known. This way can only be found in peaceful coexistence, banning of nuclear weapons and their tests and general disarmament. Socialism and peace among nations — that's what is needed to put science and technology to the service of humanity.

The charges against science as a force allegedly preventing by its growth the development of art miss the point as well. Are science and scientists in any way involved in the above-mentioned morbid phenomena in the field of art?

The producers of films packed with murder and pathology were in no way influenced by the theory of relativity or quantum mechanics. That is not the point.

It is true that partisans of abstractionism in art claim to proceed in their work from the requirements of science. The technique, as represented by a camera, made superfluous the reproduction of reality by an artist on canvas or paper. On the other hand the penetration of science into the depths of matter is regarded as a call on art to follow suit. Already the cubists in the beginning of our century claimed to have penetrated "into the essence of things", decomposed and "analysed" them just as the physicits penetrate the depths of matter by means of X-rays. Since then there was hardly any new physical theory that was not used for speculative purposes. So, the theory of relativity connected three space dimensions with the fourth — *time*. The French poet

G. Appolinair, a theoretician of cubism, claimed that cubism opened for the human eye to fourth *space* dimension, while the apostle of abstractionism, K. Malevich, offered the art to act in the fifth dimension; by the way, Malevich, who advocated abstractionism in Russia before the Revolution, thought art of all kinds to be technical activity.

Much water hos flow under the bridge since then, and the modern abstractionists swear now by "the correlation of uncertainties", i. e., quantum mechanics, and especially by the depths of outer space. But the crux of the matter is the same: these are the claims that we, abstractionists, bring the methods of science to art and therefore we are the "vanguard" and represent the future of art. Similar reasoning characterises not only abstractionists in art, but equally the partisans of abstruse "mathematical" music and film producers who substitute trick photography for the portraying of human character, as well as all sorts of futurists in literature who turn their words inside out. For all that, the simple fact that the canvases and sculptures of abstractionists are quite useless from the point of view of cognition of nature and have not helped anyone to master physical abstractions, is completely ignored.

Most certainly an artist can take upon himself to illustrate popular science books. In that case his drawings and illustrations will be of help in teaching the rudiments of science. L. Heidenreich, for instance, proposed to effect the congruity of art and science exactly by way of turning an artist into an illustrator of scientific facts. But even he was forced to admit that "atomic" illustrations may be considered works of art only to a limited degree.

Unquestionably, illustration of science books, as well as writing of science fiction novels and production of popular science films, are invaluable. But working in these genres, an artist works in the "bordering" region of science and art which cannot supersede art as a whole.

Art has its own methods of cognition, its own aims, distinct from methods of cognition and aims of science. Reduction of art to illustration of scientific books and of artistic creative work to its technical side, which is characteristic of O. Spengler and other representatives of technical aesthetics, would have simply meant the abolition of art as such.

Fortunately the whole history of modern art testifies

that art is not in the process of being nullified and has no trend of becoming a pendant to science and technology.

As for the abstract art, it is nothing but the fleeting vogue which has already outlived its "peak" and is heading towards decline; its screening behind the banners of science will not prolong its life.

Discussing the relation of abstract art and scientific abstraction we have shifted over from sociological arguments to gnosiological ones. If the representatives of technical aesthetics slur over the distinction between science and art, obliterate the margin between technical and artistic creative work, and thus come before the prospect of enthralment of art by science and technology, much more widely spread is another point of view which exaggerates the opposition between science and art, creating a real precipice between them.

At the source of such opposition in the 20th century we find Bergson and Freud. By Bergson, intellect and intuition are two absolutely different properties of human mind. Intellect, contrary to intuition, is said by him to be incapable of perceiving the inner sense of things, that is why he gives preference to intuition. Though science, argues he, is serviceable enough in everyday life, it is incapable of giving a true perception of the universe. And, as an artist possesses an intuition, art is capable of revealing the "inner sense of things". Bergson not only lacerates science and art but he puts art above science.

Freud advances not less irrational opposition of intellect to "subconscious". Freud does not favour intellect: "subconscious", and in it the efficacy of sexual attraction, takes the upper hand in man in despite of interdiction of mind.

The aesthetics, based on freudism, looks upon art as a sublimation of sexual energy, as an expression of "subconscious", and therefore as something quite opposite to science which relies upon intellect.

We had to review briefly the conceptions of Bergson and Freud, for modern irrationalism in aesthetics, one way or another, repeats and echoes them. For instance, from the point of view of Herbert Read art only in its most elementary forms "imitates" reality. But in general artistic images express the emotions of an artist, and the highest peaks of art belong to the "shapeless images" of his *subconscious* inclinations.

On the basis of such segregation of human mentality in-

to intellect and intuition, into conscious and subconscious, one may arrive to quite different conclusions concerning the future of art. If one gives the priority to subconscious, to intuition in Bergson's sense, and belittles intellect, depreciating science at the same time, it is doubtful that one can exalt art on so shaky a ground. But in our age of triumph of science depreciation of intellect becomes an ever more difficult task; that is why the opposition of intellect to emotions (including subconscious attractions) more often than not becomes the philosophical foundation for negation of progress in art.

In "*The Journal of Aesthetics and Literary Critique*" (1955) Aldous Huxley expresses the thought that notions and ideas, under the influence of human experience, change from century to century, but instinct, the emotional side of human being, is constant and remains unchanged. Hence, the progress of science has no relation to the development of moral (?) and art; and even when science does affect them indirectly, the influence is always negative since, with the emotional nature of man being unchanged, he gets, in result of progress of science and technology, more and more lethal weapons of destruction.

No matter what conclusions one may draw from the philosophical premises of irrationalism; the conclusions themselves do not make the premises veritable. Man is a part of society, of the boundless universe, part of the material world. He differs from his animal ancestors in the ability of abstract thinking, in his intellect. Man's mind reflects the surrounding world: natural phenomena, other people, social relations, and man's own material needs and interests. This reflection is effected by the organs of sense and by intellect and embraces all spheres of emotional life: passions, desires, sensations.

The emotional reflection of the world and rational reflection, effectuated in abstract notions, are indissolubly interconnected. Intellect takes part in the formation of our perceptions, tinging them into a definite hue in accordance with the aim of cognition. Intellect takes part in all occurrences of emotional life — in instincts, passions and affinites; here lies the difference between the human sensuality and the animal one.

To avoid ambiguity, it has to be reminded that modern materialism is far from considering the reflection of the

world in man's mind to be a passive one, a sort of mirror-like reflection which simply copies the existing reality; already in sensation there is an ideosyncratic moment brought about by the structure of the organs of sense and by the conditions they are in.

The emotional life is always coloured by one's purposes and desires, and the outer world is reflected in it through the prism of one's personality. Last but not least, the creative character incarnates itself most vividly in labour, in everyday expedient activity of people directed to changing the world; just as it incarnates itself in the work of intellect, which not only reflects the nature and natural laws, but forms mental images of all technical novelties long before they are created by human hands.

When looked upon from that point of view, science and art have a common ground, both of them first and foremost *reflect* the world. In science these reflections are presented in the form of abstract notions and in theories based upon these notions: in science intellect reflects the generalities of things, "justified" of concrete perceptions of sensation.

In art the reflection of the world is given through an image — a wonderful and peculiar product of fusion of the intellect and emotions. In such an image general properties, general features of things and relations among them, people and their social relations are given in a concrete-sensual form.

One cannot perceive art to be only the sphere of emotions, of feelings, the realm of "subconscious", and so on. As far back as the beginning of the 20th century, G. V. Plekhanov, an eminent Russian Marxist of that period, justly amended Lev Tolstoi who affirmed that art is a medium of conveying emotions. "Of emotions and thoughts", added Plekhanov. In our days a well-known American scholar in aesthetics, T. Munro, just as correctly amends those who are trying to repeat the mistakes of the great Russian writer. T. Munro points out that there is an insignificant connection between art and instincts and emotions in their primary, reticent and latent forms common to all human beings; that art has closer links with desires and emotions which have emerged under the influence of culture; that art, like science, is associated with thoughts and opinions. It is an appropriate remark. Real art, in any of its genres, emits the light of thought through the sensually apprehended, or created by

our imagination (like in belles-lettres), envelope. Thus in the novels of Lev Tolstoi are expressed, contrary to his own words quoted above, not only emotions but the deepest thoughts. And doesn't one absorb the ideas conveyed in the films produced by the masters or neorealism? And if we take more "earthly", plastic art, doesn't one ingest the thoughts of a sculptor or a painter at least in those cases when these artists stand on a realistic platform?

Science is inseparable from technical creative work, inseparable from political struggle, that is, from creation of new social forms. Art consists not only of an artistic image in one's mind, but of its incarnation, that is, of an aesthetical creation. People in their everyday activity materially incarnate scientific ideas and artistic images. The integrity of human consciousness, for which science and art, abstraction and image, are the different means of cognition of the world and the different means of expression of human attitude towards it, finds its continuation in the integrity of human activity directed to subjugation of nature.

On the other hand, just out of the integrity of all forms of practical activity sprout all ways of reflection of the world.

Science and art give us comparatively authentic picture of the world, including ourselves. They serve as means of remodelling the world, means of humanising it. They are interconnected, and serve like the right and the left hands of civilisation. Civilisation grows unevenly. Sometimes it employs both hands simultaneously, like in Ancient Greece at the outset of European culture.

During Renaissance the uplift of art preceded on the whole the upsurge in science. In our days science advances faster than art.

Does it give any ground for pessimistic anxiety concerning the future of art?

In our opinion, it does not.

Advance in science is the advance of intellect, in which grows not only "the gross volume" of knowledge but the ability and aptitude for intellectual speculations.

By means of education broad masses of population get acquainted with the achievements of science; therefore, the growth of the intellectual abilities of scientists and scholars promotes the growth of the intellectual abilities of society as a whole. The faculty of abstract thinking does not

hinder creative work in the realm of art, on the contrary, it invigorates it, facilitates the creation of deep, intellectually pithy images. Leonardo da Vinci, Lomonosov and Goethe were artists as well as scholars; there is no doubt that this circumstance enriched their creative work both in the sphere of art and the sphere of science.

At present such universality is unimaginable due to the colossal growth of science; but every true artist of our time should be versed in fundamental inferences of natural science, as well as acquainted with modern trends of social development. Unquestionably this will refine his conceptions of the world and therefore enhance the value of his creative work. Intellect is not "contra-indicated" to art; the light of it is just as necessary to art as to science.

Therefore we emphatically brush aside Professor Callogero's assertion prophesying the future impoverishment of art, though we share his opinion that science and technology create the conditions for mass propagation of art by means of cinema, radio, television, etc. The rise of productivity of labour makes it possible to shorten the working hours and hence to prolong the leizure time which can be partially devoted to art. The rise of the standard of life of broad masses of people facilitates it.

The Soviet Union, where the working day was shortened to 7 hours (and in a number of branches of industry to 6 hours), where standard of life grows rapidly, and educational facilities are within the reach of every citizen, witnesses the evergrowing craving of people to art. The network of Universities of Culture, where people during 1-2 years attend lectures on different aspects of culture and learning, art included, is growing from day to day. It is by no means a passive acquisition of art, mainly of the classical art; just on the contrary, the modern art arouses greater interest.

"Literary soireés" are attended by tens of thousands of people. And the most important of all is that it is not just a mere appraisement of works of art which have already been created by mankind; the broad masses of people take an active part in all spheres of artistic creative activity. The numerous clubs and Palaces of Culture can boast varied amateur circles of art, and the members of these circles as often as not enjoy greater success with public than professional actors and artists.

Such, for example, are the People's Opera House of Metal-

lurgists, which staged the opera "The Daughter of Cuba" by Listanov, and the Dance Ensemble of the Working Youth and the Students' Choir of the Ural State University, both of which enjoyed great success at the World Festivals. In Sverdlovsk Region alone more than 50 thousand people take an active part in amateur art activities, and just out of their ranks come the professional artists, actors and musicians.

In the Programme of the Communist Party of the Soviet Union, this most important document of our time, is recorded, as one of the most important tasks facing the Soviet people at present, *all-round harmonious development of human personality*. Such all-round development of personality means the amalgamation of intellectual wealth, moral upstanding and physical perfection.

To attain this it is necessary for one to master both science and art, to participate actively in technical and artistic creative work; it is necessary to develop facilities for talents and gifts of all people in all domains of production, science, technology, literature and art. Leizure time of people, on the evergrowing scale, will be devoted to creative work in all spheres of art, science and technology.

The dilemma: science *or* art, is nonexistent for the Soviet people.

All foreign observers unanimously acknowledge how graspingly the Soviet people ingest the achievements of modern culture which are based on the cultural inheritance of all the peoples and nations of the world, acknowledge the enthusiasm of the Soviet people in the creation of new cultural values both in the realm of science and art.

Retracing the lessons of the history of mankind, we are confident of a brilliant future of the world civilisation, civilisation unfettered by the yoke of private ownership and exploitation. The prospects of progress are boundless in science as well in art which have always stimulated and enriched each other and will continue doing so in future.

Bringing to mind Hegel. The great philospher erroneously presumed that art was a gone-by stage in the development of the "Universal Spirit", that the peak in art had been somewhere in the past. Hegel declared it at the beginning of the 19th century, a century which later on proved to be so prolific in artistic creations. The pessimists of our days do not realise that the temporary difficulties and mishaps of

art are called forth by specific social conditions of the decaying capitalism; that they are just as transient as capitalism itself. In vain are their allusions to intellect and science; both have nothing to do with these difficulties. The pessimists are just as wrong today in their pensive thougths over the future of art, as Hegel was in his time.

The history has proved, and is going to prove even more indisputably, how right Marx was when he predicted the growth of science and art, connecting the future prospects of progress of the world civilisation with the formation and development of communist society.

DIALECTICAL MATERIALISM AND THE PHILOSOPHICAL PROBLEMS OF MICROCOSM

Professor
S. T. MELYUKHIN

In our days the physics of atoms and elementary particles have acquired paramount importance. Its development has brought about many important philosophical problems among which the following seem to be the most urgent:

1) What is the interrelation between the continuous and the discrete in the structure of matter?

2) Do the primary, elementary units of matter exist in principle or is matter infinite in structure? What does the concept of structural infinity of matter imply?

3) In what way is the problem of substance of the universe solved at present, is there any primary substance remaining invariable in all transformations of matter?

4) Can irresolvable and indeducible elementary mathematical laws exist, from which the fundamental properties of all phenomena would follow, or are there no laws of such kind and is the causal chain endless?

5) What does the concept of structure imply when applied to elementary particles?

Some of these problems were dealt with by pre - Marxian philosophers and they were often solved in the following way: some philosophers assumed the existence of primary structureless units, of primary invariable substance, indeducible elementary laws, which were identified with the principles of classical mechanics.

Side by side with the limitation of matter in the microcosm they admitted the infinity of space and time which they assumed to be uniform, similar in all its forms, like immensely magnified known finite.

There also existed, some other notions admitting the potential structural infinity of substance (Anaximander, Aristotle, Leibnitz, Hegel), but the finite theories of the structure of matter in the spirit of atomism predominated.

Radical changes in the concept of matter took place in the first decade of our century with the appearance of the theory of electromagnetic field, of the theory of electrons, with the discovery of the laws of microcosm, indeducible from the principles of classical mechanics. This resulted in the crisis of previous metaphysical concepts of matter.

The concepts of unchangeable atoms, universality of mechanical laws, independence of properties of space and time on matter, etc. being refuted, some physicists-idealists have taken it to be the ruin of physical theory as a whole — the "ruin of materialism". It was one of the causes contributing to the mystic concepts of the world. The theoretical failure of the idealistical notions, the causes of crisis in the physics and the ways of overcoming it were thoroughly analysed by V. I. Lenin in his «*Materialism and Empiriocriticism*» (1909), where the problems of the structure of matter were given quite a new treatment.

Better than anyone at that time V. I. Lenin understood the spirit and tendencies of the development of physics in the twentieth century, its unavoidable departure from the mechanical pattern of the universe and the admittance of the infinite complexity of nature.

While many physicists in the old manner continued to look for some ultimate structureless "bricks" of the world, identifying them with electrons, V. I. Lenin stated, that "The essence" of things or "substance" is *also* relative. It only expresses a deeper insight of man into objects, and if yeasterday this insight was confined to atom and today it is confined to electron and ether, the dialectical materialism insists on the temporary, relative, approximate character of all this *landmarks* of knowledge of nature by the progressive science. The electron is as *inexhaustible* as atom, nature is infinite[1]. Later on V. I. Lenin also claimed the infinity of matter in structure.

The idea of inexhaustible complexity of microcosm became the keystone of modern physics and has been generally confirmed. Moreover, the development of theory and experiment has given it a new material content; it has brought about some qualitative aspects of structural infinity of matter.

The philosophical generalisation of the developments in the physics of microcosm was reflected in the extensive Soviet philosophical literature, especially in that of post-war years. But the ontological problems stated above are as yet of great importance and stimulate further research. The fact is that the physical experiment has proved the complexity of atoms different from those treated in the atomistic theories of the past. In those theories atoms were not believed to be some definite particles of the size of 10^{-8} cm., but were considered to be infinitesimal elements. From this point of view one could say even now that atoms known to modern science, elementary particles and fields, as well as the matter of which they are formed, are eventually composed of the ultimate structureless elements "true atoms", that matter is discrete in its structure.

Reference to modern experiment might not dispose of this view, as it is unobservable infinitesimal elements that are dealt with here. However, the statement that matter is only discrete can be disposed of theoretically. The research of the foundations of mathematics has shown that the idea of the primary infinitesimal units is contradictory, that such units do not exist in nature. Contrary to the latter, the idea of the potential infinitesimal (or infinitely large) amounts was suggested as a process of boundless decrease (or increase) of quantities. The concept of infinite quantities can be applied to countable or uncountable multitude of objects.

The idea of matter being necessarily discrete prevents the rational understanding of interaction and general interconnection in the world, the cognition of the appearance of various structural formations.

In any system interconnections of different kind must be at work between discrete elements. They cannot propagate in space by themselves, for motion is impossible without matter and there is no such thing as empty space. There must be some material substance of this forces, various forms of matter continually distributed in space. Provided that they were discrete, the problem of interaction would preserve its previous form.

The general interconnection of the phenomena and the formation of different structural systems resulting from the interaction of elements, are possible when matter as a whole is continuous. The continuity finds its necessary attribute in the discreteness of matter, in the existence of different objects and levels of the structural organisation of matter.

The idea that there are ultimate structureless micro-obje

[1] V. I. Lenin, Collected Works, Vol. 14, p. 249.

cts in nature is not valid. Structure is always some law and type of connections, it is always some form of interconnection of elements of matter, stipulating the existence of an object as a whole and the course of a process.

Interconnection and interaction are the basis of structure, the form of its manifestation.

The objects devoid of any structure would never possess connections and interactions, both internal and external. But in such a case they would not possess any properties, for any property results from interactions, is caused by internal and external connections of a body. Objects could not be united into systems of larger sizes and no bodies could result from them. These objects would not manifest their existence since the latter can manifest itself only provided the interaction is present. It is clear that such micro-objects devoid of connections and structure are illusive units and can not exist in nature. Structural nature of all material objects is their inherent attribute, which is due to such more general attributes of matter as motion and interaction. Hence when any new phenomena of nature are discovered, the following question will necessarily arise: why do the properties and laws of any particular phenomena possess just this and not some other form. The causal chain of all possible explanations will never come to an end. Any well grounded theory devoid of any contradictions and confirmed by practice will always contain some concepts and principles not to be thoroughly understood and explained only with the aid of content and methods of the theory concerned. Any theory can be entirely understood and explained provided a more general theory has been conceived, from which the concepts of the previous theory are deducible as its peculiar sequences. Such new theory cannot be created on the basis of logic alone; new experimental data are indispensable.

Internal connection and correspondence between the new and the previous theory will take place and the equations of the new theory will be transformed at certain parameters into equations of the previous theory [1]. That is why no primary universal mathematical laws can exist in the world from which all properties of all phenomena could be deduced directly. Such laws could exist only provided the structure of the world were qualitatively homogeneous, in case the properties of matter were entirely isomorphous on all space-

time scales of its existence. However, in practice we see the reverse: the world is heterogeneous in its structure and there are qualitatively different levels of structural organisation of matter. On evely level matter possesses different specific properties and laws of motion. Today several such levels are known: elementary particles and atomic nuclei, atoms and molecules, macroscopic bodies, cosmic systems of different orders. Allowance should be also made for the existence of different levels in the evolution of matter in its progress from inorganic bodies to living substance and conscious beings.

Many properties and laws of macroscopic phenomena will not be found in the microcosm and vice versa. The laws of the evolution of living organisms are qualitatively different from those of inorganic bodies. This does not mean, to be sure, that the levels in question exist by themselves. No doubt they are interconnected and mutually stipulated. Apart from specific properties and laws of motion there are also some general properties, such as interaction, motion, space-time properties, inertia, qualitative stability, quantitative and qualitative infinity, tendency to inherent evolution and some others.

There are also some general dialectical regularities manifested on all levels of the structure of matter. Such as the law of the conservation of matter and motion, the principle of causality, the law of unity and interaction of contrarieties, mutual transition of qualitative and quantitative variations, and others.

The general laws and properties provide the connection between all the levels of structure of matter. But they are not sufficient for the deduction of some specific properties and laws of matter as they do not possess any specific functional form, appropriate parameters and constants, being the most general principles of nature. All the general properties and laws manifest themselves in qualitatively different forms on different levels of the structure of matter.

In such a way the qualitative heterogeneity of the infinity of matter eliminates the possibility of a single quantitative law, which could express the ultimate essence of matter, the equation from which all the properties of the world

[1] I. V. Kuznetsov, Principle of Compliance in Modern Physics and its Philosophical Meaning. Moscow — Leningrad, 1948.

could be deduced. Each particular level has specific laws of its own, expressing the essence of material relations.

The quantitative and qualitative statement of these laws involves the problem of their causal foundation and deduction. This can be effected by means of a more general theory, whose laws involve those of the previous theory as their particular solution. Therefore, according to V. I. Lenin, the human thought passes from the understanding of the essence of the first order to that of the second, third order, and this process knows no limitations.

The relativeness of essence is the basis of the relativeness of the concept of substance. Contrary to the old metaphysical views the dialectical materialism assumes that there is no ultimate invariable substance of all things in nature. The thesis of the substantiality of matter implies only the material unity of the world, as well as the universal validity of the law of the preservation of matter and motion, of the principle of causality at the most general law of nature. Only in this sense matter as substance is absolute. As far as the stability and elementary character of some particular forms of matter are concerned, the substantiality of matter is relative. For instance, the elementary material objects with respect to chemical combinations are atomic nuclei, remaining invariable in all chemical reactions. They are here substantial particles. But at the same time they possess structure and are the *form of organisation* of some relatively simple matter, manifesting itself as elementary particles and fields.

There exists apparently a general law: those material objects which are substantial and relatively invariable with respect to the complex and higher level, are themselves forms of organisation of matter at the lower level. With respect to objects of matter of the lower level, they can originate as such, disappear and undergo different transformations. The substantiality and invariability prove to be relative, but at the same time they are objective, as are different levels of structural organisation of matter. It is in the relativity of substantial forms, as well as in the multitudiness of laws, interactions and properties, that the qualitative infinity of matter finds its manifestation.

It is of interest to consider these problems with respect to elementary particles and fields. The term elementary particles in physics implies primitive indivisible units of

matter which do not consist of other particles and fields known in modern science. More than 30 species of elementary particles have been discovered and the analysis of their microstructure has just begun. Their probable structure has been found to be quite different from that of all macroscopic bodies.

The knowledge of the structure of micro-objects involves:

1. The discovery of laws and types of connections of some material elements in elementary particles;

2. Insight into material substratum of the interconnections concerned, that is, into those forms of matter, the interaction of which results in the formation of elementary particles;

3. The study of spatial structure, the character of the spatial distribution of the elements of matter in a particular microobject;

4. Understanding of the specific features characteristic of the existence of elementary particles in time, of the time aspect of their structure and the dynamics of its transformation in time.

In what follows the data of modern physics on these four aspects of the problem are considered.

The laws of interaction of material elements in microstructure of elementary particles have not yet been discovered. None of the equations of quantum theory (Schrödinger, Dirac, Heisenberg) have provided as yet a complete solution of this problem.

Nevertheless even now the philosophical generalisation of physical data permits some preliminary information on the structure of particles to be obtained at least in the general qualitative form.

The structure of elementary particles does not imply its being mechanically composed of some smaller particles of similar kind.

The concept of mechanically complex system cannot be applied to it. In any mechanically complex system the energy of interaction between the elements is very low as compared to the total inherent energy $E=mc^2$, depending on the mass of the system. The decrease of the mass, when such a system is formed, is negligible as compared to the mass as a whole. As for the elementary particles the situation is quite different. At the present time there are no means permitting to affect particles by energy thousands or even millions of

times as large as the inherent energy $E=mc^2$ of a particle. If elementary particles were mechanically complex systems consisting of distinct elements, they would fall into elements when affected by energy smaller than $E=mc^2$. But in fact it is not the case even when this energy is 1000 mc^2 and higher.

In all these cases we have to do not with the splitting of a particle, but with the appearance of many other micro-objects — electrons, mesons, protons, etc.,— arising at the collision of particles. The newborn particles may be of the same type as the bombarded ones (for example, the appearance of electron-positron pairs on electrons). This is an argument against the idea of their being present "*ready-made*" in the bombarded particles. They appear to have been connected with the structure of interacting microparticles, but were contained in it not "*ready-made*," but *potentially, as a possibility*.

The energy of interaction between them is so high that their mass as a whole as well as other properties, are "extinguished". Outside only a small part of this properties can be observed in the transformed state, they being the properties of the particle concerned. But if the energy of exterior effects exceeds the energy of these interior connections, amounting to several mc^2, some other potential micro-objects escape from the structure of the particle. The transition from possibility to reality, that is, the appearance of distinct particles, depends therefore, on the amount of the energy absorbed. The higher the energy, the greater number of microparticles can appear in a collision. The energy of connection between their potential elements seems to be so high that they do not appear by themselves when the energy of the exterior action is low. Such considerations were used in physics for constructing various models of complex particles. For example, Markov [1] and Sacata suggested that the neutral π-meson results from the interaction of the pair nuclon-antinuclon, present in latent virtual states, which were defined above as a potential existence. The excess of the mass of nuclons is eliminated at the expense of the enormous energy of their interaction, all other properties changing at the same time. «The residual» of transformed properties manifests itself on the outside as the properties of neutral π-meson. Similar models were suggested for other elementary particles, whose structure is believed to

[1] M. A. Markov, *Hyperons and K-mesons*. Moscow, 1958.

result from powerful interaction of micro-objects. It should be emphasised, that the energy of interaction between the possible structural elements cannot exceed their total inherent energy. Alternatively the total mass and the energy of particles would be negative, which contradicts to the facts and laws of the conservation of matter and energy.

The above considerations allow the elementary particles to be defined as *micro-objects, whose energy of interior bonds corresponds approximately to the energy of the mass at rest.* This definition shows their essential difference from all other micro-objects so far discovered, such as atomic nuclei and atoms, which are qualitatively indivisible, have preserved their integrity in chemical reactions, but are characterised by a much lower energy of interior bonds. Potentially the structure of elementary particles may contain many other micro-objects, but the realisation of this possibility, that is, the appearance of real particles, will depend on the energy of interaction of a given particle with other micro-objects. It can be seen that the structure of microparticles may manifest itself in different ways depending on the difference of energy of exterior bonds and interactions. It is not an invariable factor, but varies continually with the changes in the exterior bonds.

Such a dependence of structure on bonds is possible not only at a high energy of interaction, but also at small ones. An insight into the interior structure of microparticles cannot be gained without taking into account their connection with electromagnetic, gravitational and nuclear fields, each of them making its contribution to the structure. Such properties of particles as mass, electric charge, meson charge are respectively characteristics of the bonds of particles with gravitational, electromagnetic or nuclear fields. The fact that the properties concerned cannot be severed from microparticles confirms the unity of particles with various fields. The greater the constant of interaction, the closer the particle is connected with the field. For example, the π-meson field is intrinsical in the structure of nuclons. Thus, the structure of particles is a function of their interaction with other particles and fields. It cannot be understood if we take account of the possible interior bonds alone without making allowance for the exterior ones. The difference between the interior and the exterior bonds is far from absolute.

It is impossible to establish precisely a boundary between the elementary particle and its exterior field. This unity of particles and fields is shown by the quantum theory of field, which regards particles as excited states of particular fields, thus emphasising the dialectical unity of the discrete and the continuous in the microcosm.

On the other hand, the increase of interaction energy in some particles causes the transition from the sphere of the potentially possible into that of reality of ever increasing number of micro-objects, which can exist in a latent, virtual state in the structure of related particles and fields. Consequently, structure can not be understood taking into account only the present real being of a particle, that is, all those properties, which are observed in interaction at this or that moment. On should also have regard for the inexhaustible multitude of potentially possible states of this structure, since all the features of a particular multitude depend not only on interior bonds, but also on the exterior ones, notably, on the energy of interaction with other particles and fields. In this the structure of elementary particles differs essentially from that of all other known forms of matter, from atom to cosmic systems. If the structure of the latter is determined primarily by the laws and forms of interior bonds between the elements of a system, the structure of elementary particles to no less extent depends also on their exterior bonds.

In order to visualise this paradoxical phenomenon, illustrating the qualitative infinity of matter, let us consider the following experiment. Let us suppose that two protons, with an energy of 10^{12} electron-volts each, move approximately in the same direction, so that the trajectories of their motion are at a small angle. Imagine that they collide at some point. In such a case the energy of collision can be inappreciable and the protons will go separate ways. Suppose that these protons move toward each other and collide with an energy of $2 \cdot 10^{12}$ e. v.

In this case many new microparticles will appear: hyperons, mesons and others contained in the structure of the protons in a potential state. The difference between the results shows that the structure is a function of the interaction of particles and manifests itself differently in the processes with different energy.

The above phenomenon should not be understood in the

sense that here energy passes into matter. Different particles originate at collision not at the expense of pure energy, but at the expense of interacting micro-objects, for example protons. But the colliding micro-objects with different energy also possess different quantities of matter *in respect to one another*. As a result of their collision many particles are born, among which similar ones may be present (two protons, as in the example mentioned above).

This phenomenon can be understood correctly only from the standpoint of dialectical materialism, which claims the inherent unity of matter and motion and also the dependence of the structure of bodies on their interaction. As far as motion is an intrinsic attribute of matter, the change in the form and energy of motion results in the change of structure. Hence the structure of particles and the quantity of matter involved in them behave differently in various interactions. This behaviour is especially pronounced at high energy of interaction.

The above considerations allow to treat the *spatial* structure of elementary particles from a new point of view. The spatial volume of bodies usually implies their extent in their mutually perpendicular directions. But what is this extent? Is it the primary, initial property of matter, or can it be derived from some other, more general property? From our point of view, the extent is the secondary property with respect to motion and interaction of bodies, is the function of their interaction. For instance, the extent of any microscopic body results from the interaction of elements of matter composing it. *The extent displays the stability of coexistence of elements in structure*, the latter being the result of unity of different opposing forces, in particular, those of attraction and repulsion. Assuming there are no forces of attraction and linkage between the elements of a body, it is evident that the body will not exist, and it is no use speaking of its extent.

But if we suppose that the forces of repulsion between the elements have vanished and only the forces of attraction predominate, the body will decrease in size at least 10^{14} times. This diminishing may go on, as far as the unity of opposing forces of attraction and repulsion in its specific forms seems to be present in the structure of elementary particles. The stability of structure of any material unit, as well as its extent, result from the dynamical balance of

opposing forces, from stable coexistence of interacting elements. The elimination of one of the groups of opposing forces makes the stability of the coexistence of elements impossible, and thus the basis for the extension is destroyed. In this way, the extent is not a primary, initial and invariable property of matter, as it was thought to be by Descartes, Spinoza and many other philosophers. It is the function of interaction, as a more general attribute of matter.

Relativity seeks to discover the dependence of spatial properties of material bodies on their relations, although it should be stressed that in many papers on relativity the old concept of space as some primary entity is still employed. It is often found in the attempts at geometrizing matter, at creating such a theory of space and time, by means of which various types of elementary particles and fields, as well as all their properties, could be derived [1].

Material objects here are believed to be the display of metrical properties of space and time, while in fact it is not the case: space and time are secondary with respect to matter, are forms of its being, and their properties are deducible from motion and the interaction of bodies.

In principle all these considerations apply to spatial dimensions of elementary particles. Dimensions are usually determined by measuring the effective cross-sections, when some particles are bombarded by others. But the extent of the cross-section depends on the mass of the interacting particles, the velocity of their motion, and the electrical charge, and will vary in case some of these parameters, for instance, impulse, are changed. Hence, the spatial dimensions displayed in interactions will be also different.

It should also be taken into account that particles cannot be separated from different fields inherent to their structure. Therefore the dimensions of particles cannot be accounted for without considering the extent of their fields and the unity of the discrete and the continuous in the structure of matter.

It will be noted that the spatial dimensions of elementary particles can be dependent to a certain extent on the

[1] For different theories of geometrizing elementary particles and fields see, for example, J. A. Wheeler, Neutrinos, Gravitation and Geometry, Bologna, 1960.

enormous energy of their intrinsic linkages (bonds). The latter can bring about the relative discreteness of a number of particle properties, in particular their spatial dimensions, which are of the order of 10^{-14} cm. In the current theories this finds its expression in the discreteness of space and time in the microcosm.

In the dimensions smaller than 10^{-14} cm the elementary particles will not present themselves as indivisible units. It does not mean that on this scale there are no material formations. *Matter, as the totality of all objects and systems in nature, is not only discrete, but also continuous in its structure.* Its discreteness is a relative property, while its contunuity is absolute, responsible for the general interconnection of all the phenomena in the world. But the insight into the scales smaller than 10^{-14} cm is possible only with the aid of some new experimental method, as yet unknown. This will provide knowledge of quite a new world with space-time properties distinct from those so far known. Thus, the true infinity of matter in structure presupposes the unity of qualitative and quantitative variations, some sequence of fundamental levels having their specific properties and laws. Only the general attributes and principles of matter provide for the interconnection between these levels, but they also manifest themselves differently with the transition from one level to another.

The study of the structure of elementary particles involves the knowledge of both spatial and time aspects of their existence, the dynamics of their variation in time.

Particles do not exist for a long time in self-identical state, their structure is not invariable. This is true not only for unstable particles, but for stable ones as well. They suffer continuous changes resulting from interactions with the surrounding forms of matter, from absorption and radiation of quanta of different fields, from virtual transformations.

Their properties are statistically means in time, and their structure is a unity of stability and variability. If one succeeded in measuring the values of their properties during the periods of the order of 10^{-23} sec. and less, one would obtain every time different values of properties for one and the same particle.

This is due to the fact that particles constantly origi-

nate and absorb virtual quanta of certain energy and are subject to intrinsic transformations. The time of their existence in other forms is taken to be equal to about 10^{-23} sec., then they pass again into the initial state, followed by new transformations. The quantum theory of field points out the correlation of uncertainties for the time of existence and energy of virtually originated particles $\Delta E \cdot \Delta t \gtrsim \hbar$.

This correlation implies the existence of an objective uncertainty in the values of the general properties of particles, provided the measured time is less than 10^{-23} sec. Below this limit processes will occur in the microstructure of particles, which will show qualitatively different peculiarities.

Thus, the above considerations permit to define the elementary particles as qualitatively peculiar micro-objects, whose energy of intrinsic bonds roughly corresponds to the energy of the mass at rest of the forms of matter composing them; the material, space-time structure of these particles results from interior and exterior bonds and is a unity of stability and continuous variability.

The history of scientific knowledge displays the following important regularity: all the fundamental problems of natural science, which apply to matter as a whole, have always been defined first in philosophy on the basis of dialectical and materialistic concepts. Only then were they studied in detail by natural scientists, who gave them quantitative and exact qualitative specification and practical realisation.

This may be seen from the history of the following discoveries: the laws of the preservation of matter and its general properties, atomistic theory, the development of concepts of matter and space and time, the principle of minimum action in nature, the infinity of the world, the principle of the evolution in inorganic and living nature, etc. While positivism and various idealistic trends neglect ontological philosophical problems, or distort their essence, dialectical materialism, making use of the development of natural science, aims at creating a synthetic pattern of matter in motion and at discovering its general properties and regularities. This pattern, to be sure, will not replace various concepts of natural science concerning the structure and properties of matter, but it seeks to find

out the general principles of being displayed in the world, every field studied by natural science included.

Among these objects of investigation the problems enumerated in the beginning of this paper are of basic importance. As far as these problems deal with the essence of the *infinity of matter*, they cannot be solved completely and definitively at any given moment. But at every stage of investigation dialectical materialism attempts to discover some elements of absolute truth, which would be used by the further progress of science.

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