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Marxism-Leninism, in considering the role of economics in war, demands strict consideration of the objective socio-political and military-technical factors which determine the character of a given era as well as new criteria which arise in connection with the qualitative change in weapons and, consequently, in the form and methods of conducting military operations.

Among the objective historical factors of our era, the formation of the world socialist system stands out in the foreground. The emergence and the development of the world socialist system and the swift growth of its economic might and political authority led to a sudden change in the state of the post-war world. The world socialist system is transformed into the decisive factor in the development of human society.

Creating the material-technical base for socialism and communism, the socialist countries successively inflict blow after blow on capitalism in the decisive sphere of material production. It is known that the share of the socialist economic system in world industrial production was about 3 percent in 1917, in 1937 -- 10 percent, and now has reached 38 percent. The following indicator also is proof of the superiority of a socialist economy during the years of Soviet power, the average annual increase in industrial production was 10 percent and, in the citadel of capitalism -- the United States -- for this period it equaled only 3.4 percent.

The strengthening of the economic ties between the countries of socialism answers the fundamental interests of each of them and creates conditions for their successful economic development. The possibility to make wide use of experience and to rely on friendly and unselfish support is one of the main advantages inherent in the world socialist system. The perfection of economic coordination in the socialist camp is a natural process. The successful building of socialism and communism is having a beneficial effect on the scope of the international-workers' and national-liberation movement and it assists the progressive forces to uphold more decisively the principles of peaceful coexistence of states with different social systems and to persistently defend peace throughout the world.

At the same time, imperialism has begun the period of the decline and downfall. As a result of the struggle of revolutionary forces, the area of its influence is continuously narrowing and its position is irrevocably being demolished. However, in estimating the relationship of world forces, a strictly realistic approach is necessary. It is no secret that imperialism still possesses a tremendous production and military apparatus. Relying on it, the reactionary forces in the struggle against socialist and other

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peace-loving countries, along with direct aggression, economic, political, and ideological diversion. Proof of this is the open plundering of US imperialism in Viet Nam, Laos, the Congo, its provocations against the Cuban Republic, and direct military interference in the affairs of the Dominican people. All this signifies that although the possibilities for the influence of imperialism on the course of events have become incomparably fewer, its exploitative, aggressive essence did not change, and the danger for the initiation of wars has not been eliminated. And if a new world war to which the aggressive imperialist circles are drawing mankind is not successfully prevented, then it, and its nature, will be a decisive uncompromising clash of two socially opposite coalitions in which the warring sides will pursue the most decisive class goals.

The most important factor of our era, determining the nature of a probable war, is the rapid development of productive forces. It was the colossal successes in the development of industry and natural sciences in their aggregate and their interconnections which predetermined the qualitative leap in the sphere of material production connected with the discovery of nuclear energy, the conquest of outer space, and the development of chemistry, electronics, and cybernetics. A genuine scientific-technical revolution is occurring which is expressed not only in the re-equipment of the so-called traditional branches of production with new technology. Such phenomena also occurred formerly. The present-day scientific-technical revolution manifests itself in the creation and rapid development of completely new branches of industry which lead to a fundamental change in the structure of social production.

First of all a break occurred in the structure of the power balance which was connected with the movement of petroleum and gas to the foreground. The raw material base is undergoing an important change in connection with the gradual replacement of steel by light metals and alloys, and with the predetermined production of new artificial materials with predetermined properties. The leading place among progressive branches is occupied by the chemical industry, which has become an important indicator of the level of the industrial power of the country. Strong positions are retained by the electrical engineering industry, and electronics are developing especially rapidly. Computers and cybernetic machines, which are a powerful weapon for the automation of production and control, are being widely distributed. Along with this, the production apparatus -- machine tools and industrial equipment, which are, according to Marx's expression, the "bone and muscle" system of production -- continues to change. Agriculture is changing more and more to industrial methods of production. Shifts which are occurring in the transportation industry are leading to a relative reduction in railroad shipments. More and more significance is being acquired by the development of pipeline, motor vehicle and aerial transport. Military production now is characterized first of all by the development of the latest branches of industry (atomic, missile construction, instrument building, electronic equipment, chemical).

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and an increase in the volume of scientific-research and design operation, and by the growth in the requirement for specialized and standardized equipment.

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All these new phenomena in economics and the great achievements in scientific-technical progress created the conditions for the military-technical revolution. Of course, this revolution is not a one-time act; it unfolds and grows in accordance with the practical use of theoretical achievements, especially in the fields of mathematics, physics, chemistry, and in the successful development of machine building and instrument building. In the aggregate, they determine the most important directions of the military-technical revolution: the use of intranuclear energy and the development of missile and aviation technology, radio-electronics and automation, on the strength of which cardinal changes occurred in the field of the development of means of destruction and means for delivering them to the target. Nuclear missile weapons differ primarily from weapons of the recent past by their unprecedented destructive force, unlimited range, and the lethality of initial radiation, thermal radiation, and radioactive contamination of the terrain.

The fundamental changes in the material base of war entailed changes in the methods for accomplishing combat missions. A modern world war, if one should be unleashed, will be a nuclear war and it cannot be approached with former yardsticks. The transfer of the center of gravity of military operations to the depths of the territories of the warring countries, strikes against large industrial, strategic, and administrative-political centers, means of nuclear attack, power centers, transportation networks, communication networks, the possibility of inflicting irreplaceable losses to the economy and human resource of the warring states, the decisive dependence of military operations on massed nuclear strikes and, finally, what is most important, the growth in the role of the initial period of the war and a reduction in its duration -- all this furthers the significant change in the role of the economic factor in war.

The creation of new means of armed combat which are new in principle, the fundamental change in the very nature of modern war, and the serious structural shifts in the economy of the developed states greatly intensified the dependence of the armed forces on the technical-economic base both in the quantitative and qualitative nature of material requirements and in the methods for their satisfaction. In modern war, the economical steps forth not only as the arsenal but also as the direct objective of armed action. This is why, along with the problem of economic support of nuclear war, the problem of assuring the survivability of the very economy stands out with great poignancy.

Nuclear war demands colossal material expenditures; therefore, the importance of the economic preparation for it grew tremendously. It is sufficient to not the "obsolescence" of modern equipment which is occurring much

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more difficult for the national economy is forced to solve the
problem of renewing military equipment at exceptionally rapid rates so that
the troops have everything necessary and at any moment could immediately
change to military operations and achieve decisive successes even in the
initial period of the war.

A comparison of expenditures on wars of the "pre-nuclear period" with
expenditures for the preparation for modern war graphically confirm this
conclusion. It is sufficient to say that the material expenditures of the
two world wars are estimated to have been approximately two trillion (2000
billion) US dollars. The grandioseness of this sum becomes obvious if we
recall that the entire national wealth of the United States at the end of
the Second World War was estimated at 600 billion dollars. Modern military
preparations, everywhere diverting the energy of tremendous masses of
people from peaceful and leading to the non-productive expenditure of a
large amount of material resources, will be even more expensive. The
famous English military observer R. Fletcher, maintains, for example, that
expenditures on a nuclear "deterrent" in England comprises at least 15-20%
of the military budget. The overall costs of all countries in the postwar
years which are connected with the arms race approximate a thousand billion
dollars. The war machine which now exists in the world is estimated at
350 billion dollars; this is more than the cost of the First World War.
About one hundred million men are perfecting and maintaining the modern
war machine in readiness for action.

The problem of the economic support of a future war is not limited to
a determination of material expenditure. It is no less important to de-
termine whether these expenditures will be covered by the reserve accumulated
prior to the war or by current production, as was the case in the course of
past wars. This is a very difficult dilemma and its solution, for the
present, does not go beyond the framework of assumptions and scientific
foresight.

These assumptions proceed primarily from two possible variations of
wars, because one cannot with complete confidence negate the probability of
a protracted war as well as a short war. In a future war between two
coalitions, each of which possesses great human and material resources and
extremely vast territories, it will be difficult to be limited to the
mutual exchange of nuclear missile strikes and avoid the necessity to smash
the surviving enemy forces.

In addition, effective means of combating nuclear weapons and protection
against them are being developed. In foreign countries, even now they are
searching for other means of combat, such as, for example, ray-weapons. The
appearance of reliable antimissile means will reduce considerably the pro-
bability of the complete destruction of industrial objectives and will once
again pose the problem of current production in the course of war. On the
other hand, the perfection of technical means of long-range detection re-
duces to a certain degree the possibility of surprise attack. All this

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initial period of a nuclear war, the possibility for the use and restoration of productive forces in the course of war cannot be completely excluded and, therefore, the necessity for the comprehensive preparation of the economy for the conduct of such a war remains.

Of course, it is difficult now to assume the proportions which will be established between military and civilian requirements, between the production of nuclear and conventional weapons. But nevertheless, it is important to stand on realistic ground. With a surprise attack, modern destructive means of war make it possible to put out of operation large economic areas and centers and power and railroad centers, to cut off theaters of military operations from the rear of the country, etc. Consequently, in anticipating the possibility of a short-term war, it is extremely risky to assume that the production apparatus and the current production will play the same role as in past world wars. The outcome of a nuclear missile war will be determined first of all by the reserve of nuclear weapons and means for its delivery to the targets as well as of other weapons and other material means which are produced and accumulated during peacetime, before the start of the war. In the opinion of a number of bourgeois economists such as O. Morgenstern and R. Clemens, Hitch, Makkin, Knorr, and Schliesinger, former methods of mobilization are not applicable in the third world war. They consider the condition for success in war to be the capability for potential mobilization, as early as the pre-war period, of 30% of the gross national product for the needs of the national economy (and some increase this figure to 50% and even 70%). They are based on the fact that the initial thing in economic mobilization remains the quantity of material means at the disposal of the warring sides.

This finds its confirmation in the practical preparation of the armed forces of the United States and the other imperialist countries, in their education of a tremendous amount of reserves of military production, and in the striving to increase the viability and mobility of the economy of the countries in the course of the war.

* * * * *

Economic support for a nuclear war requires extremely careful preparation for the even of any of its variants (short as well as prolonged). The economy should assure victory over an enemy who is strong in all respects by the preparation of an all-destructive counter-strike by nuclear weapons against his most important objectives for the purposes of achieving strategic results from the very beginning. As has already been said, the war cannot be limited to an exchange of nuclear strikes. Combat operations will continue for the purpose of the final defeat of the enemy on his own territory. And this means that the vitality of the economic organism of a country and the provision of elementary but necessary conditions for the productive and public activity of the population will be of no small significance.

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In particular, a large role will be played by the capability of the industry which produces nuclear, anti-missile, and conventional weapons, means of transport and communications, food, and other various types of food, the stability of communications, and the ability to restore industrial production after enemy nuclear strikes. Consequently, in problems of economic support of the war it is assumed that the experience of the last war will not be ignored but, on the contrary, will be purposefully and creatively used.

The revolution in military affairs is being unfolded under conditions of competition of two opposing socialist systems. Thanks to the scientific and labor exploits of the Soviet people, improved types of modern weapons have been created. As they have been forced to recognize this in foreign countries, too. Thus, the official report "Recent Trends in Soviet Scientific and Technical Education," published in the United States on 20 August 1964, states: "In the last eighteen years the successes of the Russians in the development of technology have been frightening. Russia now has precision electronics. It has reliable programmed apparatus and large computers. Russian intercontinental ballistic missiles represent a new level in the development of technology, which the Russians achieved more rapidly than we did, and their missiles can carry a greater payload than ours".

Thus, with the movement of the Soviet Union to the leading position in world scientific-technical progress, one of the politico-strategic calculations on a monopoly of nuclear armaments which was held by US imperialism failed.

This circumstance once again testifies how important it is to approach the evaluation of military-economic capabilities of a state in a new way. The inadequacy of concepts of the direct dependence of economic and military potentials of a country on the over-all level of the production of products alone already has been clearly discovered. The Soviet Union, although it still has not overtaken the United States in this respect, thanks to the planned system of its economy and the superiority in the development of the most important branches of science and technology which has been furthered by socialist productive relations, managed to surpass them in modern means of nuclear-missile armament. With the creation of intercontinental missiles which became the main means of delivering nuclear weapons in the Soviet Armed Forces, the relative strategic invulnerability of the United States was liquidated and the importance of the system of military bases created by her was seriously undermined.

It also became clear that a fundamental reorganization, not only of the military-industrial apparatus, but of many branches connected with it was necessary to achieve a contemporary technical level in the field of weapons production. Military-technical progress depends on the overall level of the country's economic development, and particularly of its military-

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Industrial potential. Military technology is the development of productive forces, the most important of which are the laboring masses. The basic condition for the purposeful buildup of economic potential, effective economic mobilization, and the support of the war is now the achievement of military-technical superiority, which is understood to be superiority over the enemy in the quantity and quality of armaments and in the technical equipment of troops.

The recognition of the increasing significances of military technology by Marxism-Leninism has nothing in common with viewpoints of the bourgeois "technocrats" who ignore the role of man and consider social progress as the derivative of technical progress alone and military technology as a means of saving the capitalistic system which is rotted through.

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In this article, there is no need to dwell in detail on the problem of military-technical superiority over the enemy. We only note that it is determined by a widely varied complex of elements, including the creation of a tremendous mass of modern material-technical means which assure colossal firepower and mobility, the organization of rapid scientific-technical planning of operations and the control of them, and the highest combat readiness and combat effectiveness of troops.

It is important to keep in mind that the growing dependence of the economic capabilities of a state on changes in the structure of the national economy in favor of the development of its most progressive branches poses the problem of the optimum solution of a wide circle of economic and technical problems of nuclear-rocket war with all acuteness. And this is not by chance. Even a highly industrial national economy does not automatically lead to the creation of military might which answers the requirements of modern war. For the achievement of the necessary results, there is still a requirement for the correct and purposeful consideration of the ties between the economy as a whole, its individual branches, and military construction and for the determination of prospects for military-technical progress, economic and combat effectiveness of various types and kinds of weapons and military equipment, and also the establishment of reasonable proportions in their production.

The problem of the optimum solution in military-economic planning also had significance in the wars of the "pre-nuclear age" when military-technical progress was accomplished within the limits of that material-technical base. Its significance is growing immeasurably now when the rapid development of military technology has taken on the character of a military-technical revolution. Here we will only note some of the aspects of this problem.

In the first place, since victory in nuclear war is achieved by the combined efforts of all types of armed forces and combat arms, it is naturally necessary to correctly select the proportion of the main means of destruction of nuclear-missile weapons to conventional weapons in combat

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equipment. In the past war production of the economy will take up an extremely limited period and will touch the most deeply located regions, considerably less time will remain for current production. Obviously, as pointed out by Marshal SW Malinovsky, "a large part of the efforts which the Army and the country formerly applied for victory over the enemy in the course of a number of years must now be applied in the first nuclear-missile strike and the subsequent coordinated actions of all branches of the armed forces." The nature of armed combat in a probably nuclear war makes it necessary to have a considerable portion of new and conventional combat means in ready form. Although the production of nuclear-missile weapons requires greater long-term appropriations for the solution of complex laboratory-design problems, nevertheless, considering their combat capabilities, a considerably lesser amount of materials and fuel as a whole is necessary for expenditures per unit of power than on the production of conventional weapons. This is why, from the economic point of view, it is extremely important to determine the correct relationship between the ready military production as a whole and its current production, as well as the proportions in the production of new and conventional weapons.

Secondly, the strategic leadership should have at its disposal complete data concerning scientifically-based criteria on the effectiveness of employing various types of weapons or combat equipment. Militarist fever within the framework of imperialist blocs, stock market speculation and competition in the armament markets, and the exorbitant swelling of the "military-industrial complex" in capitalist countries lead to the wasting of means and forces and to the immobilization of great material values in the form of strategic raw materials and other resources. Facts testify to the fact that the United States and her allies have begun a new round in the arms race, whipped up by US aggression in Vietnam. Thus, in April of this year, the Senate of the United States authorizes more than 15 billion dollars for the development of new types of weapons in the 1965/66 fiscal year. West Germany is being armed at full speed, and her military expenditures have tripled. Vast military programs have been adopted in France and England.

Under these conditions, the USSR has been forced to expend a certain part of its material, fiscal, and human resources for defense needs. The presence of a mighty heavy industry now permits us not only to satisfy more completely the requirements for overall economic development the defense of the country but, to a much greater degree than formerly, to supply agriculture and branches connected with serving the population with the means of production. We recall that expenditures for the Armed forces in the new budget of the Soviet Union have been reduced by 500 million rubles. This means that the planned character of the socialist economy and the concentration of scientific-technical thought on the most prospective problems of military affairs permit the Soviet Union to intensify military-technical superiority over imperialism even with a smaller military budget.

In the third place, it is important to keep in mind the dialectical interdependence contained in the concept "military superiority," namely the harmonious relationship between mass of technology and mass of people in the armed forces, in other words, the most judicious, optimum measure of saturation of the armed forces with technological equipment. The rapid introduction of the latest weapons and equipment among the troops should be accompanied with the assurance of their maximum combat capability in which, on the one hand, there would be no shortcomings in the equipment and, on the other hand, the equipment itself would not burden down the personnel in its servicing and combat employment. The correctly selected, scientifically based optimum measure of technical saturation of the troops should serve as the initial indicator for determining the requirements of the armed forces for material-technical supplies and the purposeful loading of military industry.

It is completely understandable that all this requires a transition to optimum planning and control in the field of economics which is based on the systematic processing of economic information by electronic computers, on the widespread use of mathematical methods which permit determining variants of the most effective use of means, and on the defense of the country.

Of course, the achievement of military-technical superiority over the enemy does not reduce the importance of other elements of the economic potential but on the contrary, assumes purposeful, clearly thought-out advance work on perfecting the forms and methods of the mobilizational re-organization and adaptation of industry, transportation, agriculture and trade, planning and control to the needs of the troops, determination of the required proportions between all branches of production, organization of material-technical and ration supply, preparation of human resources for war, etc. In economic planning, a special place should be occupied by the scientific potential which, along with the traditional potentials -- military, economic, and morale -- is now one of the components of the military might of a country.

Rapid scientific-technical progress has far-reaching consequences for the development of the economy. If one speaks of the economy of modern capitalism, then one should consider first of all the increasing interference of bourgeois governments in it. Private business does not want to assume the risk of tremendous capital investments in new branches which would not bring profits in a short time. The bourgeois government takes this risk in the interest of the entire capitalist class. In this connection, the government market, that is, work for the government, acquired a tremendous role for the monopolists. As is known, V. I. Lenin called working for the state "a special type of national economy."

Prior to the Second World War, this "special type of economy" was observed primarily in fascist countries where, in accordance with the policy of autarchy, state control was implemented over the economy in the

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interests of military monopolies. As the result of the intensification of government interference in the process of production for the purpose of militarizing the economy also became a characteristic feature in the main capitalist countries in peacetime. New branches of production which are engendered by scientific-technical progress first of all receive a militaristic orientation (nuclear physics, missile construction, aircraft construction, radio-electronics, etc.) In the United States, for example, militarism controls about 70 percent of all efforts in the field of development of science, and three-fourths of the increase of overall expenditures on research is for military-space purposes.

The arms race is engendering a functionalized arms market in which the monopolies sell military goods to the government with a guaranteed high profit. Military-economic business thus acquires the features of a mass and legalized enrichment at the expense of the national budget and at the expense of the tax-payers.

The mutual dependence of economics and militarism will become more and more intimate, and several bourgeois authors have been forced to admit this: "There exist two Americas, and there exist two economics: military and civilian. Of course, they interact ... but we must recognize the fact that the military economy plunders the civilian economy. In the first place, the Federal Government generously releases funds for scientific-research work in military industry to the detriment of the peaceful branches...Of 16 billion dollars disbursed annually for scientific-research purposes, only four million are expended in civilian industry. In the second place, military corporations rob civilian industry, enticing the best specialists for themselves, and there are not enough of them in the country."

State-monopolistic capitalism is converting a military economy into a permanent attribute of capitalism, not only in war years, but also in peacetime. The military economy, as a product of state monopolistic capitalism, is growing on the soil of a national capitalist economy. It is also spreading to the sphere of super national monopolistic amalgamations which have emerged in the form of so-called "intergraions." The creation of international economic organizations of imperialism is connected with the attempt to mobilize the resources of the capitalist world and to "regulate" the world capitalist economy in the interests of monopolies. It is inseparably connected with capitalist programming, with the so-called planification in the interests of the "military-industrial complex." However, in analyzing the process of integration, it is important to stress not only the economic, but first of all the military-political aspect connected with the activity of aggressive military blocs.

European integration introduced new features into the military economy of the imperialist states. Now, the correlation of forces in the imperialist camp cannot be determined only on the basis of data on the economic potential of individual capitalist countries. It is important to consider the

Integration of forces between imperialist groups, the members of which are not only connected by treaty relationships but are also military-technically and financially dependent on each other. Thus, in a world divided into two opposing social-economic systems, the problem of the study of the economy of coalitions arises.

Military-technical progress presents greater and greater difficulties for the capitalist military production. Each scientific-technical achievement increases the volume of means diverted to the preparation of war. New missiles, bombs, submarines, and spy-satellites become more and more expensive, and inventions follow each other with such speed that by the time a weapon comes out of production it often is obsolete, and many military orders are cancelled even before they are filled. Of the main capitalist states, only the United States is able to develop all the latest types of armaments and military equipment. True, some other imperialist states have not refrained from the arms race and, without reckoning with the expense, strive to have their own nuclear weapons. After England created "independent" nuclear forces, France began to create "nuclear strike forces". The West German revanchists are more and more actively being drawn to nuclear weapons, too. Meanwhile, the imperialists of the United States in recent times are steadily obtaining a more uniform distribution of the burden of armaments among the NATO members, understanding that a lengthy militarization of the economy will lead to a drop in its rate of growth and to a reduction of its ability to compete. This once again is evidence of the limited possibilities of imperialism for maneuver in the field of military-economic mobilization.

State "regulation" of the economy in the interest of a financial oligarchy not only does not eliminate, but intensifies even more the inter-imperialist contradictions within the framework of "integration" and intensifies the internal instability of imperialism. And this also affects the military-technical development of capitalism and, in particular, of its citadel -- the United States.

This is why United States diplomacy is presently becoming refined in attempts to foist the NATO "multilateral nuclear forces" on her partners and thereby open access to nuclear weapons for the West German revanchists. As was stressed in the Warsaw communique, plans for the creation of multilateral forces "are aimed at strengthening a special US-West German bloc within the North Atlantic Alliance."

A comprehensive realization of the fruits of the scientific-technical revolution requires a high level of collectivization of the means of production, clear-cut planning coordination of science and technology, and the lifting of the cultural-technical level of the population. Only socialism possesses these conditions in full measure. All this opens tremendous possibilities for assuring a higher productivity of labor than in the developed capitalist countries -- the most important condition for the raising of the economic might of the countries of socialism.

of the present military-technical revolution, there is a requirement for constantly improving the forms of organization of production, mastering the main directions in the development of technical progress, and working out the correct military-technical policy, which corresponds to the new criteria of economic support of military might and is capable of assuring the frustrations of the criminal intentions of militarism and, if war becomes unavoidable -- the rapid and utter defeat of any enemy.

The general plan of the economic policy of the Soviet state is the building of communism and the continuous raising of the material and cultural level of the people. The means allotted to the solution of this problem are growing unswervingly as the economic might of our country is strengthened. The production of agricultural products and consumer goods is broadening and the growth rates of production of the means of production and consumer goods are converging. In the Soviet Union, in the process of creating the material-technical base for communism, there have been created a special metallurgical, atomic, electronic, and missile industry, precision instrument-building, jet aviation, modern shipbuilding, and production of the means of automation. A graphic expression of progress in the most important branches of science and technology and an indicator of the level and potential of Soviet industrial production is the creation of satellites and space ships.

Of tremendous significance for the further growth of the economic might of the world socialist system is the accomplishment of all tasks for the building of communism which have been developed and which were determined by the 22nd Congress and subsequent plenums of the Central Committee, CPSU. In the period that has passed since the 22nd Congress, the Central Committee CPSU profoundly and comprehensively considered the urgent problems of the most expedient ways and means for creating the material-technical base for communism, of a common technical policy for the Party, of qualitative transformations in the leading branches of material production, of raising the economic effectiveness of the most progressive directions of technical progress, and of the systematic study and introduction of the newest achievements of world science and practice. All this is the most important condition of the preservation by socialism of the vanguard positions in world science and technical progress.

Modern war requires continuous, ever-growing, and harmonious development of varied technical means and, first of all, of nuclear-missile weapons. It leans on a highly-developed coordinated material-productive organism economically capable of supplying the armed forces with all necessities. All this obliges us urgently to follow the course of the military-technical revolution, comprehensively consider the demands which it makes on the economy, closely link them with the experience of economic mobilization in the last war, and strengthen the economic, political, and military collaboration of the socialist countries.

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The military superiority of the socialist camp over the forces of imperialism does not signify even the slightest underestimation of them. Imperialism is still strong and capable of unleashing any adventure which is dangerous for humanity.

Under these conditions, it is necessary constantly to be concerned that our Armed Forces have the most modern means for defending the Motherland and maintain all types of military equipment in the required condition. The unceasing strengthening of the defense of the USSR and the might of the Soviet Armed Forces is the urgent task of the Soviet people.

Notes

1. Mezhdunarodnaya zhizn', No 7, 1962, pp 70, 79, 80.
2. Nation, 20 August 1964.
3. Krasnaya Zvezda, 25 October 1962.
4. It is known that the manufacture of one rocket with a greater combat effect than 4000 rocket projectiles used in the last war requires less material expenditures.
5. Pravda, 23 April 1965.
6. O narodnohozyaystvennom plane i byudzhetе SSSR na 1965 god (The Economic Plan and the USSR Budget for 1965) Izdatel'stvo Ekonomika, 1964, 65 pages.
7. Voennaya Myel', No 1, 1964. Page 13.
8. Mirovaya Ekonomika i mezhdunarodnyye otnosheniya, No 10, 1963. Page 58.
9. Nation, 16 January 1961.
10. The very practice of forming international organizations is proof of this. First the NATO bloc was created, and then the European Coal and Steel Community was formed. First an attempt to form a European Defense Community was undertaken, and then there appeared the Common Market and its military-economic affiliates such as Euratom, and others.
11. Krasnaya Zvezda, 22 January 1965.

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Comment by Col. A. Yekimovskiy

Of late, our military press has published several articles, responses, and theoretical works which analyze the nature and classification of the individual phenomena of armed struggle. Entirely opposite points of view have been expressed on some basic situations. The sharpest of all polemics developed on the subject of what should be classified as military action and as strategic action.

For example, the article by Marshal of the Soviet Union V. Sokolovskiy and Major General M. Cherednichenko classifies as military operations strikes by the strategic nuclear missile forces against military, economic and political enemy targets; the operations of anti-missile and PVO Strany troops of the country, protecting the country and its armed forces against enemy nuclear strikes; the advance and, sometimes, defense, on land theaters of operation, and navy operations at sea.

In their work "Military Strategy," the co-authors, who are also the authors of the above-mentioned article, essentially consider such operations as types of strategic operations (page 373). The authors describe the types of military and strategic activities as identical concepts (pages 344, 367, 380).

In his article, Major General Zav'yalov includes as military operations "operations of the Armed forces as a whole, which are at the basis of any war." (Article 15). The author includes here attack, defense and fight in the air.

Unfortunately, we cannot fully agree with any of these points of view. Above all, we consider wrong to identify the concepts of "types of military operations" and "types of strategic operations." The first, undoubtedly, is broader than the second for military operations may include the use of one or several types of armed forces as a whole, as well as their operative task forces and formations. In other words, these activities will be displayed on various scales, not only strategic. Strategic operations presume the use of major formations of armed forces and express only their inherent method of fighting in carrying out assignments of absolutely strategic significance. The identification of such concepts would mean restricting the possibility to find more accurate expression for the nature of such different phenomena.

First of all, we consider as such the strikes dealt by nuclear missile forces. It is known, in fact, that the basic role in a future war will be played by nuclear weapons used through strategic purpose facilities. These facilities, in our opinion, as was properly claimed by Marshal of the Soviet Union V. Sokolovskiy and Major General M. Cherednichenko, are not inherent to offensive or defensive operations. Regardless of the nature of operations on land theaters, they may strike at important targets in the deep enemy rear in the interest of the war as a whole and carry out their assignments independently. Nuclear strikes delivered by operational and factual means also help resolve very important problems in operations and combat. In such a case they are a component part of the other types of military operations, for example, offensive or defensive on land theaters. This is no reason at all for not considering nuclear strikes as a type of combat operations just as we consider it entirely acceptable to consider, for example, a short defense in some directions as a component part of an overall major offensive operation.

Naturally, advance and defense continue to remain types of military operations. However, they should not be spread over to include the operations of all armed forces as a whole, as is being done, for example, by General Zav'yalov. He writes that an offensive is the type of military operation of armed forces as a whole, the basis of which "consists of powerful nuclear strikes with strategic nuclear facilities -- rocket troops, atomic submarines, armed with missiles and long-range aircraft" (page 18). "Defense (meaning against enemy nuclear attacks, carried out by the anti-aircraft and anti-missile defense troops -- the author) will be one of the basic types of military operations and will acquire an exceptionally great national importance" (page 20). On this basis, he classifies it as strategic defense on the part of the armed forces.

If we agree with the author that the operations of strategic nuclear facilities should be considered as a basis for strategic offensive of armed forces, logically they should be considered also as a basis for strategic defense. It is entirely obvious that by striking at the strategic nuclear attack facilities of the enemy, they carry out an exceptionally important assignment of a defensive nature, decisively weakening the power of the nuclear enemy strike and creating conditions for successful operations for the antiair and antimissile defense troops. In this connection, the question naturally arises as to how proper is it to consider the same type operation as a structural part and also as the basis of two simultaneously developing but entirely distinct types of military operations? Obviously, it is hardly logical to pursue this line of thought and this leads us to

the operations with strategic facilities should be classified as an independent type of military operations (in this case as strategic operations). Offensive and defense, as types of military operation, may be mentioned only within the framework of a land theater. Offensive, as well as its variety -- pursuing -- will be applied here at all scales, including strategic; defense could be no more than operational. Even though as regards the latter we consider that it could be done with rather major forces, for example, one or two front formations, together with other types of armed forces. The possibility of defense conducted on such scales was clearly proved by the experience of the past war, indicating that troops undertook defense with such major forces even during the period of general successful strategic offensive. The same may be said of the scales of counteroffensive which, under conditions of a short defense, are typical in the transition from defense into offensive. Retreat, as a variety of defense of our troops, can also not assume a strategical scale.

However, as was already pointed out, we classify defense and counteroffensive on such a scale not to the strategical but to the operational category, mainly because, within the framework of operational command, they must be considered on a broader scale than in the past. During last war, for example, operations in a different direction of two and sometimes a single front formation could be classified as strategic, since control of the operations of major operational formations of land forces constituted the basic area of activity of the strategic leadership of the armed struggle. Under current conditions, the center of strategic leadership has moved more and more in the direction of major intercontinental and global scales within which strategic forces and facilities are used in the interest of solving the tasks of the war as a whole. For this reason, the operations of individual fronts and, sometimes, of groups of fronts may, in our opinion, be in the field of operational command.

Military operations or varieties of offensive include also a meeting engagement. Its rejection on the part of General Zav'yalov, when he says that "once the fight is on, this means that one side is attacking or advancing while the other is defending itself. And, vice versa, if there is no offensive or defensive -- there is no fight!" (page 17) -- is simply unexplainable. It turns out that the author does not consider the possibility of a case in which both sides are advancing and neither is on the defensive. Yet, it is precisely such a situation that may be the most characteristic in a modern nuclear missile war. As we imagine it, a future war may begin after strikes by nuclear missile means with meeting engagements by army formations of border military districts. Such battles and engagements are not excluded even in subsequent offensive operations against enemy reserves moving up from the deep rear. True, only the meeting engagements (the

battle) would be of short duration. So other types of military operations. If one of the sides begins a defense or a retreat, the other one will undertake an offensive or pursuit. However, this is no reason to deny them in general. As regards the scales of battles, taking into account their individual nature in different directions, they could hardly outgrow the framework of an army.

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In our view, defense against the enemy nuclear attack should also be considered as a separate type of military operation (anti-air and anti-missile, carried out through the means of the PVO Strany Troops and other types of armed forces). True, the tasks of such a defense would be conducted to a considerable extent, in the course of other types of military operations, particularly when dealing nuclear strikes and engaging in an offensive. However, at a given stage, the forces and facilities of the anti-missile and anti-aircraft defense will enter into action. Even though the method of action of these forces will be of an active and offensive nature, the assignment as a whole remains defensive and, therefore, the type of military operation of PVO means and forces should be considered as defense against enemy nuclear strikes. However, it would be wrong to classify as strategic operation such a defense. As was already pointed out, strategic operations include operations of a strategic scale not only by virtue of their purpose and composition of the forces taking part in them, and which usually consist of major formations of troops of one or several branches of armed forces, but which, furthermore, are characterized by corresponding time and space indices. Such concrete indices greatly determine the scale of the very purpose of the operation, the amount of forces and facilities used as well as the possibility to carry out joint operations on the basis of their coordinated activities.

Approaching this question from such a standpoint, it should be said that defense against enemy nuclear strikes is, undoubtedly, of major strategic significance. On this basis again, it would seem that it should be classified as strategic action. As regards the other factors, from this point of view it does not fall under the classification of strategic action. The operations of the PVO Strany ob'yedineniya divided on a territorial basis, may take place at different times and in different areas, depending mainly on the composition of the forces and the nature of enemy attacks. As a result, in the course of their combat operations, the PVO troops main effort cannot be directed against the main enemy groupings. This is what is precisely most characteristic of a strategic scale of operations.

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The same forms of military actions we have previously indicated and task forces, and primarily the nuclear strikes of a strategic or operational scale delivered jointly with nuclear missile or air nuclear means of other branches of the armed forces or independently. Navy task forces or formations may also engage in offensive or defensive operations together with the land troops in maritime areas if they are a structural part of one or another type of military operation on the part of land forces. In some cases, for example, in operations for the capturing of maritime straits or groups of islands the navy which includes submarines, ships, aviation and marines may undertake offensive operations separately or constitute the basis of an offensive formation of troops belonging to several types of armed forces. Such a type of military operations could be considered as no other but offensive. In this respect, we agree with the author of the book Voyennomorskoy flot (The Navy)⁴ and do not share the opinion of the authors of the above-mentioned article in Krasnaya zvezda (Red Star) who classify navy operations as military operations.

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The various types of military operations such as nuclear strikes, offensive and defensive, are characteristic to the air force as well. Thus, long-range aviation is used to deal nuclear strikes independently or in combination with the other types of armed forces, for example, with the submarine navy forces on aircraft carrier strike formations, the navy or convoys of the enemy in the open sea. Tactical aviation may deal nuclear strikes and, also, take part in the type of military operations carried out by land troop formations and fighter aviation may participate in the defense against enemy nuclear attacks.

As regards fighting in the air, classifying it as military operations as is recommended by General Zav'yalov in his article is, as we see it, quite doubtful. It is sufficient to say that military operations, as we habitually understand them, involve a struggle with arms and its results are the destruction of the personnel, the arms and the military equipment of the enemy. However, in this case there is nothing of the kind. This struggle is a structural part of the other types of military operations.

Thus, under current conditions, the types of military operations should be the following: nuclear strikes; defense from the nuclear means of the enemy; offensive and defensive on land theaters of operations and adjacent maritime areas with their varieties -- pursuit, meeting encounter (battle), counteroffensive and withdrawal (retreat).

Strategic operations should include: nuclear strikes by strategic nuclear forces at the deep enemy rear (with the participation of strategic rocket troops, navy submarines and long-range aircraft); nuclear strikes at the enemy in the open sea (with navy submarines,

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and navy missile carrying and long range (with the participation of most or all types of armed forces).

Concerning the forms of military operations and forms of armed struggle. Let us point out, above all, that military operations and armed struggle are almost identical concepts. The difference lies only in the fact that the armed struggle, strictly speaking, may take place not only in times of war but in peacetime as well and is carried out both by troops as well as by the civilian population with the help of any weapons whatsoever. Military operations are inherent to war only. For this reason, when it is a question of the forms, it would be more accurate to use the term of form of military operations and not armed struggle. However, this does not mean that one should entirely abandon the term of "armed struggle." It is extremely necessary in cases when one would like to emphasize armed struggle among the other forms of struggle used in war (ideological, diplomatic, etc.). However, since in the given case the above terms are considered by all as being identical and, most frequently, in this sense the term used is "forms of armed struggle," we will also use it in the future.

Until recently, the main forms of armed struggle, as is known, were considered to be the operation and battle. No one objects to this. Yet, the belief arose that perhaps the forms of armed struggle also include nuclear (nuclear missiles and nuclear aviation) strikes with which, in our view, one cannot agree. Nuclear strikes which are a type of military operation, cannot be at the same time a form of precisely this type. One or another type of military operation shows up in concrete forms in various scales and within the given framework of the goal of operations, time, space, as well as the method of operations of troops used for the purpose. In one or another form of armed struggle there is a given procedure of operations and interaction among all participating forces and facilities. This means that nuclear or nuclear missile strikes may be used in combat restricted by certain goals, place and time, on the basis of close cooperation among the various arms and types of armed forces taking part in the operation. True, these operations do not fit in within the old concepts and it is difficult to accept them with the help of established points of view. Obviously, however, nothing else remains but to accept this new phenomenon as objective reality and, on this basis, resolve problems facing the theory and practice of military affairs.

In the light of this fact, nuclear strikes with strategic facilities at other continents or in the open sea acquire the form of a single strategic operation of nuclear forces (rocket troops, missile carrying submarines forces and aviation).

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The scale of operations on land theaters, as well as the scale of operations in the air, may say so, have exceeded the framework of this field of military art which usually encompassed the concept of "operational art." True, during last war already, operations of strategic significance were carried out (operations of groups of fronts). Yet, at the same time, a general strategical offensive along the entire Soviet-German front was not considered as a single strategic operation but was the sum total of operations of groups of fronts interrelated only to a certain extent in time and space (strategic scale) and of individual front and army formations (operational scale). Now, the forces at one or several land theaters which will include the participation of all the types of armed forces, including nuclear strategic forces, striking along the entire depth of the strategic offensive operation, require accurate coordination as regards target, space and time. This phenomenon is not only a type of strategic operation (strategic offensive), but it also acquires the form of a strategic offensive operation.

The action of operational formations of ground forces, of air forces and PVO troops of land theaters also turn into joint operations but on a smaller operational scale. Such operations should include those of one or, sometimes, two fronts and as well as army operations. The biggest of them will take place in combination with rocket troops and long-range aviation. Operation in maritime areas would be, essentially, also joint operations involving rocket, land, navy and air forces, as well as the PVO Strany troops. Such combined operations may include others which acquire the form of separate operations carried out with the forces of one or several operational formations of aviation troops, particularly long-range aviation and navy (sea operations), as well as air and sea landing operations in which may take place the personnel of other types of armed forces.

Battles, as a form of armed struggle, show up in the operations of ground troop formations. In some cases, they may involve task forces (units of the navy, air force and airborne troops). Sea engagements take place in the seas, and air engagements in the air.

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task force is compactly deployed, covering a group of major rear sites
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Such an operation may be only of an operative and not strategic scale. Anti-missile defense may also turn into a form of operation only if it is carried out by entire operational task forces pursuing the same aim and under single operational command.

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As a whole, discussing the forms of armed struggle, we should point out that it should be considered not isolated from the types of military activities but in close coordination. At the same time, these concepts cannot be identified. The type is the essence, the content of a phenomenon, while the form is the way this content shows up. The form of military operations should not be applied to the external display of the content (i.e., the type of military operation), as is sometimes done in our military literature, but should be considered as a concrete display of the essence of type itself of military operation on one or another scale (operation or battle). Only the form helps reveal the nature of a phenomenon from all sides, only through it could one understand the essence itself of the various types of military operations we have discussed. It is entirely natural that, analyzing these types of military operations in connection with phenomena of another sort, they in turn may become forms. However, in this case we have taken them as the essence, i.e., as the content and are indicating the forms in which this content shows up.

Operations and battles, in turn, have also their own nature which shows up in various forms. The forms of offensive operations, for example, would include: encirclement, fragmenting of enemy formations, etc.

From the point of view of scale, no sharp delineation is possible among the forms of armed struggle. In some cases, a factor such as the forces and facilities used became the criterion for the scale of an operation and in another -- the goal of the action. Under certain circumstances, those same indices may make the operations strategic or operational.

The question of methods for waging war is closely linked to the aspects analyzed above. The book Voyennaya strategiya (Military Strategy) states that: "Methods of waging war should include the sum total of forms and methods for the conduct of military operations, the forms and methods of using the means of armed struggle, task forces, formations and units of the different types of armed forces and arms, as well as armed forces as a whole, for the fulfillment of political, military-strategic, operational and tactical tasks" (page 318). It is further stated that "the type of strategic action (or military action) and the concrete forms in which they show up in the course of the war (operations, strikes, battles), the combination

of those forms and their interaction constitute the nature of the methods of waging war" (page 367). Thus, the authors classify as the methods for waging war military operations of all scales, together. Yet, their analysis of these methods leads to a revelation of the nature of nuclear war and the types of action of the various arms, of their task forces and formations. Such an approach to the analysis of the methods of waging war could hardly be considered successful.

Essentially, the concept of "methods of waging war" should include the main aspects in the nature of the use of the armed forces of the country or a coalition of countries to achieve victory in the war as a whole. In this connection, it is pertinent to recall that F. Engels, speaking of the means (methods) of waging war and of the system of waging war meant a single and not several methods for waging a single war or a series of wars. The essence of the method of war, for example, during the times of Napoleon was considered by Engels as being the skillful leadership of big masses of troops, maneuvering them and concentrating them on the decisive sectors. Engels compared this method of waging war, progressive for its time, and criticized some subsequent less efficient methods, which did not answer concrete historical conditions, such as the slow trench warfare of the American civil war (1861-1865) and the French system of waging war (the 1953-1856 Crimean War) which he considered as a backstreet Russian war and a waste of forces (F. Engels. Selected Military Works, Voenizdat, 1957, pp 626, 630, 425, 76-79).

What was the most characteristic aspect in the Great Fatherland War from the point of view of the method of operation of all armed forces aimed at reaching the final goal? It was the essentially systematic, in time and space, defeat of enemy formations with subsequent occupation of enemy territory.

Currently, the armed forces have such means of struggle the use of which would help reach the defeat of the enemy within a short period of time wherever on earth he may be. Consequently, the most suitable method for waging war under current conditions is the simultaneous defeat of troop groupings and the destruction of the material-technical foundations for waging war on enemy territory along its entire depth, and achieving the purpose of the war within a short period of time.

In our opinion, the question of the method of waging modern warfare should be considered only within that context. The sum total of different ways and means for carrying out one or another assignment by the troops should be better named, as was done in the book O sovetskoy voyennoy nauke (On Soviet Military Science), as methods and forms of armed struggle. In this case, not war as a whole is considered but armed struggle (Military operations) which show up with methods and forms of its organization and waging, corresponding to the war scale.

Such is our point of view on those matters.

Comment by Capt 1st Rank N. V'yunenko

In his article, Major General I. Zav'yalov properly underscores the idea to the effect that now, when there is a radical departure in the views concerning the methods and nature of armed struggle "it would be erroneous to drop all concepts developed in the course of past wars and military development -- to invent and implant allegedly new aspects of principles in places where conventional concepts retain their vitality even under conditions of a nuclear war as well" (page 15). It seems to us, even more so, that there is no need whatsoever to retain and adamantly defend that which has already outlived its own usefulness, which has become part of history, as well as there is no need to try to squeeze a new content into an old form. It is precisely thus that one could consider the desire of General Zav'yalov to prove that now, as well as many centuries ago, there exist only two interrelated types of armed struggle -- offensive and defensive.

In our view, the author ignores the important fact that concepts and principles true for one time become wrong for another. The quite well known General Dragomirov, in his article "On the Relation of Drill Regulations to Tactics" this idea as follows: "There are things, ideas about which have apparently become so strong that they are not even mentioned; in fact, the opposite is true: frequently it is not so much the concepts which are established but the phrases which express them. These sentences pass from mouth to mouth and slowly their meaning disappears and only thing that remains is their sound; the only thing that is left is the outside cover of the concept like an empty bottle: It is a proof of its content but, meanwhile, the content has long disappeared." Something similar has taken place with the concept of "offensive" and "defense"; in the course of many years of their historical development, the most diverse contents have been included. It has become a habit to call all active operations by no other name but offensive even though frequently they have nothing offensive in them. The same has taken place with the concepts of "defense." Despite the fact that as weapons have developed and that the types, forms and methods of armed struggle have been constantly changing, we frequently come across the desire to encompass these changes within the already existing and habitual concept of "offense" and "defense." No third possibility, as Comrade Zav'yalov believes, exists. Yet, let it be said immediately, a third possibility has arisen and, despite the opinion of the author, really exists and is developing -- it is the nuclear missile strike, i.e., precisely that new type of armed struggle the "illegality" of which was being proved in the discussed article.

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has been known even before the nuclear time. Its appearance should not be linked only to the use of nuclear missile weapons which only increased its significance and hastened its development. It has been applied in past wars, mainly through highly mobile types of armed forces -- navies and air force, together with the other types of armed struggle, to reach the goals of the war, of the campaign, the operation or the battle. In many cases it had a separate significance and was not necessarily a structural element of defense or attack. The use of navies in past wars was always a clear expression of the desire of the warring sides to destroy, in one or several blows, the main forces of the enemy fleet, regardless of whether it was being done for defensive or offensive purposes. The history of armed struggle at sea is rich with examples showing the attacking side achieving major strategic results with one powerful blow. Such was the defeat of the American fleet in Pearl Harbor in 1941 by the Japanese navy. This attack had the form of a clearly expressed single operation and was nothing else but a strike as understood today. These operations on the part of the Japanese navy had nothing which could be called an offensive -- no given distance had to be covered, against enemy opposition, nor did it have any other characteristics for this type of combat operations. It was a brief and powerful strike against the enemy. A strike, as a type of combat operation, has been extensively applied at sea in operation, aimed at the achievement of so-called defensive goals.

Under current conditions, when the armed forces have such a powerful means for annihilating the enemy such as strategic missiles, a new type of combat operation -- strikes -- will play an even greater part than in the past. Nuclear missiles strikes will be applied by all the types of armed forces coordinated with other types of military operations in the interests of achieving the common goal -- the defeat of the enemy. Accepting this new type of armed struggle does not reduce by any means the importance of other types such as offensive and defense. The fact that such strikes cannot be "classified as offensive or defensive" would not influence their results, particularly if they are successful.

Comrade Zav'yalov considers that nuclear missiles strikes, as a type of military operation, are improper also because they are characteristic not for the war as a whole but for the operations of each type of force individually. However, it is hardly necessary to prove the simple truth that armed struggle, under current conditions, is a combination of the operations of all types of forces and it is precisely here that is found the most important prerequisite for victory.

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types of our armed forces would apply only one type of struggle, namely defense, since the purpose of the Soviet armed forces consists in defending the country from an attack on the part of the aggressor. Obviously feeling the weakness of his position on this question, the author, contradicting himself, nevertheless must admit that an "answering nuclear strike is an act of self defense, an act of defense against enemy aggression, but that it should be classified as an offensive method of military action" (page 17).

The author is entirely wrong also in stating that the strike is a "more limited concept than operation and battle in the course of which many different strikes may be made" (page 17). As regards nuclear weapons, this is an entirely unacceptable idea. It is well known that the consequences of a nuclear missile strike -- "a simultaneous action of striking at the enemy" -- would be incomparably greater than the result of the biggest possible operations, campaigns and even wars of the past. Such strikes would be made not "in the interests of offensive" or "the interests of defense," but would pursue entirely real goals -- the breakdown of the nuclear enemy attack at the very beginning of the war and the decisive defeat of its armed forces. In order to achieve such purposes, the rocket troops need no offensive whatsoever. They have been deployed on time, and their "offensive," as well as "defense," would consist in the same thing -- launching the missiles at the time determined by the military command.

Similar actions will be inherent to navy missile carrying submarines. They may use their weapons from previously taken positions without having to undertake an offensive for the sake of accurately striking against the enemy. They will strike at the enemy with nuclear missiles from the areas wherever they will turn out to be at the beginning of the war. The same type nuclear missile strikes at the enemy will be made by long-range aviation as well, without engaging in any whatsoever offensive in the former meaning of the word.

The fact that the concept of nuclear missile strike has found a broad application on the tactical, operational and strategic scale does not prove at all a "loose attitude concerning terminology," or the "unfoundedness and flexibility" of the positions of Comrade Zavyalov's opponents. This is one more serious proof of the fact that the new type of armed struggle, i.e., nuclear missile strikes, is real and has acquired the same rights to exist as offensive and defense in all areas of military art -- strategy, the theory of the conduct of operations, and in tactics. It has been disseminated among all the types of armed forces and various types arms. The bigger the role played by nuclear missiles in the arms used by one or another type of armed forces, the greater the importance in its use of nuclear missile strikes as a

leadership of the USA and NATO is training its armed forces, particularly the navy, to make, above all, nuclear missile strikes. The USA is building a nuclear missile submarine fleet which includes about a third of the nuclear missile strategic facilities at the disposal of the armed forces of the USA. A certain trend in the redistribution of striking power of the armed forces, with emphasis on the navy, has been noticed in England as well which has also engaged in the building of atomic missile carrying submarines. The same thing is noticed in France whose five-year military plan calls for placing most nuclear strategic missiles on the atomic submarines it is building. All the new, and now existing, strategic facilities will be used not for offensive or defense but for striking sudden, brief and extremely powerful nuclear missile strikes at predetermined targets and from predetermined positions.

The essence of the armed struggle at sea will also consist in nuclear missiles strikes aimed at destroying, above all, the carriers of nuclear missile weapons -- ships and submarines -- the destruction of convoys, of bases, etc.

It looks as though fighting formations of ships carrying airplanes and missiles, as well as convoys at sea, will consist in special operations which would include a combination of systems of nuclear missile strikes made by the various types of navy ships in different sequences. Similar activities will be carried out for the destruction of ground targets with missiles launched from submarines.

The characteristic aspect which distinguishes a nuclear missile strike from previous battles or operations at sea is the fact that the carriers of such weapons, carrying out combat assignments, do not engage in fighting the forces against which they will be using their missiles. For example, if the air force is using missiles, the aircraft carrying such missiles will not meet with counteraction on the part of the target which it is striking. The same aspect prevails in the operations of missile submarines and surface missile carrying ships. The enemy must defend itself from the rockets themselves. The struggle against the weapons carriers must be conducted by other groups specially designated for this.

For this reason, now in armed combat at sea the main aspect becomes the one-sided action of the weapon carriers, i.e., the one-sided strike in the full sense of this word. He who succeeds, with his strike, to forestall enemy action and cause the enemy a decisive defeat before he has been able to make use of his entire striking power will have greater chances to win in modern naval combat or operation.

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... leads to the conclusion that the new means of armed struggle, having radically changed its nature, have led to the appearance of new ways and forms of waging this struggle. The task of military science consists not in trying, at any cost, to squeeze the new content into the old form but in bringing to light this new content and properly determine the ways for its use in armed struggle for the sake of victory over the enemy.

Comment by Col. P. Shkarubskiy

The appearance of a new weapon always leads to the appearance of new methods for waging war. True, this does not take place immediately. At first, the new weapon is applied on the basis of the already developed principles of the military art. Those who apply the weapon as though adapt themselves to the existing methods of action. However, as F. Engels said, the moment comes when "technological successes, almost as soon as they have become applicable and have been in fact applied in military affairs immediately -- almost mandatorily and frequently against the will of the military command -- create changes and even sharp turns in the way of waging combat..." (K. Marx and F. Engels, Works, Vol XX, p 176)

Currently, such a time has come as regards nuclear weapons which have become already established and are holding a dominating position among all other modern weapons. Now, the world has such a stock of nuclear ammunition and means for their delivery which, according to the bougeois military specialists, could put out of action, with a single strike, entire countries. The imperialist countries continue their arms race, concentrating on the production of ballistic long-range missiles and atomic missile submarines for a "nuclear attack" with a view to striking at cities, the economy, the nuclear missile facilities and formations of the armed forces of the socialist countries.

Obviously, if the imperialists try to unleash a nuclear missile war, they could be defeated only by the decisive destruction of the means for nuclear attack. Primar enemy targets are the launching pads of rockets, aircraft on the ground, submarines in their bases and at sea, dumps and bases for nuclear weapons as well as the industrial enterprises engaged in their production. What is left will become the target of the anti-air, antimissile and antispace defense.

In this light, General I. Zav'yalov's claim to the effect that defense is the main type of military operation could hardly be considered as justified. Defense, as never before, takes second place to offense.

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effect that the rocket troops engage in a nuclear offensive which constitutes the basis for the strategic offensive of armed forces. Historically, the offensive has developed as a concept of continuous action and movement ahead for a certain period of time. For this reason, it is applicable to land troops. In the Great Fatherland War and the term "offensive" was properly considered also as regards the artillery which, in the course of all the operations, systematically struck at the manpower, firepower and combat equipment of the enemy, moving together with the advancing infantry and tanks.

However, the rocket troops cannot, like the artillery, constantly carry out nuclear strikes. They cannot engage in the systematic destruction of the enemy opposing the offensive, following the advancing troops. The nuclear weapon will be used for destroying the main targets and main formations of troops on the theaters of military operations by massed, group and single strikes.

At the beginning of the war, the massed strikes of the nuclear troops will constitute the first blow against the aggressor. In the course of the operations, blows will be dealt at the main formations at the military operation theaters. As a rule, in order to strike at individual targets, the rocket troops will use group and single strikes. All this will be done within a short period of time.

Thus, the term "nuclear offensive" may extend the rocket troops but does not fully reflect the nature of their operations. A "nuclear strike" while properly understanding its nature, may be classified both as offensive and defensive.

Unlike for the rocket troops, for the air force the author considers as inherent both offensive and defensive operations with all types of aircraft participating. However, he does not answer the question of where would the air force use be most effective. We find this answer in the experience of the Great Fatherland War. It is precisely in offensive, in striking at the enemy troops, grounded aircraft and other targets that our aviation achieved its greatest successes. Defensive operations aimed at deflecting the enemy strikes were nothing else but finishing up the destruction of its aircraft after striking at the air fields where it was grounded.

The article deals also with such an important problem as the struggle in the air. The author considers it as a new type of military operation, claiming that it would be "carried out simultaneously both for the interest of offensive and the interest of defense (page 22). It seems to us that this is not the main reason for classifying air combat as a separate type of military operations.

One of the main aspects will be the significance of a given fight, its scale and means and methods of action used. This struggle is, in the full sense of the word, an "electronic war," as it is frequently called. It will make use of a tremendous amount of radio electronic equipment available to the troops and at the disposal of supreme command. All available forces and means will be used to destroy the radioelectronic equipment and to interfere with their operation.

This is our opinion on certain aspects as to the types and forms of military operations discussed in the article by Major General Zav'yalov.

Undoubtedly, these questions should be extensively discussed in the military press. The proper determination and understanding of the nature of the types and forms of military operations, their interrelationship, place and role in the future war, will greatly influence the answer to the questions of the development of means for armed struggle, the building of armed forces and their training to repulse aggression.

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3. Voyennaya Strategiya (Military Strategy). Edited by Mar SU SOKOLOVSKIY; Second Edition, Voenizdat, 1963.
4. Voyenno-Morskoy flot (The Navy). Voenizdat, 1959, pp 289-291.
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6. Voyennaya Mysl', No 1, 1965, p 23; Voyennaya Strategiya (Military Strategy), pp 376, 394
7. S. N. KOZLOV, M. V. SMIRNOV, I.S. BAS', P. A. SIDOROV. O sovetskoy voyennoy nauke (On Soviet Military Science), Voenizdat, 1964.

CPYRGHT

THE CRITICAL TIME AND OPERATIVENESS
OF TROOP CONTROL

by Engr - Col A. TATARCHENKO

CPYRGHT

The time factor has always played an extremely important role in combat operations. Now, in connection with the spread of nuclear missile weapons and the revolutionary transformations which have occurred in the structure of armed forces, in the methods for conducting armed conflict, and in military theory, this factor has begun to play, not simply an important role, but the decisive role in the development and outcome of combat operations.

Therefore, understandable is the general striving to introduce into troop control the achievements of cybernetics -- the science which studies the most common rules of control in nature, society, and technology.

It has turned out that because of the material unity of the world, various systems of control have been constructed according to approximately one principle. The line diagram of the control system consists of an operating device, channel for the transmission of controlling commands, and a feedback channel. The operating device interacts with the external atmosphere, as a result of which its state and position change. Thanks to the presence of a feedback channel, the controlling device, during time T_1 , receives informative information concerning these changes. On the basis of the information obtained and conforming with the established goal, the controlling device, during the time T_2 , works out controlling information which is transmitted to the operating device during time T_3 in the form of commands.

With this, the elementary cycle ends. Expended on it are time segments T_1 , T_2 , and T_3 , the sum of which can be considered as the time of control $T_{\text{control}} = T_1 + T_2 + T_3$. Following subsequently is the execution of the received command by the operating device which expends time $T_{\text{operating}}$ in this time. As a result of the execution of the command, the operating device changes its state and position, which entails a new control cycle. In several actual systems, for example, biological, these cycles follow each other continuously and in others, in particular social systems, they are repeated periodically.

Examining the system of troop control, we can discover in it not only elements which are similar in their fundamental purpose, but also similar processes.

As a matter of fact, any system of troop control has a controlling device (headquarters, command post (KP), control post, etc), an operating device (troops with their armament and equipment), and also channels of communication between them over which reports from sources of information arrive in one direction and, in the other direction -- signals and orders for the troops. The same processes for the transfer of information over channels of communication and its processing in the control device proceed in each troop control system. The troop control cycle can also be characterized by expenditures of time T_1 , T_2 , T_3 and the duration of operations of the troops -- time T_{opr} .

However, along with the analogy in the elements and processes, the troop control systems have their own clearly expressed specific features which place these systems in a special position. In military operations, highly-organized masses participate which are controlled from single centers by means of a branching structure of control organs. Nowhere is there such a saturation of equipment as in the armed forces. The volume of information which circulates in military systems is very vast -- concerning the enemy, concerning friendly troops, tactical and technical data on armaments, the terrain, condition of routes of communication, hydrometeorological conditions, the radiation and chemical situation, etc. In transmitting military information, it is necessary to consider jamming which the enemy, as a rule, creates for all communications means and means of control and his striving to intercept information which is being transmitted. Interruptions and breakdowns in systems of military control are unallowable and, therefore, special demands are made on the dependability of their elements. Troop control organs are objectives for enemy strikes, and this requires assuring their survivability and mobility.

Even with this brief enumeration of the specifics of military systems, one can explain the intensive development relative to the independent branches of cybernetics and, namely, military cybernetics which can be defined as the science which studies the most common laws of control in military affairs, that is, the laws of troop and weapons control.

However, we have not yet touched upon two more most important features on which we should also dwell.

The first of them consists of the fleeting nature of those processes with which military systems are called upon to control. In this connection, the struggle to gain time acquires an exceptionally acute nature. For this very reason, in the process of training military cadres the conviction is cultivated that success accompanies the one who is able to collect information and make a decision in the shortest time, assign missions and organize the troop operations, prepare and launch strikes against targets in the shortest time, and bring up and commit the reserves to combat in time.

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At the same time, "best times", "timely", as well as "immediately", "as rapidly as possible", and others which characterize the qualitative side of the time factor do not reveal its quantitative side and do not provide the numerical value which would permit judging how operational the control by a different process may be.

If it is said that in combat operations delay is similar to death, it remains unclear exactly which delay is fraught with such serious consequences. Any delay, or a completely specific delay which disturbs the measure of the phenomenon? For it is impossible to reduce expenditures of time infinitely and, if such attempts are made without knowing the measure, one can fall into the other extreme -- commit super-haste and be in too much of a hurry to the detriment of well-founded decisions and actions, to the detriment of all-round support, and to other important principles of military art. Moreover, channels with increased traffic capacity for transmitting information and high-speed computer equipment are very expensive and it is inexpedient to use them always and everywhere.

So that it would be possible to make well-based quantitative demands on the operativeness of control in each specific case, a careful analysis is necessary which the concept of critical time can further.

The critical time (T_{crit}) can be defined as the time at the end of which the operations of the troops do not lead to the assigned mission in general or with the effectiveness which was expected and planned for.

The value of critical time, just as of the time for the troop operation, is closely connected with the nature of the combat operations and with the purpose of the control and, in specific conditions, may have the most varied values.

PYRGHT What does it mean to control operationally? This means to see to it that the sum of the time expended on the control cycle (T_{cont}) and of the time necessary for the troops to execute a received command (T_{opr}) is less than the critical time, that is, so that the inequality $T_{cont} + T_{opr} < T_{crit}$.

Consequently, the condition of operativeness of control can be written as follows: $T_{cont} < T_{crit} - T_{opr}$.

In this, we recall that the time of the control cycle in turn is the sum of the time for receiving, processing, and transmitting information.

Let us use an example. Let us assume that enemy aircraft (or cruise missiles) were detected by the radar system 10 minutes before they reached the line for striking the objective, the approaches to which are defended by fighter aircraft. Let us assume that the fighters, after receiving the signal, are capable of intercepting the enemy in 6 minutes (in the case of alert on the airfield) or in 3 minutes (in case of alert in the air). In this, we have the basis to consider that, in the process of warning the KP (T_1) making a decision (T_2) and transmitting commands (T_3) to the airfield (or to the alert zone in the air) one or two minutes may be expended. How

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can the operativeness of control be evaluated under these conditions?

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to reduce all possible variants to a table.

Location of alert fighters	Critical Time, T_{crit} , min.	Time of operation, T_{opr} , min.	Required time for control, min				Time available T_{opr} , min	Conclusion
			T_1	T_2	T_3	T_{cont}		
1. At the airfield	10	6	1	1	1	3	4	Control operational (reserve of time 1 min.)
2. At the airfield	10	6	2	2	2	6	4	Control not operational (short 2 min. of time)
3. In the air	10	3	1	1	1	3	7	Control operational (reserve of time 4 min)
4. In the air	10	3	2	2	2	6	7	Control operational (reserve of time 1 min.)

It can be seen from the table that variants 1, 3, and 4 assure operativeness and variant 2, because of large expenditures of time for control (6 minutes) does not assure timely intercept of the enemy since a shortage of two minutes occurs. In order to maintain operativeness in this variant, it is necessary that T_{cont} be no more than 4 minutes. The requirement to reduce the time for control to one or two minutes or "to the shortest times" in general would be groundless.

The reduction in the time for control depends on a number of specific conditions. In some cases, it can be assured by accelerating the receipt and transmission of information (this will reduce T_1 and T_3), in other cases -- by accelerating the process for making a decision (this will reduce T_2), and most often, even if a small saving, in each of these processes.

The most accessible methods for reducing the expenditure of time in receiving and transmitting information are increasing the skill of the communications personnel and reducing excess multiple stages in the passage of reports; reducing the number of words (symbols) in each report by rational coding;

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bring up the commander's equipment. It is necessary to help the people with authority; using means of mechanization as well as a whole series of methods which can be found in each specific case. A large reserve of time is laid in observation of the principle of transmitting only necessary information but in sufficient quantity. Without doubt, automated communications are extremely promising, but their introduction does not exclude the use of all "internal" reserves for reducing the time to transmit information and orders. The concept of critical time will help select various methods for reducing times T_1 and T_3 and evaluate its effectiveness.

The most probable methods for reducing expenditures of time to process information (to make a decision) can be: strengthening discipline, raising qualifications, clear-cut delineation of functional duties and assuring interchangeability of persons in authority in case of necessity, knitting together staffs and sections of command posts, and others. An important and promising direction is the introduction of means for the mechanization and automation of the most labor-consuming processes which are connected with processing information and making a decision.

In this connection, it is necessary to dwell on the second most important feature of military control systems. As is known, combat operations belong to the number of processes which contain elements of uncertainty which are caused by the presence of a number of random factors and previously unknown conditions. Therefore the staff, in preparing a decision, is required to consider not one variant (and, consequently, result) of combat operations as a whole or each of their separate stages, but a great number of possible variants which differ from each other (results). In this, each of them has only some probability of coinciding with what is planned. No military commander is able to predict accurately how combat operations will develop in time and space; he can only assume that under certain conditions such and such a result will be attained in such and such a place at such and such a time. In order to form these assumptions on a quantitative basis, that is, more objectively, it is necessary to perform a whole complex of calculations using mathematical methods of investigation and leaning on the concept of probability. In this, one can assume with a sufficient degree of practical confidence that, in the course of of combat operations, those events will occur whose probability is sufficiently great. And conversely, those events the probability of which is very small, can be considered as practically impossible.

However, in view of the presence of elements of uncertainty inherent in combat operations, it is necessary to perform not one calculation each time but many variants of calculations, to solve the problem of optimum planning, target distribution, and a number of others. This requires tremendous expenditures of time if no use is made of high-speed computer equipment for which the corresponding algorithm has been worked out ahead of time and a computer program has been prepared. Great help can be rendered by slide rules, tables, graphs, and nomograms worked out ahead of time, including from results of machine computations. In any case, both methods, based on mathematical methods of investigation, permit reducing the time for the performance

of troops consuming calculations necessary for making a decision and further reducing the expenditure of time T_2 .

The practical solution to the problem -- in just what control organs and for what types of combat operations is high-speed computer equipment necessary and where can one get by with other means -- again is connected with the concept of critical time.

The question may arise: where to take those values T_1 , T_2 , T_3 , and T_{opr} which go into the simple relationships previously presented? First of all, from practical time measurements of the time spent on various processes. Therefore, in daily activity, on troop and staff exercises, it is absolutely necessary to measure the time expended on control as well as on the actions of the troops.

However, in far from all cases can dependable characteristics of time expenditures be obtained by timing, especially when timing one time. As a matter of fact, the expenditure of time on various processes depends on many circumstances which it is difficult to consider ahead of time; in other words, it is a random value which can take a different amount in each specific case. So that the calculations which are made can be more dependable, they should be based on averaged characteristics and, in individual cases, consider the amount of possible deviation from them.

To estimate times T_1 and T_3 , it is expedient to use a value of mathematical expectancy (average value) of these times which, in contrast to the average arithmetic value, considers the frequency of appearance of various values obtained during timing. For example, if as a result of ten measurements of the time T_1 we obtained 1 minute in four cases, 2 minutes in one case, and 3 minutes in five cases then, accepting that the probability of appearance of these values is proportional to the obtained frequency, we come to the following law for the distribution of time T_1 :

Value T_1 (min.)	1	2	3
Probability of these values	0.4	0.1	0.5

The mathematical expectancy of the time T_1 , equal to the sum of the products of each of the values times its probability, in this case will equal $M_{T_1} = 1 \cdot 0.4 + 2 \cdot 0.1 + 3 \cdot 0.5 = 2.1$ minutes (while the average arithmetic expectancy equals 2 minutes). The mean square deviation of the time T_1 from its mean value equals

$$\sigma_T = \sqrt{(1-2.1)^2 \cdot 0.4 + (2-2.1)^2 \cdot 0.1 + (3-2.1)^2 \cdot 0.5} = 0.943 \text{ minutes.}$$

Just what time T_1 should enter the calculation? To solve this problem, it should be kept in mind that time T_1 can be greater than its mathematical expectancy: by the amount σ_{T_1} (i.e., be equal to $2.1 + 0.943 \approx 3$ minutes) approximately one case out of each six; by the amount $2\sigma_{T_1}$ (i.e., be equal to $2.1 + 2 \cdot 0.943 \approx 4$ minutes) approximately in 2-3 cases out of 100; by the value $3\sigma_{T_1}$ (i.e., be equal to $2.1 + 3 \cdot 0.943 \approx 5$ minutes) approximately in 1 case out of 1000.

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But on some problems the time T_1 may also be less than 2.1 minutes. In this connection, as a rule, the mathematical expectancy of the time T_1 may be used in the calculations, i.e., the value of 2.1 minutes. And only in individual, especially important cases can its maximum value be considered equal to 3, 4, or even 5 minutes.

To estimate the times T_2 and T_{opr} , it is expedient to use a different method of calculation, in accordance with which the expected time for making the decision (or action) is determined on the basis of three estimates: minimum T_o , maximum T_p (these are also estimates which in practice can be encountered in very favorable or very unfavorable conditions, but each no more often than in one percent of the cases) and the most probable estimate T_v (often encountered in practice). Then the expected time for making the decision (or action) will equal

$$T = \frac{T_o + 4T_v + T_p}{6}$$

and the mean square deviation will be

$$\sigma_T = \frac{T_p - T_o}{6}$$

Thus, if under very favorable conditions the staff is capable of preparing a decision on a given problem in 10 minutes, in very unfavorable conditions in 1 hour 40 minutes, but most often succeeds in doing in in 40 minutes, the expected time for preparing the decision is

$$T = \frac{10 + 4 \cdot 40 + 100}{6} = 45 \text{ minutes.}$$

In this, the mean square deviation will equal

$$\sigma_T = \frac{100 - 10}{6} = 15 \text{ minutes.}$$

This means that in one case out of six, the staff requires $45 + 15 = 60$ minutes; in 2-3 cases out of 100 $45 + 2 \cdot 15 = 1$ hour 15 minutes will be required; and finally, in 1-2 cases out of 1000 $45 + 3 \cdot 15 = 1$ hour 30 minutes will be expended. As a rule, the expected time can be used in the calculations (in the example, it equals 45 minutes.) And only in individual, especially important cases is it considered as equal to 1 hour, 1 hour 15 minutes, and even 1 hour 30 minutes.

In conclusion, it should be stressed once more concerning the importance and necessity for a careful consideration of the time factor in troop control, remembering that poorly organized control will consume the lion's share or all the critical time and deprive the troops of the opportunity for the purposeful use of their combat power. Well organized control expends the minimum necessary portion of the time on the processes of receiving,

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Approved for release, information, leaving the maximum reserve of time
for the troops.

In this connection, one should spare no efforts in checking the expenditure of time by all echelons of control, in estimating their operativeness by all possible methods and, in particular, using the concept of critical time and, in the case of discovering a shortage, seeking ways to eliminate it. The time factor should enter into an estimate of the activity of each officer and soldier, each control organ, each crew and podrazdeleniye, of any military body.

CPYRGHT

AIR SUPPORT OF GROUND TROOPS

by Maj Gen Avn S. SOKOLOV

CPYRGHT

The use of tactical (frontovaya) aviation and the nature of its tasks have changed considerably since the equipment of ground troops with operational-tactical rockets capable of striking at troop formations and targets deep within the enemy rear. In this connection, the question arises: would it not be better to abandon entirely air support for ground troops and entrust it completely to rocket troops? Military theory and practice have answered this question in the negative.

The point is that each of these combat weapons has its positive qualities; for example, aircraft have high maneuverability, while rockets have great speed of flight and, consequently, the ability to reach the target within a short period of time. For this reason, in modern ground troops operations, rockets and tactical aviation operate not as rivals, but as allies, supplementing and reinforcing one another. As in "pre-rocket" times, tactical aviation is used for joint combat operations with ground troops and, in maritime areas, with the navy. One of its important tasks is the air support of ground troops.

What does this support represent, what is its basic purpose, and how is it carried out? This question can best be answered by an analysis of the combat capabilities of tactical aviation and its sphere of use.

It is known that modern tactical aviation can deliver, together with rocket troops, a large amount of nuclear ammunition to the targets. The use of nuclear weapons helps aviation to perform, relatively independently, major assignments in the interests of the operation as a whole, involving the destruction of a portion of the forces of an enemy formation (ground troops, aviation, or others) and the destruction of enemy rockets and nuclear weapons.

However, as proved by the experience of past, non-nuclear wars, aviation is also very effective in combat with the use of conventional weapons. Let us recall the role which it played during the Great Patriotic War in defeating enemy ground troops

and air force formations, and also in supporting its own forces, both in a swift offensive and in a defensive operation. Air reconnaissance in support of ground troops, fighting against enemy reserves, and other aviation tasks, have not lost their significance but, on the contrary, have become even more important.

Important combat qualities of aviation, such as the ability to appear quickly over the battlefield and to destroy, with a high degree of effectiveness, small and mobile targets, the location of which may be only approximately known at the time a mission is assigned, have improved considerably. Speed, flight altitude, and rate of climb of the aircraft, as well as the combat efficiency of conventional weapons, have greatly improved, as compared with World War II.

The capability of tactical aviation to act independently in reconnoitering and striking at targets, judging by the experience of past wars, makes it an irreplaceable means of support for ground forces in combating small, shifting, and mobile targets, such as rocket launch installations at their positions or on the march, enemy fire weapons, individual tanks, and others. Even standard guns, not to mention rockets, make it possible for modern fighter-bombers to carry out such a mission efficiently.

Another aspect should be mentioned. Modern combat operations are to a great extent mobile, involving high speeds in the shifting of forces and equipment. Consequently, mobile targets will be encountered in greater numbers than in the past, and considerably more frequently, i.e., individual groups of troops, tank podrazdeleniya, infantry on armored carriers, and others. This qualitatively new phenomenon in combat operations increases the significance of the participation in combat of mobile groupings and targets, which can be hit most effectively and with the least expenditure of forces by aviation.

Thus, in the interests of the ground troops, aviation may perform a wide range of tasks. These tasks may be divided into two groups, depending on their nature and purpose. The first group includes general, front-line tasks, i.e., air reconnaissance along the entire depth of the operational deployment of enemy troops; combating enemy aviation at airfields and rockets at launch sites in the operational depth; destruction of enemy rockets and nuclear weapons; protection of troops and targets in the rear from enemy air strikes; combating deep reserves, and other tasks.

The second task (group of tasks) is carried out by tactical aviation in operational or tactical coordination with ground troops, supporting them during combat when they are in immediate contact with the enemy. This includes the destruction of rockets and nuclear weapons in tactical and immediate operational depth; combating immediate enemy reserves; destruction or neutralization of radiotechnical equipment and control points in the line of attack of a particular operational or tactical grouping; illumination of an area or installation of light signals to facilitate the combat operations of ground troops at night; and sometimes individual flights for the purpose of air reconnaissance. This task is carried out, as a rule, in accordance with the plan of a combined-arms ob'yedineniye (or soyedineniye).

In considering the nature of the second task, it is easy to observe that its results have a direct effect on the success of combat operations of combined-arms ob'yedineniya and soyedineniya; therefore, such combat operations of tactical aviation are known as aviation support of ground troops.

Let us now try to formulate the concept of "aviation support." Essentially, it may be considered that aviation support of ground troops, under present operational conditions, constitutes combat operations of tactical aviation for the destruction (or neutralization) of enemy targets on the ground, according to the plans and by request of commanders of ground troops ob'yedineniya (or soyedineniya), within the scope of the established flight resources and nuclear ammunition for a particular combined-arms ob'yedineniye (or soyedineniye). The purpose of aviation support, in the final analysis, is to enable the rapid advance of ground troops.

Let us briefly discuss certain aspects of the methods used in providing aviation support. There is no need to prove the priority importance of the destruction of nuclear rocket weapons under conditions of a nuclear war. However, we must point out the difficulties in striking at such targets. First of all, nuclear rocket weapons will obviously be best protected by air defense (PVO) facilities. For this reason, the PVO facilities must be neutralized first, wherever such targets are located. Secondly, these targets will be well camouflaged both at their launch positions and at their temporary locations, or while being moved.

In the course of air combat operations, all the facilities of air reconnaissance are used for the active spotting of nuclear

rocket weapons along the entire line of advance of the supported troops. Not only special air reconnaissance flights are planned, but any data of incidental intelligence obtained during combat missions of all types of aircraft are used. Various methods of air reconnaissance are used to spot nuclear weapons of the enemy, i.e., visual reconnaissance, aerial photography, and reconnaissance with the help of radiotechnical and other equipment.

Air reconnaissance is conducted on a continuous basis, day and night, under favorable or difficult weather conditions, for the purpose of spotting new targets of nuclear rocket weapons, following the movement of previously spotted targets, and supervising their destruction. The targets which have been spotted are destroyed immediately or after a minimum amount of time.

The most efficient way of combating nuclear rocket weapons is with the help of fighter-bombers, which conduct an independent search and destruction of the targets spotted, i.e., the method of "hunting." This method was used fairly extensively by our aviation during the Great Patriotic War for the destruction of ground and air targets of the enemy. For this reason, the principles of its organization have remained essentially the same. Naturally, in applying this method one must consider the changes which have taken place in the aircraft armament, and even in the tactical and technical characteristics of aircraft, as well as in air defense and in the nature of enemy targets.

It should be stressed that the success of the "hunter" crews greatly depends on their training and initiative in carrying out their ~~assignment~~ mission, as well as on the assignment of permanent areas of operation, or of certain directions, to them. In carrying out their mission, the "hunter" crews may locate important ground targets, which can not be destroyed by them alone. In such cases, they must immediately radio their control point and, if possible, mark the target or help in guiding to the target other groups of aircraft, which have taken off in answer to their call.

However, individual spotting and destruction of targets is not the only method of combat operations applied by fighter-bombers. In some cases, they may take off for the purpose of delivering strikes, as ordered by the control point. For example, a reconnaissance aircraft may have discovered the position of a

battalion, a group, or a battery of tactical aircraft. The reconnaissance aircraft crew cannot destroy this target unaided. Therefore, it must immediately transmit data concerning its nature and location to the air force headquarters. After receiving the report, the air force command may assign the mission to fighter-bombers, or to bombers alone, and sometimes to fighters alone, to destroy or neutralize the target. In view of the fact that a request for tactical aviation may be received at any time, a certain number of its aircraft, on the airfields must always be ready to take off on a mission to destroy the spotted targets.

Depending upon circumstances, various methods of operation of tactical aviation will be used in certain combinations. For example, a "hunting" flight may take place for the purpose of obtaining no more than orientation data on the targets spotted by reconnaissance.

Other methods may also be applied. These may include the re-assigning of air force units already in the air on a different type of mission, to the destruction of nuclear rocket targets. Such a use of aviation may help to reduce the time needed from the moment the target has been spotted to the actual striking at the target, as though the mission were carried out not from the position of "alert on the airfield," but that of "alert in the air."

These are some of the methods in combat operations of fighter-bombers, used in the spotting and destruction of nuclear rocket targets.

We might say a few words about the destruction and neutralization of enemy radiotechnical facilities. The methods for the destruction of such targets depend on the purpose of air operations. In some cases, partial destruction of radiotechnical equipment would be sufficient; in others -- the total destruction of individual, important units of one or several radiotechnical systems may be necessary.

The most effective means for the destruction of radiotechnical equipment is the use of conventional (non-nuclear) weapons by fighter-bombers. The armament of a modern fighter-bomber, its guns, and especially its rockets, can destroy any radiotechnical station.

Taking into consideration the extremely large number of radiotechnical facilities of enemy troops and the need to neutralize and destroy them, a certain percentage of the air forces must be permanently assigned for this purpose to the support of troops.

In the course of aviation combat the nearest enemy reserves. Aviation can quickly detect formations of enemy reserves and by systematically delivering strikes against them, even without using nuclear weapons, establish favorable conditions for the operations of the troops it is supporting, prevent the advance of reserves and inflict casualties among them.

The bringing up of reserves, as the experience of the Second World War indicates, may be prevented by various means. These would include the blowing up of several bridges or crossings, strikes against troops in ravines, etc. This leads to a bottleneck of troops and equipment, usually in the form of ground targets drawn out in a line, which become suitable nuclear targets.

The scope of the missions of aviation support is determined by the flight resources at the disposal of the command of the combined-arms ob"yedineniye or soyedineniye. Naturally, such resources will not always be the same. They are determined by the front command according to concrete circumstances and the striking power available to the ob"yedineniye or soyedineniye, and may be either increased or decreased during operations. During the Great Patriotic War, the predetermined resources for aviation support was also revised in the course of combat operations, frequently on a daily basis.

The flight resources allocated for aviation support must be used exclusively for the destruction of targets determined by the commander or chief for whom the support is planned. In this connection the question arises of whether there remains any validity in the position on aviation support which existed during the Great Patriotic War, when aviation soyedineniye were completely subordinate, operationally, to the commander of a ground troop soyedineniye or ob"yedineniye, or at least attached to a ob"yedineniye or soyedineniye for a certain period of time.

In our opinion, this method has lost its significance. The structure of ground troop and aviation soyedineniye and ob"yedineniye has changed. Their capabilities changed when they were supplied with nuclear weapons and with the increased efficiency in the use of conventional weapons. For this reason, there has been a change in the conditions of conducting combat operations and the procedure for coordinating the operations of the various arms and branches of armed forces. The nature of combat operations now demands strict centralization in the use and control of aviation.

New aspects have developed in the field of coordination. In modern operations both ground troops and aviation are interested in joint operations. It can not be considered that aviation alone must operate in the interests of ground troops. Ground Troops must, in turn, carry out many assignments which ensure the success of the combat operations of tactical aviation. These include combating enemy aircraft and guided missiles, neutralizing

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and aviation control systems) within the operational area of one's own
air force, rendering assistance in securing bases for tactical aviation,
particularly where ground troops are advancing rapidly.

The organization of coordination between tactical aviation and ground troops requires, above all, the proper distribution of assignments (targets) among aviation and rocket troops. Taking into consideration the combat characteristics and capabilities of aviation, as was already pointed out, it is expedient to use it to strike small, mobile, newly discovered, and rapidly moving enemy targets. The main targets for fighter-bombers may be launchers and missiles of various types, cruise missiles at their sites, aircraft on airfields and, sometimes, in the air, columns of troops and trucks, radio and radar stations, control points, railroad cars and locomotives, enemy airborne and amphibious landings (both during and after the landing), and many other targets.

One of the tasks of coordination is ensuring the aviation escort of ground troops. However, the concept of "aviation escort of ground troops" should not be understood in the sense that it had in the Great Patriotic War (particularly between 1944 and 1945), when our attack planes were frequently in the air over the battlefield continuously for several hours, even if it offered no suitable targets. Today "escort of advancing ground troops by tactical aviation" should be understood to mean its capability to carry out certain missions requested by the ground troops at a given time, under conditions in which the ground troops are advancing rapidly and certain soyedineniya are separated from the main forces of the front.

This is a very responsible task for tactical aviation. First of all, it must be in a state of high combat readiness to carry out such assignments day or night, under simple or complex meteorological conditions. Secondly, it must rapidly move to new airfields, following the advancing troops at a pace equal to their ~~own~~ daily progress, i. e., not remaining behind the ground troops as was sometimes the case in the last war. These conditions are essential for the escort of ground troops by aviation, especially fighter-bombers, which carry out almost all the tasks involved in aviation support.

Problems of the combined employment of ground troops and tactical aviation must be worked out in advance, prior to the beginning of combat operations. This must be reflected both in the plans of the ground troops and in the plans of the tactical aviation soyedineniya. Coordination between the ground troops and tactical aviation^s organized primarily by the command of the front-line ob'yedineniye. The command of the combined-arms ob'yedineniya and representatives of the aviation are responsible for organizing the coordination for carrying out ~~cert~~ specific assignments.

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We have touched on only a small number of questions of aviation support. However, it seems to us that from what has been written it is possible to conclude that under modern conditions there still exists the possibility and necessity of using tactical aviation for missions involving both front-line and combined-arms *soyedineniya* and *ob"yedineniya*, i.e., for the conduct of combat operations in the form of aviation support, even though, compared to the last war, it has changed substantially in form and content.

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THE OPTIMUM PHYSICAL AND PSYCHOLOGICAL LOAD FOR SOLDIERS AND MOD-
ERN METHODS OF TRAINING IN THE PROCESS OF TROOP FIELD TRAINING

by Maj Gen Z. VEYS

CPYRGHT

Revolutionary changes which occurred in recent years in the armament and technology of the socialist defense union are making new and increased requirements on all regions of military affairs. This especially pertains to the main activity of the army during peacetime -- the education and training of servicemen, podrazdeleniyas, chasty, soyedineniya, staffs, and the personnel of military training institutions. The requirements which are made by modern war on the individual soldier as well as on each military collective are incomparably higher than they were in the past. As is known, it now is insufficient for the serviceman to learn military affairs in general terms; under modern conditions, each officer and soldier should be a master of his trade. For this, it is necessary for him to master comprehensive knowledge, skills, and qualities which permit him to accomplish his missions under difficult combat conditions by displaying high consciousness, creative initiative and selflessness in the interests of victory over the enemy.

But such high qualities, physical skills, and moral steadfastness are only attained when the soldier experiences the corresponding physical, spiritual and moral loads from the first day of his military service.

At the present time, the National Peoples Army of the GDR (German Democratic Republic) is conducting a number of investigations and experiments which should provide the answer to the question of the possibility of attaining this maximum physical and psychological load in the course of field training. The investigations which we have conducted have been generalized and analyzed in detail. We will tell about some of them in this article.¹

The author adheres to the opinion that the possibilities which are available in this field are far from exhausted and that even closer cooperation with the Soviet Army in scientific investigations on problems of training

¹The article by Major General of the National Peoples Army of the GDR, Z. Vey's, is printed as an exchange in experiences.

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will permit making a significant step forward. The treaty of friendship, mutual aid, and cooperation which was concluded between the Soviet Union and the German Democratic Republic places this obligation upon us.

In the conduct of inspector's checks, it was frequently established that the degree of physical training of those who were obligated to military service still does not correspond to the requirements which should be made from the point of view of modern training in our National Peoples Army. And we decided to obtain accurate information on the level of physical capabilities of those who were being called up for service.

Considering the requirements of modern war and the missions of the National Peoples Army of the GDR (NNA) in the socialist defensive alliance, we investigated the ways and possibilities which permit raising the intensity and quality of military training to the required level.

For this purpose, we set about the study of sports exercises by the draftees prior to their joining the army and their physical capabilities. During the registration of the draftees in the army, a special investigation group used the following methods:

- written questionnaire;
- revealing functional capabilities using sports tests;
- a medical inspection to check physical preparedness.

The investigation was conducted in various chasti of all types of armed forces which are part of the NNA. There was no special selection of people for the check. The average age of the people obligated for military service who were investigated was 22 years. Approximately 40% of them were 20 and 21 years old. All persons investigated were suitable for military service and were in good health.

It turned out that 38.6% of those obligated for military service did not take up sports at all after completing their general educational schools, 14.5% took part in sports activities unsystematically and only 45.1% of the young people regularly took them up. All together, only 33.3% of all those questioned had a sports badge and 1.9% had confirmed it a second time; 17.2% of those obligated for military service did not even know how to swim.

In determining the expected average indices for sports tests, the investigating group proceeded from the standards for the "Olympic Badge" which served as the basis for graduation examinations of the 10- and 12-class schools. The highest number of points obtained -- 67 (of 72 possible), the lowest -- 8 points; the average number of points collected was 28.

The indices in pulling up on the hands, in propping in the prone position, and in throwing the hand grenade for distance were comparatively good and with respect to the distance of jumping and speed of running, there was little that was conforming.

The investigation revealed that the present training of ~~Approved For Release 2000/08/09 : CIA-RDP85T00875R000300090019-6~~ personnel are a satisfactory basis for their further physical development in the National Peoples Army. The level of endurance and speed turned out to be unsatisfactory.

The check which was conducted after four weeks of service in the army was evidence of the improved physical training of the personnel who were obligated for military duty and the load for the majority of them turned out to be completely within their capabilities. But, at the same time it was noted that in the period of the body's adaptation among the young people who were drafted into the army, there was some drop in their physical activity.

The task of the second part of the investigation consisted of testing the most effective methods for raising the physical strength of the soldiers. A special program was introduced in test podrazdeleniyas for the conduct of morning exercises and physical training, and they were also occupied with various types of sports and physical training in the course of field training. So-called circular training² was employed as an organizational-methodological form which permitted improving the physical training of the servicemen.

Proceeding from the necessity for the maximum perfection of the training process and the complete utilization of a small amount of time (18 months), as a result of the investigation data was prepared concerning the expedient use of training time and concerning the causes of the disproportion between its expenditure and the results of the training.

Observation of the training was conducted using investigation plans which embraced 30 lessons. In the course of the exercises, investigation was performed on the activity of the instructor and soldiers (all together 114 men) and a written questioning of the soldiers and noncommissioned officers of various chasti of ground forces (all together about 1000 servicemen were questioned) was conducted.

An analysis of the exercises which had been checked (tactical, firing training, physical training, exercises on the regulations, drill, and protection against weapons of mass destruction) showed that the physical activity and, first of all, the active mental activity of the soldiers in the course of the training was far from satisfactory. To some measure, this is explained by the fact that the instructors themselves do not know to a sufficient degree the ways and capabilities for intensifying the training process to free time for practical independent training of the soldiers and noncommissioned officers.

First, this pertains to the selection of methods for stimulating the trainees to active independent physical and mental activity. The exercises, true, occupy 50% of the total time (68.9% for practical training and 10.7% for theoretical training), but independent work in which the physical and mental activity are ideally joined together is not employed at all in practical training and, in the theoretical part of the training, occupies only

²The author has in mind combined training.

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4.2% of the overall training of servicemen such methods predominate which instill among the trainees a passive attitude toward the exercises (talks, guidance), while the methods which stimulate the soldiers to physical and mental activity (conversations, independent work) are hardly used or are used to a clearly insufficient degree.

At the same time, the talk in theoretical training occupies 55.0% and in practical training only 16.5% (on the whole, 28.5%). The share of the more active method -- conversations, is respectively 24.9% and 9.1% and the application of the method of demonstration is already completely insufficient (5.7%).

The methodological deficiencies which are present are sharply demonstrated in the analysis of the method for conducting the exercises. On theoretical and practical exercises, the talk in combination with the demonstration occupies respectively 74.5% and 22.0% while the more active method of conducting the exercises (conversation, independent work), which activates soldiers and the noncommissioned officers occupies only 7.9% in theoretical training and only 0.9% in practical training.

The conclusions from the questioning which was conducted showed that requirements which are too low are made on training. This pertains especially to theory. 47.5% of the soldiers who were questioned asserted that they could better master the training material while only 5.6% of the soldiers think that they are not able to do more. This is evidence of the fact that the majority of the servicemen are not completely loaded.

In summarizing the investigation on the intensity of training among the troops, one can note that, first, the activity of the trainees and consequently the intensity of the training process are low. This pertains especially to the theoretical training of the soldiers. Second, the essential reasons for shortcomings in training are hidden in the methodological inexpediency of the organization of the training process -- first of all in the predominance of methods which lead to passive behavior of the soldiers and in the insufficient application of activating methods. Third, the results of the questioning revealed the necessity to employ increased demands in the training of servicemen and showed that a large number of them expect such a decision.

On the basis of conclusions obtained in the course of investigations of the intensity of the training process among the troops, at the present time a pedagogical experiment is being conducted in one of the training chasti. It is not yet completed. We can only tell about the goal which was established, methodology, and some preliminary results.

The training of non-commissioned officers for our National Peoples Army represents an especially complex problem which consists, first of all, of the fact that only five months are available for training and the courses for training non-commissioned officers are made up practically without exception of servicemen who have undergone only four weeks of basic training.

This means that we must train the students in a period somewhat less than five months, that is, first as a soldier and then as a non-commissioned officer. Proceeding from this, a training chest was selected for the conduct of the experiment. For the experiment to be made more convincing, it was distributed over only one discipline -- teaching small-arms firing. A motorized rifle company served as the test podrazdeleniye.

The purpose of the experiment consists of working out and testing pedagogical methods which permit raising considerably the activity of the servicemen on all exercises and which assure the systematic assimilation of the necessary knowledge and abilities.

In this, we analyze and make practical use of the latest recommendations of pedagogical science which are expressed in the application of methods of programmed instruction. Results of an experiment conducted earlier in one of the officers schools showed that the employment of programmed instruction, even in a relatively short time, leads to higher indices in training. The experience obtained in other armies, including in the Soviet Army, judging from published materials, as well as outside the army confirm that it is expedient to use programmed instruction along with existing methods of training.

At the same time, still insufficiently deeply studied is the question as to whether the teachers with average qualifications are capable of employing modern pedagogical methods in combat training without rendering them very great assistance on the part of specialists in the field of programming, and with what success this can be achieved. We are speaking of the capabilities and ways for the broad introduction, into actual troop life, of modern methods of programmed training. Nor have we yet decided the materials, subjects, and elements for which an optimum decision is possible or what methods are required for it.

In studying the problem, we want to find the answers to such questions.

What effect is rendered by the optimized planning of marksmanship training in the instruction period in courses for training non-commissioned officers as well as by the employment of elements of programming in the test podrazdeleniye on

- a) the results of firing,
- b) theoretical knowledge,
- c) practical skills,
- d) methodological capabilities of the students on exercises in the teaching of firing from small arms?

-- What results can be expected from the conduct of the test with respect to the use of training time and varied formulation of the method of training in the test podrazdeleniye?

-- In what measure does the organizational-methodological formulation of the exercises influence the more attentive attitude of the students towards marksmanship training and influence their activity?

-- Does programming affect the process of training in the remaining unprogrammed disciplines of combat training?

-- Are the instructors with average qualifications able to employ the methods being tested, obtaining assistance possible under troop conditions from their organizational commander?

We are investigating all these questions using the following methods: we take the initial level of training of the students of the test podrazdeleniye and of several podrazdeleniyas being compared at the start of the training and, by means of observation, analysis of personal records, written reports, and practical checks, we discover the degree of progress of the trainees.

We conduct the planning of marksmanship training in the test podrazdeleniye with consideration of the knowledge and the experience of organization of programmed training in it.

Training materials are worked out for individual lessons: for theoretical lessons -- programmed training texts, for practical lessons -- detailed synopses which consider the degree of knowledge of the instructors in methods of programmed training. At first, these materials are worked by a control group and subsequently, with the inclusion of the instructors and the students of the test podrazdeleniye.

The lessons in the test podrazdeleniye are analyzed by the control group. The passage of the lessons in the test podrazdeleniye is also observed in other disciplines as well as in compared podrazdeleniyas. In this respect, the progress of the students of the test podrazdeleniye is checked in the process of training in the middle and at the end of the courses. In the same manner, a check is conducted in the middle and at the end of the courses in the compared podrazdeleniyas, too. The results of the training which are achieved by the students in examinations in other disciplines are used for comparison. For this purpose, questioning of the students is conducted in written form.

It is clear to us that the training of students by the method of programmed instruction assures continuous, systematic acquisition of the necessary knowledge and abilities and that it demands from the trainees a clear, specific scientific analysis of the material being worked out and a sharp differentiation of separate and partial subjects in accordance with their importance. Only on the basis of such an approach is the opportunity assured to plan the necessary systematic repetition of all important elements of the knowledge which can be taught. Planning the material in this way is freed of any ballast, that is, only those elements of the material are taught and assimilated which are necessary to the future non-commissioned officer. Un-

fortunately, this is still not a firm rule with us yet since, proceeding from the short period of military service, the necessary selection of material up to now is determined to considerable measure by the subjective impressions of individual instructors and commanders.

The working out of the theoretical material on lessons in marksmanship training using programmed training texts will lead, for example, to a more intensive, independent, and creative mastery of the knowledge by the students. It was established in checks that the progress of the students of the test podrazdeleniye of the school, on the average, was higher than that among the personnel of the compared podrazdeleniyas. In theoretical tests which took place in the middle of the courses, the soldiers of the test podrazdeleniye received 42.2 points and of the podrazdeleniyas being compared, on the average, only 25.8 points. In this connection, it should be noted that it was recommended to company commanders of the podrazdeleniyas being compared that they submit their best platoon for check while all platoons were subjected to the test in the test podrazdeleniye.

It should also be expected that the knowledge obtained by the students of the test companies is retained longer and more firmly than with the students of the podrazdeleniyas being compared.

No little significance is had by the circumstance that the students have an extremely positive attitude toward the work with programmed training texts. In the questioning, almost all students of the test podrazdeleniye expressed the desire to retain this method. Many of them base their opinion on the fact that such a method promotes broadening and improving independent work and provides the opportunity for constant checking of their individual studies by the director.

We have already drawn the conclusion that practical instruction from synopses which consider the principles of programmed instruction assures a more confident, profound, and complete mastery of the skills and abilities which the students are required to possess. As a result of the practical test in the middle of the courses, the test podrazdeleniye, for example, received on the average 64.8 points (out of 75 possible), and the podrazdeleniyas being compared -- on the average, only 52.8 points. In this, it still is necessary to consider that in the podrazdeleniyas being compared individual exercises in firing, which are conducted in the course of the training, were systematically prepared (this is generally accepted coaching which threatens the accomplishment of tasks facing marksmanship training as a whole) while training in the test podrazdeleniye proceeded in exact conformance with the program which did not permit conducting special working out of individual exercises. Nevertheless, the results of exercises performed up to now in the test podrazdeleniye are much better.

From what has been said, it follows that the experimental employment of programmed instruction permitted improving the training considerably and, first of all, activated the students to independent and creative work. The

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methods of programmed training are already being employed at the present time in some of the schools of the National Peoples Army. Results obtained also confirm the indicated conclusions. Consequently, the future also belongs to programmed instruction in military training because it is the means which helps us to cope with growing requirements which are made on combat training by the nature of modern war.

From the investigations conducted in the National Peoples Army of the German Democratic Republic, a number of conclusions can be drawn:

1. Each instructor should first know the mental and physical capabilities of his subordinates in order to determine minimum and maximum loads and adopt effective measures to increase progress. In the very first four weeks of military training, the instructor should work with himself especially purposefully in order to acquire the knowledge and abilities to use teaching and testing machines.

2. Considering that mental and physical labor of a man do not represent values independent of each other but are a component part of any human activity, in the training process consideration should be given to both these facets and their dialectical interconnection. One should strive to overcome the one-sided physical load of the students: in accordance with his capabilities, each serviceman should receive a large mental load, but one within his capabilities. Thanks to the daily concern and wide support of the entire educational system in the GDR by the workers' and peasants' government, the mental level of our youth is rising from year to year; therefore, this should also be considered in military training.

3. In view of the direct dependence of military knowledge, skills, and abilities on the level of general development of the servicemen, in the process of training this activity should be directed to working out optimum knowledge and abilities. Therefore, methods should be primarily adopted which force the soldier to work independently, actively, and creatively physically as well as mentally.

4. The maximum amount of mental and physical load of the servicemen in the process of the lessons depends to a large degree on the systematic character, sequence, and purposefulness of the training in all instructional disciplines. On the one hand, this assumes the clear coordinations of procedures studied in individual disciplines and, on the other, the specific and scientifically-based planning of each subject of instruction as well as the excellent organization of theoretical and practical lessons which assure the complete conversion of the plan into actual troop training.

5. The results of the tests which have been conducted confirm the value and usefulness of the programmed method of instruction. In theoretical training, this is expressed primarily in raising the degree of independence in developing knowledge, in the compulsion toward an intensive mental pursuit of the material being studied, and also in the immediate confirmation of the correctness of the knowledge obtained. In practical training, the value of

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This method consists first of the systematic repetition of important elements and in self-constraint toward proper, independent practical activity.

The purpose of this article, as has already been stated, is the exchange of some experience in the matter of combat training of soldiers and students of schools in combat training which will promote closer cooperation of both our armies in a practical manner as well as in the field of the theory of instruction.

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SOVIET ARTILLERY IN THE GREAT PATRIOTIC WAR

CPYRGHT

by Col Gen Arty (Ret) F. SAMSONOV

The role of artillery, just as is the case for each type and branch of the army, depends on a number of interacting factors. The most important of these are the military qualities of the weapons, how many of them the army has, the correlation between the organization of the particular branch of the army and its ordnance, and the methods and means of using them in battle - the battle capabilities of the weapons.

The military quality of the weapon is determined primarily by its firing capability. Even M. V. Frunzye pointed out that "in a modern battle the decisive factor, and the main strength, is fire. Only with the help of fire can the domination of the enemy be arrived at....Hence, every group in the army, every type of weapon, must appear before the enemy, that is, on the battlefield, so as to ensure to oneself superiority in fire."¹ This thesis has been completely proven in the course of World War II, and retains its significance even now the war is over.

Artillery, as a branch of the army, has at its disposal the greatest means of fire power available to any of the branches of the land forces. The attention of the nation's leadership and of its armed forces have always been engrossed in artillery development and in outfitting artillery with modern, first-class weapons.

The qualitative modernization and the quantitative growth of artillery in our country in the pre-war years were of great importance. On the eve of the Great Patriotic War, the People's Commissariat of Defense, in setting forth a number of basic conditions of the operational art and tactics, decisively confirmed the basic part of the artillery, as a branch of the army, plays in battle and in operations. At the same time, the development of aviation, and of the tank forces, and the immeasurably increasing importance of them in the conduct of maneuvering operations had to be taken into consideration.

We did in fact have at our disposal first-class artillery weapons. This was convincingly pointed out in an article by Colonel General of Artillery N. N. Zhdanov.² We will only point up certain of the situations in his article in the interests of our own article.

1. M. V. Frunzye. Collected Works, Vol. I. Gosizdat (State Publishing House), 1929. pp. 237-238.

2. Voyennaya Mysl* (Military Thought), No. 3, 1965.

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At the beginning of the war our computed requirements in mortars, 45- and 76-mm guns, and we were only slightly lacking in howitzers. This shortage was the result of the increase in the number of howitzers in the tables of organization and equipment for the rifle divisions just prior to the war. We had all of the large caliber guns we needed for the corps artillery and the artillery in the RVGK. 3

There had been a sequential replacement of artillery weapons with new, even more modern artillery pieces, in the period 2 to 4 years before the war. However, the process was not completed. When the surprise attack by the Hitlerite troops began we had only 49% of the new 45-mm guns, and only 14% of the new 76-mm guns. Deliveries of the new 122- and 152-mm howitzers were low too; 19 and 28%, respectively. However, the earlier models of the guns had adequately high battle qualities.

The biggest bottleneck was in providing the troops with the small caliber, 37-mm, antiaircraft gun; the total supplied was some 30% of the organizational requirements of the troops. There were very few large caliber antiaircraft machineguns. The result was that the troops suffered heavy losses in men, in supplies of horses, and in prime movers and automotive transport, the result of enemy air attacks. Batteries which lost their prime movers had to destroy the materiel portions assigned to them in order not to leave them for the enemy.

Since the materiel portions of command responsibility contained quite large reserves, we had been unable to manufacture ammunition in quantities sufficient to bring them up to the norms decided upon in the corresponding decisions which had been made on the subject. Provision for them at the beginning of the war was very inadequate. There had been no success in overcoming the difficulties involved in developing ammunition production at the beginning of the war. Having placed great importance on antitank defense, we had adequate supplies of armor-piercing projectiles for the 45-mm gun, but very few for the 76-mm. Armor-piercing projectiles for the antiaircraft guns had not been designed, although their use had been anticipated in the struggle with tanks. The high-explosive fragmentation shells were only good against light tanks, and only good against the side armor of medium tanks, and that at short ranges, when tank fire was more active and when the time available to destroy the tanks had shortened.

Finally, it should be recalled that the idea of making subcaliber and shaped charges was known to us long before the war, ¹ but their manufacture began only during the war when the enemy had already used them in the struggle with our tanks. We were also late in using in our armaments and in establishing wholesale production of rocket installations, their missiles, and of self-propelled artillery mounts as well.

In the short space of the three, incomplete, pre-war Five Year Plan periods a great amount of work was actually done to raise Soviet artillery to the first class level. However, there were shortcomings which reduced the battle capabilities of our artillery.

3. RVGK - Reserve held by the supreme command of armed formations of war.

1. The principles of the shaped effect had been investigated in the Artillery Academy in 1934.

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We needed prime movers, without which any maneuvering was out of the question, in order to pay off on the battle qualities of the weapons, but we also needed the technical equipment for communications and reconnaissance, without which it would be impossible to control fire.

Much has been written concerning the shortcomings in means for mechanically towing the artillery pieces. Let us note here that the tractors supplied the army lacked speed, and spare parts, and rapidly broke down. The national economy had no tractors or trucks capable of meeting the army's requirements in the event of mobilization. The main bulk of the prime movers were low-powered agricultural tractors which were obviously inadequate. The bottleneck for our artillery was the weak supply of mechanized prime movers, and this seriously reduced artillery's mobility and maneuverability.

The question was not a new one. As far back as 5 June 1929 V. K. Triandafillov had reported to the RVSР (Revolutionary Military Council for the Republic - 1918-1934) on a project for a tank-tractor armament system. The report advanced the thesis that "every mechanical means of transportation produced in the country should lend itself to use in the army under wartime conditions and, conversely, every special means of transportation for the army should have a peace time use in serving the economic needs of the country." ¹ It is also useful to recall that M. N. Tukhachevskiy, in 1932, wrote that automobiles and tractors which could become the mechanical base for a tank should be introduced into the national economy. ²

The military leadership, as well as many artillerymen, saw the only answer in the creation of a "family" of special artillery prime movers. The first models appeared before the war (in the form of tractors such as the "Komsomolets," "Komintern," and "Voroshilovets"), but their total in the artillery tractor park at the beginning of the war was only 20.5%. ³ It should be noted that throughout the war the only tractors delivered were agricultural types. The reasons for this have not yet been given sufficient study.

At the beginning of the 1930s it would have been opportune to have dealt with yet another problem, that of gradual elimination of horse-drawn prime movers. It is possible that this problem could have been resolved in the 10 to 12 years remaining before the war.

Of the other problems, we will discuss that concerned with the supply of technical equipment for reconnaissance. The available instruments did not solve the problem of engaging in massed artillery firing and controlling such fire accurately and without observation from ground observation points. The anti-aircraft fire-control instruments were not designed for the high aircraft speeds involved nor could they cope with the anti-aircraft maneuvers used.

1. TsGASA (Central State Archives of the Soviet Army), Vol. 4, Schedule 2, D. 504, p. 16.
2. M. N. Tukhachevskiy, Selected Works, Vol. 2, Military Publishing House, 1964 p. 187.
3. History of the Great Patriotic War of the Soviet Union, 1941-1945, Vol. 1, Military Publishing House, 1963, p. 452.

The provision of such aircraft, available in the corps aviation detachments, was obsolete and was not suited to serving with the artillery. The Air Force and the People's Commissariat for the Aviation Industry failed to provide the help needed in order to design and build a spotter plane which would satisfy the requirements of the time. The repeated appeals of N. M. Rogovskiy in 1935-1937, and of N. N. Voronov in 1938-1941, to the leading military authorities had no results. The resolution of the Defense Committee of the SNK (the Council of People's Commissars) of the USSR concerning the building of a new spotter aircraft remained unacted upon.

The organization of our artillery on the eve of the war was quite modern. All types of artillery were represented and the forces were equipped with artillery from top to bottom. Included was company, battalion, regiment, and corps artillery, as well as RVGK artillery. There was no artillery organic to operational combinations (armies, fronts) since plans called for reinforcing them as needed from the RVGK artillery.

Artillery in the rifle divisions comprised 90% of the entire mass of ground field artillery and was distributed as follows. Company artillery (50-mm mortars) had 28.2%, battalion (82-mm mortars and 45-mm guns) 22%, regiment (120-mm mortars, 45- and 76-mm guns) 14%, division (45- and 76-mm guns, 122- and 152-mm howitzers), 26%.

The share of each type of weapon looked like this: mortars in the allowances totalled 49.2%, 45-mm and 76-mm guns 32.7%, and howitzers 18.1%. If the 50-mm mortars are disregarded the 82-mm and 120-mm mortars made up 29.3% of the total mass of armaments allowed the troops, while guns totalled 45.5% and howitzers 25.2%.

The company 50-mm mortar had poor fire qualities, and the rifle company, because of the constant shortage of personnel, lost the tactical importance assigned it prior to the war during the Great Patriotic War. Hence, production of the 50-mm mortar was sharply curtailed as the war went along, from 116,600 in the first half of the war to 28,500 in the second period of the war, and was finally stopped completely, while these mortars were removed from the armaments provided.^{1, 2}

It should be noted that prior to the outbreak of war we had a low percentage of RVGK artillery, despite the fact that it was the primary source of artillery for maneuvering in operations. At the end of World War I the most advanced countries had 30 to 40% of all their low-maneuverable artillery in the RVGK. This included the entire mass of artillery weapons (less the mortars). We had 12.4% of our guns in the RVGK artillery.

V. D. Grendal', N. M. Rogovskiy, and N. N. Voronov, former artillery heads in the 12 to 15 years before the war, repeatedly raised the question of increasing the share of RVGK artillery. They were unable to find persuasive arguments. That

1. Archives of the Ministry of Defense, Vol. 81, Schedule 12076, pp. 2-12.
2. Later references and discussions did not take the 50-mm mortars into consideration.

RVGK artillery which we had was retained only to reinforce our front in an effort to meet the established norms for artillery support for fronts and armies.

It should be emphasized that the main body of artillery was divisional artillery. This fact indicates that the artillery organization did not fully respond to the doctrine of maneuverable war. Moreover, divisional artillery was top heavy in howitzers, since they held 84% of all howitzers in the Soviet Army. This was irrational, even from an economic point of view. The howitzer is basically the weapon of the offensive. Ordinarily, from one-third to one-half of all the divisions in an army in the field in time of war will take part in a simultaneous offensive, even when several fronts are involved.³ Consequently, from one-half to two-thirds of divisional howitzers were always in "mothballs."

The theory of the combat employment of artillery had been developed by us on the basis of the general theory of military science, and provided for the wise use of artillery's combat possibilities. Volume I of the History of the Great Patriotic War 1941-1945 (Chapter 10) reflects the high level of theory of our military science in detail and correctly. However, there were assumptions made, and, in our view, there were certain inaccuracies in some of the details. The question of antitank defense (pp. 445-446 of the above mentioned work) is a case in point.

The authors did not understand the prewar regulations and instructions in our orderly system of antitank defense, but saw in them only "various methods of struggle." These regulations and instructions sanctioned the fact that when a tank fired by direct aiming only "special antitank artillery" was used and that "antitank artillery was not grouped into individual antitank strong points and defense pivots," but rather that all antitank weapons "were to be concentrated to hold the non-tank-traversable areas in the locality."

The 1936 Field Regulations recommended the organization of antitank areas within defense perimeters (as is obvious, tactically speaking this means within the main and second lines of defense).¹ In the textbook on general tactics these Regulations recommendations have been developed to point out that "...there must a system of antitank areas coordinated with the mobile antitank reserve in order to stop and destroy these tanks."¹

An even more detailed exposition of the antitank defense system is contained at pages 228 to 240 of the Combat Regulations for Artillery, Part II, 1937, which were still in force in 1943. "Artillery is the principle source of fire power

3. The sole exception was the concluding warfare during the 1945 campaign.

1. General Tactics, Vol. 1. Military Publishing House, 1940, p. 207.

2. "Special" antitank artillery included the batteries in the rifle regiments and the battalions in the rifle divisions. Ordinarily, the guns which were included in the PTO system for use in direct firing at tanks were called antitank guns.

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for use in the struggle with the tanks in conjunction with the engineering equipment in the locality, and the natural obstacles, is the antitank defense system." (Page 228). Further on the Regulations explain in detail what is meant by the PTO (antitank defense) system, and provide recommendation for the organization of the system. And further on are the firing assaults on tank units in areas where the tanks are concentrated and on assembly areas (page 230), and barrages to be laid down along the routes over which the battle dispositions of tanks are moving towards the leading edge of the defense (page 232), and meeting tanks with point blank fire directly in front of the forward defense perimeter (page 234). And further, in case the tanks break through the perimeter, the Regulations required the positioning of antitank guns deep within the defense in such a way as to "provide for a system of continuous antitank fire along the front and in depth to the areas in which the PP (infantry-support) and DD (general-support) groups are located, inclusively." (Page 234). As antitank guns², the Regulations recommended the assignment of battalion and regimental guns, and individual guns from the PP group gun batteries. Even the "firing positions of the PP and DD group batteries themselves are included in the overall system of antitank defense," that is, in the area of their firing positions these guns too were to fire directly on any tanks breaking through. And, finally, at page 240 is a discussion of the place, and the tasks, of the mobile reserve of antitank guns in the overall PTO system, while, at page 229, is the statement that "the entire artillery of the defense must be ready to repel a tank attack."

Thus, so far as the legend concerning the concentration of the means for the struggle with the tanks in non-tank-traversable areas is concerned, it is obviously founded on misunderstanding. In commenting on the PU-36 (the 1936 Field Service Regulations), M. N. Tukhachevskiy wrote: "It is desirable to select the forward edge along obstacles it would be difficult for tanks to overcome, and to make widespread use of artificial and natural obstacles."³ As will be seen, this has absolutely no resemblance to the attempt to conceal from the enemy the antitank defense means in non-tank-traversable areas.

During the Great Patriotic War we linked up the antitank areas (they were also called strong points and centers and areas) with firing coordination within the overall system, set up this PTOR (antitank defense area) system throughout the army zone (as of the summer of 1942), and then throughout the front as well (in the battle along the Volga, around Kursk, and in the Lake Balaton area). It was augmented by coordinated artillery antitank reserves from the rifle regiment to the front.

We have not refuted the principles on which front, army, corps, and division antitank defenses were founded, but rather, on the basis of what actually was done, supplemented the correct recommendations contained in PU-36 and BUA (Combat Regulations for Artillery), Section II, 1937, with new methods used in the struggle and the system of PTO developed beyond the boundaries of the rifle division defense area.

3. M. N. Tukhachevskiy. Selected Works, Vol. 2, p. 258.

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Our artillery units used the very simplest methods of arriving at the initial data for firing and adjusting firing were more widely used than were sophisticated methods available to us. This latter can be explained by the fact that most battery and divisions commanders had not been in their assignments over one or two years. Artillery officers were in general young, 67% were not over 30 years of age, while the period of service in the army for 83% of the officers was under 8 years. The overwhelming majority (86%) of the officers were Communists and Young Communists. This fact not only provided the Motherland and the Party with unlimited devotion, but also a maximum of activity and initiative on their part in carrying out their service and combat duties.

The first part of the war, and particularly its initial campaign, was an extremely difficult period for the Soviet Army. It not only lost men and equipment, but the army in the field had to retreat deep into the interior and, at the same time, face a situation in which many hundreds of industrial enterprises had to be evacuated on an urgent basis. There was a sharp, temporary, curtailment in the production of guns and ammunition. The difficulties were compounded by the loss of most of the GAU (Main Artillery Directorate) depots located close to the western border. Tank troops and aviation also took tremendous losses.

The demands for artillery armament never the less were increased by the colossal growth of new formations. In the first five months of the war almost as many combined arms units (division and above) were formed as there were divisions at the beginning of the war.

Industry, in the first months of the war, was unable to fill the combat losses of the army in equipment and armaments, with the result that the technical equipment available to the troops fell off sharply. By the end of 1941 the tremendous exertions on the part of the Soviet people were able to improve somewhat the supply to the Soviet Army of armaments and ammunition, and from that time on the technical supply to the troops increased without interruption. ¹ Artillery power, as will be seen from the data in Table 1, increased at a great rate.

Table 1. The restoration of artillery power in the Soviet Army during the first period of the war, in the basic indices (in %)

	Artillery	Of which mortars *
Available 22 June 1941	100	26.2
" 1 December 1941	66.1	20.1
" 1 May 1942	112.8	57.5
" 15-20 November 1942	185.3 **	110.6

* Mortars, less 50-mm.

** Apart from tank guns, of which category industry provided some 20,600.

1. History of the Great Patriotic War of the Soviet Union, 1941-1945, Vol. 2, Military Publishing House, 1963, p. 608

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Restoration of the ammunition industry. This was because some 300 plants producing various artillery shell components had to be urgently evacuated to the eastern regions of the country. The monthly production of these plants had been 11.1 million shell casings and mine casings, 7.9 million fuzes, 5.1 million cartridge cases, 7,800 tons of gunpowder, 3,000 tons of TNT, and other products.¹ As a result, and despite the heroic efforts to restore the ammunition industry, the increase in ammunition production lagged behind the increase in the number of guns and mortars, and supplies of ammunition per unit armament fell 1.8 times at the end of the first period of the war. The struggle to increase this supply lasted into the succeeding period of the war.

It was at this same time that a number of organizational changes were made in order to alleviate the adverse effects of shortages of armaments and ammunition; and there was a simultaneous change in artillery organization as well, mainly the result of an inadequate mobile artillery reserve. The most important of the changes involved reductions in the allowance lists for organic artillery, and seeking ways in which to organize so as to obtain the highest number of mortars and light weapons and to cut back on the production of heavy (152-mm) howitzers, and of all guns of larger calibers. In the difficult situation which existed at the beginning of the war, it was necessary to make a maximum effort to form the anti-tank and anti-aircraft artillery, in which troops were so badly needed.

The mobile nature of the war required an operationally mobile artillery reserve, and there was very little of this. Hence, it became necessary to reduce the combat strength of individual artillery regiments in order to increase the number of weapons in the reserves.

Tables of organization and equipment (T/O&E) were changed for organic artillery in the first period of the war because of necessity, and it was natural, therefore, that every opportunity was used to restore previous artillery saturation norms in the rifle divisions, which were the basic skeleton under the entire land army structure. Just how the artillery saturation norms for the rifle divisions were changed may be seen from the data in Table 2.

Table 2. T/O&E Changes in Artillery for Rifle Divisions in the First Period of the War

Artillery armament	Projectile weight, kg	Per Rifle Division										No. in % at start of war
		A		B		C		D		E		
		1	2	1	2	1	2	1	2	1	2	
Mortars:												
50-mm	0.9	84	76	54	49	72	65	76	68	85	77	101.2
82-mm	3.1	54	167	18	56	72	223	76	236	85	264	
120-mm	15.9	12	191	6	95	18	286	18	286	18	286	
Total mortars		150	434	78	200	162	574	170	590	188	627	125.3

1. N. Voznesenskiy. Military Economy of the USSR in the Period of the Patriotic War. State Political Literature Publishing House, 1947. p. 42.

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Artillery:

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76-mm PA	6.2	54	77	18	26	30	43	30	43	30	43	55.0
76-mm DA	6.2	16	99	16	99	16	99	20	74	12	74	66.7
122 mm g	21.8	32	698	8	174	8	174	12	124	20	124	125.0
152-mm g	40.0	12	480					12	262	12	262	37.5
Total guns /		132	1466	54	373	66	390	74	503	74	503	56.1
GRAND TOTAL		282	1900	132	573	228	964	244	1093	262	1130	92.9

A - at beginning of war; B - Summer 1941; C - at beginning of winter campaign of 1941/42; D - Spring 1942; E - Summer 1942. 1 - Number of guns; 2 - weight of salvo (kg). PTP - Antitank obstacles; PA - Regimental artillery; DA - divisional artillery; g - howitzer.

It is to be noted that the General Staff gradually, but persistently, increased the number of artillery pieces in divisions after the sharp drop (by 55.2%) which had occurred at the beginning of the summer-fall campaign of 1941. In one year the artillery had been increased to 92.9% of its pre-war level. This resulted from the increase in the number of mortars and 76-mm divisional guns (25% more, as against the initial allowance in 1941). However, since the number of howitzers per division fell 3.5 times, and since these were replaced by 120-mm mortars (because there were no 160-mm), for a net increase of only 6 pieces, the weight per salvo by an artillery division continued low (one-third that of the prewar weight). And just because the salvo weight plays so large a part in offensive operations, whereas two campaigns of three at the beginning of the war were defensive, the effect was not so great as was the shortage in numbers of guns.

At the same time, and despite the difficulties involved in creating the new artillery formations, there was a sharp increase in the specific weight of RVGK artillery and its role in operations (thanks to its maneuverability). The process of development of RVGK artillery in the first part of the war can very well be seen from the data in Table 3.

As will be seen from the table, the Army had no rocket installations at the beginning of the war. And the decision to include them in the armaments was not taken until 21 June 1941. Even so, the number of rocket installations increased sharply in the first year of the war. There were five times as many in mid-1942 as there were on 1 December 1941. This was definite proof of their ability to survive and of the big part they played in massed artillery fire. At the great tempos prevailing the growth in the number of M-30 (300-mm rockets) racks almost doubled, indicative of the growing demand for fire power activity at the immediate depth of enemy combat formations covered by defensive armaments. The over-running of this first defensive position, which offered attacking troops the best organized and stiffest resistance, was a necessary prerequisite to penetrating the enemy's defense throughout its depth.

The Table reveals that the maneuvering reserve of artillery increased considerably during the difficult situation prevailing during the first period of the war. At the end of this first period the number of RVGK artillery regiments had increased 10 times. There were five times as many RVGK artillery regiments, on the average, per rifle division as there had been at the beginning of the war. One combined-arms army for use in conducting a large, frontal operation came to have five times as many regiments, thus created yet another serious problem; control over large masses of maneuvering, or mobile, artillery.

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The solution was found in the organization of independent artillery brigades, divisions, and other units. At the end of the first period of the war the State Committee on Defense issued the appropriate decrees.

At this time the RVGK had all types of artillery, except for the self-propelled artillery. Now the RVGK artillery became what it should have been, not only artillery for qualitative reinforcement of combined-arms teams, but an all-around entity as well, forming a large, mobile reserve for GHQ, Front commanders, and armies.

The increase in RVGK artillery outstripped that of organic artillery in subsequent periods of the war as well. In the second and third periods organic artillery increased 1.1 times; RVGK increased 2.1 times. Its specific share increased to 32% (in availability of guns and mortars), without the M-30 racks taken into consideration. At the end of the Great Patriotic War the specific share of RVGK artillery was what it had been at the end of the first World War.

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Table 3. Development of RVGK Artillery in the F

Dates of beginning and end of campaigns	Number of computed regiments							
	A	B	C	D	E	F	G	H
22 June 1941	15	64	20	11**	-	110	-	110
1 December 1941	101*	58	58	14**	24	255	-	255
1 May 1942	177	149	122	63	72	583	-	583
15-20 November 1942	199	196	240	83	138	856	256	1112

A - Heavy guns; B - Howitzers; C - Antitank; D - Mortar; E -
I - Mortars; J - Small caliber guns; K - 76-mm guns; L - 122-mm
P - Total; Q - In %.

* The sharp jump is explained by the transfer to the RVGK of the
of the corps commands.

** Mortar battalions were the equivalent of a mortar regiment.

*** Including 480 85-mm AA guns used as antitank guns.

**** In addition to 4560 M-30 racks.

***** Division in one ptabr. (sic - unknown). It is known that
they were not included in the RVGK artillery inventory.

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ry in the First Period of the War

regiments		Number of guns in them								
G	H	I	J	K	L	M	N	O	P	Q
-	110	528	-	960***	3070	4030	-	160	4718	100
-	255	582	382	1016	3712	5110	584	12*****	6288	133
-	583	1516	198	2604	5750	8552	1720	12	11800	250
256	1112	2296	1494	3960	7203	12657	2592****	3180	20725	439

artar; E - Rocket; F - Total ground artillery; G - AA; H - Total AA;
 L - 122-mm and larger; M - Total; N - Rocket installations; O - AA;

RVGK of the surviving corps regiments resulting from the disbanding
 regiment.

known that the forces had 720 AA guns on 1 December 1941, but
 inventory.

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Strengthening the organizational structures of the RVNA artillery also continued. Artillery regiments, over 60% were included within the ranks of 10 artillery corps, 105 artillery battalions, and 85 independent brigades. 1

So now there were large staffs for artillery units (brigade and larger), exercising direct control of the fire and maneuvering of approximately 1,200 artillery regiments, between the small artillery staffs in the combined-arms units and operational units on the one hand, and the artillery regiments and battalions (the tactical artillery groups) on the other. The staffs of the artillery units (brigade and higher), through the staffs in the various artillery groups, had under their control over 50% of all artillery participating in a particular operation. Only now was it possible to speak of real possibilities of centralized control of massed fire, not only at the beginning of artillery preparations for the attack (or counter-preparations in defense), but throughout the engagement as well.

In the course of developing the project for the new Regulations in 1943, it was decided to recommend that the fronts and armies refrain from forming a multiplicity of artillery groups. The fundamental principle involved in forming such groups would have to be provision of a clear cut correlation with combined-arms units (brigade and higher) and other, smaller, units of the same type. Every combined-arms commander, from rifle regiment to army commander, and in some cases even as high as front commander, had his inclusive artillery group. This violated the basic concept of correlation: every combined-arms commander had "available" artillery.

The experience of the war revealed that, in the interests of massing artillery fire, what was needed was centralized control of the artillery on the scale of some combined-arms unit (division and above) (combined-arms unit groupings into larger still groupings). Therefore, the artillery commanders in such combined-arms groupings, being the deputies of the commanders of such groupings, received the right to control the fire and maneuvering of all, or of those parts of the artillery they needed, to monitor the combat utilization of the artillery in subordinate combined-arms units and sections and to make timely corrections in case mistakes were made.

Large, controlled, masses of artillery became a reliable instrument for wide-spread, mass artillery fire. The massing of artillery in operations increased, and so, correspondingly, did enemy losses from our artillery fire; at the same time the conditions for breaching the enemy's defenses were eased.

The role of artillery was improved as a result of the growth in its capability to fire, because difficulties with prime movers were overcome, as were those concerned with control, and because of skilful control of its massed fire power.

1. All data are in conventional regiments, that is, in accordance with the strength of independent battalions; they were taken by respective types of artillery, two or three to a regiment. The percentage of independent regiments in the ground artillery was considerable lower. The medium caliber AA battalions in AA artillery remained independent until the end of the war.

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Artillery, in two defensive campaigns during the first part of the war, and in several large defensive operations in the second and third periods, gained a great deal of experience, and learned how to inflict losses on the enemy, how to break up tank and infantry attacks, to stop his advance while giving own infantry and tanks invaluable assistance.

In the first days of the war the artillery units, as a result of the complicated conditions, the small amount of equipment, and the poor mobility, absorbed heavy losses, and although they inflicted considerable casualties on the enemy, they failed to achieve the expected results, only briefly delaying him on individual sections. However, by the end of the initial campaign of the war, and even in the battle around Moscow, artillery began to gain more and more strength, began to break up enemy attacks, and forced him to look for new directions in which to strike because of the artillery fire he was encountering.

Even so, artillery still had extremely limited means for the struggle in the defense around Moscow. This will be seen from Table 4.

Table 4

	Available weapons and mortars on the Western Front						
	PTO	Weapons DA	RVGK*	Mortars	Total	BM-13	AA Guns
2 October 1941	769**/2.2	832/2.5	364/1.0	1586/4.5	3551/10.2	21	94
16 November 1941	804/2.1	647/1.7	337/0.8	648/1.7	2436/6.3	268	113
5 December 1941	1287/2.7	1189/2.5	323/0.7	2119/4.4	4918/10.3	372	226

* RVGK weapons do not include antitank; the latter are shown together with all antitank guns.

** Numerator - number of weapons; denominator - density per km of defense front.

Despite the most strenuous exertions on the part of the General Headquarters were unsuccessful in increasing artillery density, particularly antitank. It became necessary to seek the solution to the problem in operational terms - by maneuvering equipment along the direction taken by the enemy's main blows. Thus, the 16th Army, defending the Volokolamsk direction, was assigned 6 antitank regiments; the 5th Army, in the Mozhaysk direction, 11 regiments; the 43rd Army in the Maloyaroslavets direction, 8 regiments and 1 battalion.

The result of these actions was to increase the density of antitank equipment in the 16th Army to 3.2 guns per kilometer by 16 November; that for the 43rd Army to 3 guns per kilometer. However, even these changes failed to raise the density to the norms set forth in Regulations. Strength was low. The answer had to be sought in decisive maneuvering of antitank artillery in a tactical zone. So there evolved successful increase, but not without risk, in the artillery density along the Minsk-Moscow highway (82nd Motorized Rifle Division) to 14 guns, in the 1st Guards Motorized Rifle Division sector (Naro-Fominsk) to 18 guns, and in the 43rd Army, along the Warsaw direction.

From 16 November to 6 December 1941, over 400 tanks and armored vehicles, 20 aircraft and some 200 vehicles, were destroyed by artillery fire from the Western Front, while up to 15,000 enemy soldiers and officers were taken out of action. This was no small contribution to the struggle with the invaders in the battle in the close-in approach to the capital. /

As artillery density increased, so too did experience in its use; as the artillerymen mastered their combat assignments the role of artillery in defensive operations increased with each year the war went on.

In the Stalingrad area the density of antitank guns along the main directions increased to 10 (62nd Army) and even 19 (66th Army) weapons per kilometer, while the overall density increased to from 50 to 85 guns per kilometer. Around Kursk the

density in PTO weapons increased to 18 (13th Army), while the overall density increased to 86 guns and mortars, etc. The artillery density inside the defensive sectors of the divisions along the probable avenues of tank approach increased 1.5 to 2 times.

Organizational skill in maneuvering was brilliantly evidenced by artillery and tank commanders at all levels in the Kursk battle, in the defensive battles around Kiev at the end of 1943, and in the Lake Balaton region. We countered the enemy's tank unit maneuvers by our artillery maneuvers, and, as a result of the growing strength of the artillery we formed an impenetrable fire barrier. The significance of maneuver and control of artillery in these operations have not yet been adequately studied in depth, and all the lessons have not been extracted for the future.

Also to be noted is the great skill of our artillerymen in organizing tactical maneuvers with artillery batteries, as a result of which guns, and even howitzers, successfully fought the heavy tanks used by the enemy, despite the fact that they did not pierce frontal armor, and were inferior to the tanks in grazing shot range. Thus, the tactics used to fight tanks were developed in the crucible of war, the war that was so rich an arsenal of examples and methods.

Practice has confirmed the fact that the greatest successes are achieved only with the skilful correlation of the various branches of arms. Effective examples and methods of correlation, leading to tactical and operational successes, were gradually worked out.

This was the way in which methods and examples of AA cover for the troops were developed. Recognition of the direct dependence between the selection of enemy air strike areas on the selection of the areas in which his main forces would act and on the operational concentration of own troops opened up a vast scope within which to forestall enemy maneuvers by the use of antiaircraft artillery.

Artillery had to be closely coordinated with aviation in carrying out combat assignments. AA artillery forces and fighter aviation were coordinated within the overall system of PVO troop measures when covering ground forces against enemy air strikes. The coordination between artillery and assault aviation was close knit during the struggle with the enemy's artillery in the course of breaching his defense's

tactical depths, particularly at that time, detected enemy batteries could not be taken under artillery fire. As we know, the artillery offensive itself, together with air offensives, preceded the attack by the ground forces during our own first periods.

The experience gained in the struggle the artillerymen of besieged Leningrad had with the enemy's artillery was also of tremendous value in the overall advancement of knowledge. It was of decisive importance in this sector. And there is no question that the city was saved from extensive destruction, and its inhabitants from destruction by the German artillery, by the great service rendered by the Leningrad artillerymen.

Artillery density increased at a greater rate in the offensive operations than was the case in the defensive ones. The tactical densities in the sectors in which the enemy's defenses were breached increased approximately as follows:

1st period of the war:

41 guns/km, 16th Army, 6 December 1941, Moscow area;
35.3 guns/km, 6th Army, 12 May 1942, Khar'kov area;
86.7 guns/km, 8th Army, 27 August 1942, Sinyavin area;

2nd period of the war:

71.5 guns/km, 65th Army, 19 November 1942, in the battle along the Volga;
133.1 guns/km, 63rd Army, 12 July 1943, Oryol area;
139.0 guns/km, 53rd Army, 3 August 1943, Belgorod area;
380 guns/km, 38th Army, 3 November 1943, Kiyev area.

The latter figure is not typical for the large offensive operations during the second period of the war and the first half of 1944. The tactical density at that time increased from 130 to 180 guns/kilometer (including only the artillery which fired during artillery preparation and artillery support for the attack, and excluding 50-mm mortars).

The increase in the artillery density resulted in an objective increase in its capacity to fire, and this, in its turn, led to a solution to the problem of simultaneous, continuous delivery of artillery fire against the enemy defenses along the entire front in the break through sector and along his flanks.

The artillery played the part of the main firing striking force in cracking the enemy's defenses in the offensive battles and operations. Its role became larger, the greater its ability to shoot became; the more skilful its use, the greater became the mastery of how to control its fire and maneuver it.

The directive letter from the General Headquarters of the Supreme High Command (VGK), dated 10 January 1942, and better known by the designation of the letter "Concerning the Shock Armies and the Artillery Offensive," was of great importance in the development of combat mastery by the artillerymen. There are reasons to suppose that the letter came about for a number of reasons, chief among which were:

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the obtaining of incomplete results of the set for the offensive operations during the counterattack in the Moscow area;

efforts to understand the causes of the results, and to eliminate them before the Soviet Army went over to the general offensive.

All of the correct, in principle, and extremely important conditions set forth in the letter were not new, but were in fact known ever since the time of the war of 1914-1918: concentration of the maximum possible artillery in the break through sector in order to use its fire power to the maximum; prepare for, and support, the attack with massed fire by artillery prior to the complete breaching of the enemy's defenses; follow the attackers right behind the curtain of fire. All of this reflected the main idea; continuity of participation of artillery in battle, its close coordination with the infantry, with the tanks, and with aviation, and continuity of neutralization of the enemy along the entire accessible depth of the defense.

The extraordinary situation pertaining in the initial campaign of the war led many of the commanders to distrust the Regulations, to shift them around temporarily to correspond with actual conditions, and to attempt to get along, generally speaking, without their recommendations. One of the consequences of this was the uniform distribution of forces and fire power along the entire, unusually broad front of the defensive zone and of the establishment of subordinate, unrealistic, missions for their combat capabilities and the time allotted to carry out maneuvers and get ready for combat.

A letter on the subject of artillery offensives, written by I. V. Stalin, despite some inaccuracies in military terminology which gave rise to a number of puzzling and practical errors among the troops, played a tremendous role. The letter pointed out, precisely, and clearly, the shortcomings which were actually apparent, and pointed out what had to be done. In the winter of 1942 the letter's contents sounded like some sort of a revelation.

One of the main features of the effect the letter had was the moral strength it communicated to those who had to carry on the struggle for the introduction of sensible methods and examples of the combat utilization of artillery. It stirred the initiative of the artillerymen and limited those commanders who had not taken into consideration the objective difficulties of the combat operations of artillery units.

The letter played a particularly great role for the workers in the artillery industry, and for that industry's supervisors, placing them in the position of workers in one of the most important sectors in the struggle to strengthen the country's defenses. The rapid growth of the artillery fire capability was the indirect result of the recognition of the decisive role of the artillery in the offensive.

There gradually crystallized among the troops an understanding of the artillery offensive as that means of combat action by the artillery which was organically linked with the actions of the infantry and of the tanks and which was similar in character and methods to the action of the combined-arms battle order. It therefore came to be divided into three periods:

artillery support of the attack;

artillery support of the battle in the depth of the enemy defenses.

The purpose of artillery preparation did not come under review, but its missions and the methods used to carry out those missions changed with the growth in artillery fire capability and the accumulation of experience in the use of artillery. What was learned was how to eliminate the gap between the end of artillery preparation for the attack and the beginning of artillery support of that attack, something which was not successfully done in 1914-1918.

The great advantages of density of massed fire over its duration were revealed. But if the enemy was not reliably neutralized soon after he ceased firing (in accordance with the norms for the expenditure of projectiles on neutralization), he would resume firing and, even if weakened, still had the capacity to foil an attack in any particular sector.

Also revealed was that only simultaneous, and continuous, neutralization of the enemy's order of battle along the entire front of the sector in which a breakthrough was in progress, and throughout its depth, from which the enemy could fire on the attackers, would ensure a completely successful attack.

And, finally, it became clear that with the increase in artillery density, and the density of its massed firepower, it was possible to reduce the time of firing during the artillery preparation for the attack, primarily because of doing away with the period of "destruction" requiring methodical firing and correction of such fire. Then with a further increase in the artillery firing capabilities it would be possible to shift from alternating concentrations in depth of enemy order of battle to a single, powerful, firing attack lasting for from 15 to 20 minutes. Rushing the enemy during the attack, ringing the attackers with a continuous curtain of fire ahead of the front and on the flanks of the break through sector, with simultaneous neutralization of the depth of the defense, or at least the first defensive position, and of the enemy's artillery, ensuring cracking the defense. This was culminating point in the growth of artillery power.

As fire capability increased there developed, in the artillery support of the attack, a process of progressive seizure and simultaneously massed fire power of more and more depth of the enemy's defense. At the end of the war dual rolling barages covered the depth of the entire first defensive position. Simultaneously, the most important targets in the regimental and divisional reserve positions were neutralized by concentrated fire. This fire, together with the break through of the attackers into the second and three defensive positions, was transformed into a PSO (successive concentration) throughout the depth of the main defense sector. The result of this was a continuing need for the artillery offensive during the third period, because the fire slackened off, fire resistance increased, the attack bogged down temporarily, changing from a continuous ahead movement to an alternating one of maneuver and strike the targets of the attack in turn.

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Great credit belongs to artillery command cadres, and particularly to its commander, Marshal of Artillery N. N. Voronov, for the successful solutions to the complex problems involved in the growth and in the qualitative development of artillery, in providing artillery with everything needed for battle operations, in the growth in the mastery of the control of maneuvering and firing by large masses of artillery, and in its constant combat coordination with the troops. Marshal Voronov headed the artillery continuously from 1937 to 1950, and won universal respect for himself. Marshal of Artillery N. D. Yakovlev and General I. I. Volkotrubenko carried on their shoulders the completely superhuman load of the tremendous organizational work done, leading the most important sectors in the work of combat supply for the artillery throughout the war. No small part in developing scientifically based tactical and technical requirements for the models of artillery armaments was played by the Artillery Committee, headed by V. I. Khokhlov. The closest assistants to N. N. Voronov, Marshal of Artillery M. N. Chistyakov, and other generals and officers, who handled organizational and operational questions, combat training, training and distribution of cadres, did quite a bit of work on the matter of the overall development of Soviet artillery.

Exceptionally great was the role played by the artillery commanders of Fronts and Armies in organizing maneuvers and the totally crushing fire of large masses of artillery, in organizing and carrying out the combat and operational coordination between artillery and infantry, tanks, aviation, and engineering troops. The widely known artillery commanders in the fronts during the war period - generals V. I. Kazakov, N. S. Fomin, G. F. Odintsov, M. I. Nedelin, N. M. Khlebnikov, M. M. Barsukov, G. S. Kariofilli - grew into important combat commanders during the war, as did Army artillery commanders, generals P. S. Semenov and N. N. Semenov, V. S. Korobchenko, M. S. Mikhalkin, V. M. Likhachev, P. I. Kosenko, G. V. Godin, corps, battalion, and brigade artillery commanders N. V. Ignatov, L. I. Kozhukhov, P. M. Korol'kov, N. F. Salichko, N. N. Zhdanov, A. I. Ratov, A. F. Pavlov, N. D. Chevola, and many others. The staffs were the direct organizers of maneuvering and firing, carrying out the idea of the commander's concept and the operations of command by fronts and by artillery of fronts. Talented generals, such as G. S. Nadysev, S. B. Sofronin, G. M. Brusser, G. D. Barsukov, and others, should be mentioned.

We lost many of our most prominent artillery men during the war, the Deputy Commander of Artillery of the Soviet Army, General V. G. Kornilov-Drugov, the Deputy Chief of the GAU (the Main Artillery Directorate), K. R. Myshkov, Front artillery commanders A. K. Sivkov, P. M. Belov, and many army, corps, and battalion artillery commanders, as well as large and small artillery unit commanders. We remember them, and we bow our heads to their courage, spirit, and heroism.

Artillery commanders, enriched by the war experience, continue the noble work of strengthening the might of present day artillery and missile troops under conditions prevailing today. Among them are the former Commander of Artillery, 2nd Shock Army, K. P. Kazakov, who gained fame around Leningrad and Narva, and in the battles on the fields of what used to be East Prussia, the former artillery battalion commander I. F. San'ko, the former Front Deputy Artillery Commander, and then Commander, Guards Mortar Units, General P. N. Kuleshov, former regimental artillery commander M. I. Sobolev, and others. They not only are guardians of the glorious traditions and combat experience of artillery in the Great Patriotic War, but are also the teachers

of young command cadres, solving new, complex problems involved in the further growth of the might of the missile troops and of the artillery, and in maintaining them in a constantly high state of combat readiness to protect the honor, freedom, and independence of the socialist Motherland.

The Soviet government has placed a high value on the combat deeds of Soviet artillery during the years of the Great Patriotic War and, in 1944, established a national holiday - Artillery Day.

137 of the most outstanding artillery units were awarded the Guards honorary title. 1 Several hundred artillery units were awarded orders of the Soviet Union, and of these 14 were so awarded five times, while the 30th and 40th Gun Brigades won the honor 6 times. One of the combat distinctions during the war was the conferring of the name of a particular city on the unit which distinguished itself the most in the freeing of that city. These honorary designations were awarded to artillery units, large and small, 1,186 times.

The first awards of the Order of the Patriotic War, established in 1942, went to the artillerymen who beat back the counter attacks of two enemy tank divisions around Khar'kov. The batteries, the troops who were first awarded this Order destroyed and put out of action many tanks, fighting to the last man, to the last shell.

Artillerymen won almost 1,200,000 orders and medals during the years of the Great Patriotic War. The most heroic deeds were noted by the awarding of the highest military honor, Hero of the Soviet Union. Some 1,800 artillerymen were so honored.

There is no question that there are many deeds, particularly deeds done in the defensive battles, which have still not come to light, and the names of the heroes are unknown. We know only that all of the artillery sub-units and units fought the enemy to the last man, barring the way to the insolent invader, sacrificing themselves because they loved their Motherland.

The glory of our Army, the defender of the honor, freedom, and independence of the Motherland, will never cease to be talked about. And the deeds of the artillerymen, and of the workers in the artillery industry, occupy an merited place in this historic victory.

1. This figure does not include those units which received this designation when they were formed (the Guards Mortar Units, for example).

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Investigation of the laws of wars and armed conflict represents a most important task of Soviet military science, for true science begins where a description of facts is supplemented and replaced by the discovery of internal, law-governed relationships.

In recent years alone, a number of books have been published which consider individual facets of this great problem and which have tremendous practical significance. They include the following works: o sovetskoy voyennoy nauke (On Soviet Military Science), authored by Prof N. V. Fukhovskiy and published in 1959; Voprosy dialektiki v voyennom dele (Problems of Dialectics in Military Affairs), authored by I. A. Grudinin and published in 1960; Ob osnovnykh zakonakh khoda i iskhoda sovremennoy voyny (Basic Laws of the Course and Outcome of Modern War), authored by P. I. Trifonenkov and published in 1962; Neobkhodimost' i sluchaynost' v voyne (Necessity and Chance in War), authored by S. A. Tyushkevich and published in 1962; Dialektika i voyennaya nauka (Dialectics and Military Science), authored by S. I. Tyushkevich and published in 1962; Dialektika i voyennaya nauka (Dialectics and Military Science), authored by S. I. Krupnov and published in 1963; O sovetskoy voyennoy nauke (On Soviet Military Science), second edition published in 1964; O voyenno-teoreticheskom naslediy V. I. Lenina (The Military-Theoretical Legacy of V. I. Lenin), published in 1964; Marksim-Leninizm o voyne i armiyi (Marxism-Leninism on War and the Army) published in 1962; Voyennaya strategiya (Military Strategy), the second edition published in 1963; and others which are completely or partially devoted to the investigation of the laws of modern war.

Attention to this problem is completely natural. The military danger is not eliminated as long as imperialism exists, and our military cadres are facing the need to deeply penetrate the nature of a possible war in order to ensure the best execution of the task of strengthening the defense capability of the country and the most rapid defeat of the imperialist aggressors were they to unleash war.

Much has been done in the investigation of the laws of war and armed combat. But nevertheless, the problem cannot be considered solved since, for a number of problems, there are different viewpoints which contradict each other at times. Least investigated remains the methodological side of the problem and this leads to diverse interpretations of individual problems and, at times, engenders an incorrect approach to their solution. Up to now, the relation of the objective and the subjective in military affairs, the laws of war and armed combat, and the relationship of the laws of war and principles of military art have not been completely clear.

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The recently published work by Col. M. V. POPOV concerning the essence of the laws of armed conflict is distinguished from other works which are available in that it focuses primary attention on methodological problems and reveals the most important principles of approaching the solution of a problem. Relying on the results of investigations achieved in Soviet military theory, the author "strived to show the methodology of recognizing the laws and noting their characteristic features and peculiarities (page 4). Characteristic of the entire book is a profound theoretical approach supported by convincing illustrations from the history of wars and military art. The author succeeded in developing a harmonious and to a great degree original system of viewpoints on the laws of armed conflict.

Considering this problem historically, M. V. POPOV evaluates the attempts of representatives of bourgeois military science to find a way to understand the laws of war, and he analyzes the views of individual modern bourgeois ideologies. The book draws the correct conclusion that bourgeois military theoreticians, subconsciously sensing the operation of the objective laws of armed conflict, try to explain their nature and to understand their significance for the course and outcome of war. But they are not capable of doing this because of their class positions and the fallaciousness of their methodology. In solving problems of the laws of war, the bourgeois ideologists switch from voluntarism to fatalism.

Understanding the laws of war is possible only on the basis of dialectical-materialistic methodology, the author discloses the tremendous significance of the statements by V. I. Lenin on the laws of war and armed conflict and his profound analysis of the operation of these laws under conditions of war at the start of the 20th century (page 27).

The book examines the basic stages in the development of the views of Soviet military theoreticians on the laws of war and armed conflict. The author properly stresses that the overcoming of Stalin's cult of the personality opened a broad expanse for the development of Soviet military science and for creative discussion in the press of many important military-theoretical problems, including the laws of war.

The central point in the work is occupied by the second and third chapters which present the author's view on the system of laws of armed conflict and investigate various groups of these laws. We will dwell on the basic features of the contents of the chapters which we have mentioned.

The author absolutely correctly considers the initial theoretical prerequisites for understanding the laws of war and armed conflict to be first, the dialectical-materialistic concept of law and principles and

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M. V. Popov, *Sushnost' zakonov vooruzhennoy bor'ny* (The Essence of the Laws of War), Moscow, Voenizdat, 1964, 134 pages.

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secondly, Marxist Leninist theory is a phe-
nomenon. Nor does the treatment given to these propositions cause
doubts.

It is believed, however, that the author devoted unjustifiedly little attention to one more theoretical prerequisite which can be placed among the first. We have in mind the Marxist solution of the problem of the relationship of subjective and objective phenomena in social development. The author carried a more or less detailed examination of this problem over to the concluding chapter of the book. Perhaps this was the reason for the inadequate treatment of the objective nature of the laws of war which operate on the basis of conditions created to a considerable degree by people in the process of their practical activity.

Subjective and objective categories in dialectical materialistic philosophy serve to explain the relationship between the conscious, purposeful activity of people on the one hand and the historical process as it takes shape on the other. By subject in history we understand the consciousness and the will of people, considered in all the wealth of their social relations, people combined in classes, parties, nations, and making history with their activity.

V. I. Lenin pointed out that an objectively necessary chain of events of social life is made up of the actions of people -- subjects of history: "... all history is made up namely of the actions of personalities who undoubtedly consider themselves leaders (Complete Collected Works, Vol 1, page 159). Each person steps forth as a subject in relation with the world which surrounds him and this also means with respect to other people; each class is a subject with respect to its existence, etc.

The subjective and objective in history are inseparably related to each other. The consciousness and will of people reflect their being and, in the final analysis, are determined by objective conditions. At the same time the consciousness and will of people -- subjects of history -- perform their practical activity on the objective course of history, transforming the surrounding world in the interests of man. Purposeful socio-historic practice represents the unity of the subjective and objective, and their interrelations and interchangeability.

The dialectics of the subjective and the objective has great significance for an analysis of the laws of war and armed conflict. It provides the opportunity to clarify how the purposeful practical activity of people under conditions of war leads to the emergence of objective, essential, stable ties -- the laws of war and armed conflict. The dialectics of the subjective and the objective leads to an understanding of the tremendous role of command personnel, their organizational capabilities, knowledge, experience and will in the attainment of victory.

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The subjective factor stands out as the condition for those objective tendencies which operate in the process of war. Owing to this, the objective relations in war may stand out as the relationships between the goal which is consciously advanced and the means for its achievement, especially as both the goal and the means have a certain objective basis. This means that the law of war and armed conflict can be connected with one pole being the consciousness and the will of the people and their practical activity; this does not deprive the law of its objective character. Such, for example, is the law of the dependence of the course and outcome of war on the relationship of moral and political forces and the capabilities of the combatant sides.

The laws of war and armed conflict are related to each other in the closest manner and represent a definite system. The author of the book believes that a system of the laws of war includes three groups of essential ties and relationships. The first group of laws expresses the "dependence of the course and outcome of war on the economics of the warring powers, their socio-political system, the political-moral state of the population and the army, the level of development of science, and the quantity and quality of armaments" (page 44). The second group of laws of war expresses the "dependence of the means and forms of armed conflict on the political content of the war, on the properties of the weapons and combat equipment, means of communications and signals, terrain, time of year, etc." (page 45). Finally, the third group of laws includes the internal laws of armed conflict concerning operations on strategic, operational, and tactical scales.

In our opinion, this classification of the laws of war and armed conflict is completely acceptable basically. However, it is hardly correct to assert, as the author does, that the second group of laws of war constitutes the external relation of armed conflict with those conditions under which war proceeds. Neither the political content of war nor, what is more, weapons and quality of personnel should be considered only as conditions of war -- these are its integral internal aspects. With respect to the third group of laws, they are the laws of the course and outcome of military operations and differ from the laws of the course and outcome of war primarily according to the scale of phenomena which they embrace and this is also the basis of their qualitative uniqueness.

The difference between the laws of war and the laws of armed conflict which are presented in the book remains insufficiently clear for the reader. Pointing out that there is no absolute boundary between these laws, the author notes: "Any law of war is more or less a law of armed conflict and every law of armed conflict is more or less a law of war as a whole" (Page 45). This proposition for which there is no explanation, cannot be considered satisfactory when the discussion concerns objective laws which either operate in a certain region or do not

...the absence of appropriate conditions. The expression which is presented engenders an incorrect impression of some "partial" or incomplete operation of one or another law.

The book examines in detail the laws which the author has relegated to the second and third groups and, first of all, the relationship of the political content and armed violence in war. Disclosed in this relationship is the essence of war which cannot be unilaterally reduced either to politics or to violence. "In a Leninist definition of war," writes the author, "forming a dialectic unity are the two semantic parts which correspond to the two most important facets of the nature of war: the first -- war is a continuation of politics, and the second -- war is armed violence. As a continuation of politics, any war has its political content and as violence, war is armed conflict" (Page 47).

These thoughts of the author appear to us to be absolutely correct. The specifics of war -- armed conflict -- cannot be considered as something foreign with respect to its essence. The essence of war is many-faceted and this found its expression in the Leninist definition of war.

The book examines the decisive significance of the political content of wars to explain their character. Depending upon their political goals, wars are divided into just and unjust, progressive and reactionary. In addition to that which was said by the author on this question, one must stress the unity of the Marxist evaluation of wars from the point of view of their justification and progressiveness. Just wars cannot be conducted in the name of reactionary goals, and reactionary wars cannot be just. At the basis of an ethical evaluation of wars, Marxism places the conformity or nonconformity of their goals with the interests of the liberation struggle of the laboring masses, with the interests of the progressive development of society. "In history", wrote V. I. Lenin, "there have repeatedly been wars which, despite all the horrors, beastiality, misfortune, and torture inevitably connected with any war, were progressive, i.e., they were of benefit to the development of mankind, helping to destroy especially harmful and reactionary institutions ..." (Complete Collected Works, Volume 26, page 311). Of course, the progressiveness of various just wars is relative. Even the most just war leads to a greater or lesser degree to the destruction of productive forces of society, the development of which is the most profound criterion of progress.

It is especially important to have this in mind in modern conditions where imperialism is threatening humanity with nuclear war. War with the employment of nuclear weapons can undermine the very foundations for the existence of human society and inflict tremendous damage to its progressive development. Therefore, the most important requirement for progress in our time is the prevention of a new world war. Capitalism, as the main obstacle on the way to the progressive development. Therefore, the most important requirement for progress in our time is the prevention of a new world war. Capitalism, as the main obstacle on the way to the

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the progressive development of human society, must and should be eliminated by the revolutionary struggle of the popular masses under conditions of peaceful coexistence of states with different social systems. World war is not necessary for this.

But if the imperialists succeed in unleashing a world war it will consequently be a just war on the part of the socialist countries who are protecting the most progressive social system -- socialism, and who are protecting the interests of the workers of the entire world. If a nuclear war becomes a fact despite the will of the people, the decisive conditions for preserving the achievements of progress and for further development will be the most rapid defeat of the aggressor with the least losses for mankind.

The essential relation between the political content and armed violence in war represents, in the author's opinion, the basic law of war which is formulated in the following manner: "... the political content of a war has a decisive effect on the general nature of armed conflict, on the methods and forms of its conduct, and on the employment of one or another type of armament" (page 53). The author proceeds on the basis that a basic law, in contrast to other laws, does not express any aspects or features of the essence, but the essence itself, and, consequently in a decisive manner, affects all aspects and processes of the development of a given field of nature or social life. The dependence of armed violence in war on its political content, in the opinion of the author, satisfies these requirements to the greatest degree. The operation of a given law permeates all processes of armed conflict from the largest strategic operations to the actions of an individual soldier. "This law," writes the author of the book, "represents the pivot around which the operation of other laws of war and armed conflict develops" (page 54). Attempts have been made repeatedly in our press and in the works of various authors to formulate a basic law of war. M. V. Popov went further than his predecessors in this problem and found, as is thought, a more correct path to its solution. He does not try to include in the basic law all or nearly all the determining relationships of war and, what is more no attempt is made to provide an exhaustive formula for the achievement of victory in the basic law.

The author takes one decisive element and establishes its relation to other aspects of war and armed conflict. Such an approach must be recognized as correct. But nevertheless, the solution to the problem of a basic law of war which is provided in the book apparently requires refinement. The question inevitably arises for the reader: is the relationship of the political content of war and armed violence in it the only decisive relationship determining all the remaining aspects of war and armed conflict? In this, do we not lose sight of the dependence of war and the forms and methods of

waging it on economics without which an understanding of the essence of war will not be completely adequate.

War cannot be comprehensively understood without consideration of the decisive effect on its development of the concrete forms not only of the political content but also of such factors as weapons and the quality of personnel. And these factors are very closely related to the method of production and to the level of development of productive forces and the nature of the social system. Perhaps, therefore, one should speak not of one but at least of two basic laws of war which express the different aspects of its essence.

Of great interest to the reader is the third chapter which examines the laws of armed conflict as an integrated, two-sided process of combat operation of troops. Examined here are many interesting although, in individual cases, debatable propositions. The author shows that the course and outcome of armed conflicts depends on a whole series of internal essential relationships which arise in the course of military operations. "War," writes M. V. Popov, "usually represents a unity of several strategic campaigns which consist of a large number of operations which, in turn, break down into a tremendous number of engagements and battles. And each battle, operation, and campaign has certain limits in time and space which stand out in known limits as an independent process" (page 70). The author also sees in the relative independence of the processes of armed conflict the objective basis for the existence of its special laws. However, without dwelling on this, one should have disclosed the qualitative uniqueness of the processes of armed conflict at its various scales and its difference from war as a whole.

The author formulates four laws of armed conflict: (1) "The dependence of the course and outcome of an engagement (operation) on the correlation of combat power of those armed forces which take direct part in it ..." (page 77); (2) "The essential dependence of the course and outcome of any engagement, battle, and operation on the concentration of the main efforts of the troops of the opposing sides in the decisive direction..." (page 81); (3) "Military operations on an operational-tactical scale from force of necessity are subordinated to the interests of strategy which, in turn, depends on the results of the individual engagements in battles" (page 92); (4) "In any engagement, battle, or operation, the advantage is obtained by the one of the opposing sides which manages to forestall the enemy in deploying his troops in combat formation and operational formations and forestalling him in the initiation of active combat operations" (page 97).

All the aforementioned principles are factually treated in a lively and interesting manner. In our opinion, the most important is the first of the laws. It is closely related to the law of the dependence of the

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course and outcome of all wars on the balance of the military forces of the warring sides but it has its own specifications since it expresses the essential relation of a completely different scale and different content (the combat power of the troops which are directly participating in the battle is not identical with the military forces of the combatant sides).

It seems to us that the matter of the second relationship is somewhat different. V. I. Lenin, as is known, called the requirement to have an overwhelming balance of forces at the decisive point at the decisive moment a "law" for military successes," he placed the word law in quotation marks (Complete Collected Works, Volume 40, page 6), thereby stressing a certain conditionality in use of this concept in a given case. "The law of combat success" is nothing more than in indisputable law of practical activity by following which one can achieve success. In other words, it is a scientifically based principle of military art. Does there lie at the basis of this principle a certain objective tie which determines the course of military operations? Yes, there undoubtedly is such a tie. It consists of the fact that the course and outcome of a battle, engagement, and operation depends not only on the relationship of the combat power of the sides in general but, first of all, on the relationship of forces of the sides on the decisive directions. An objective character is also had by the dependence of success of military operations on an entire front or sector of the front on the success on the decisive sectors. These relationships, taken in the aggregate, have all the indicators of a law of armed conflict.

Essentially, the fourth law is also formulated as a principle of military art. The ability to forestall the enemy in the deployment of combat formations and operational formations and when necessary, also at the start of combat operations -- is a rule of practical activity of the military commander and the troops subordinate to him. Lying at the basis of this rule is the objective relationship in accordance with which the course and outcome of an engagement or an operation depend on the degree of readiness of the troops of the opposing sides for active operations. Combat power of the troops may be completely manifested only under conditions where they adopt combat formations or a specific operational formation and with the corresponding moral-political and psychological preparedness of the personnel.

Thus, in investigating the laws of armed conflict, it is necessary persistently to distinguish the objective laws and principles of military art. The extremely fruitful idea of such a distinction was first developed, by the way, in the other works of M. V. Popov. In this book, this problem is examined in the last, fourth chapter carrying the title "The Relationship of Laws and the Conscious Activity of People in Armed Conflict". The author absolutely correctly considers the principles of military art as the "most general, basic, and guiding ideas on the method

purpose of achieving success in armed conflict" (page 122). In contrast to objective laws, principles always remain within the sphere of consciousness of people, having an objective basis in the laws of war and armed conflict.

These laws by themselves do not provide practical recommendations and instructions for the activity of people. The formulation of various laws states a certain objective relationship and a necessary, existing, and repeated dependence of some processes on others.

On the basis of knowledge of the natural ties of war and military affairs, people work out principles of military art which directly point to the necessity for a certain activity to achieve an assigned goal. "A fundamental difference of any principle of military art from a law of military science," writes M. V. Popov, "is that the principle is not only a concept which states the presence of a certain essential tie in the phenomena of armed conflict and which expresses its basic content, but is also an idea, conclusion, or recommendation for the methods of combat operations of troops" (page 125).

Scientifically based principles of military art, being a subjective reflection of objective necessity, stand out as obligatory norms in the operations of a military chief. At the same time, principles do not paralyze the freedom of his creativity and initiative since they only indicate the general direction of practical activity.

The book discloses the historical nature of the principles of military art. It consists first of all of the fact that principles arose simultaneously with soldiers and will cease their existence together with them. With a change in weapons and equipment, and qualities of personnel, some principles are replaced by others and the content of those principles which retain their significance for the duration of a long period of time is essentially changed. The author shows that such principles as coordination, concentration, and economy of force retain their significance in a nuclear war, too, but their content will be different.

In a short epilogue which closes the book, the concept is expressed that under modern conditions, for the Soviet Armed Forces, special and great significance is had by the explanation of specific laws and law-governed elements of armed combat with the employment of nuclear weapons. The discussion is not only concerning the laws which are examined in the book (the specifics of their appearance in nuclear war is shown by the author as he presents his material), but also of the laws and law-governed elements of combat operations at strategic, operational and tactical scales and of the specific law-governed elements of operation of one or another combat arm in various types of battle.

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In other words, the author is necessary to look for and investigate the law-governed elements of individual facets and fields of military affairs. "It would be incorrect," it says in the book, "to search for in a preconceived manner, the peculiar laws in each specific type of combat operations of troops, for example, in an offensive defensive, in forcing water obstacles, in airborne operations, in combat operations at night, in a forest, or in mountain terrain. Nor should one refrain ahead of time from assuming their existence in these phenomena of armed conflict. Only a scientific investigation can provide the answer" (page 129).

The author does not support these propositions with specific materials. However, the very posing of the problem is completely proper on the grounds that regular ties and relationships should be investigated in various facets and phenomena of armed conflict. Recognition of the qualitatively special field of strategy, operational art, and tactics leads to a recognition of the special natural laws for each of these fields. Dialectical-materialistic methodology proceeds from the fact that natural ties of reality are infinitely varied and there are no limits to their perception by man. It is only necessary to keep in mind that a law is a form of generality and, consequently, every natural tie should not be raised to the rank of law.

The perception of the natural ties of war and armed conflict is not a goal in itself. It should be the basis of expedient activity of command cadres in the building of the armed forces and the leadership of military operations. The book stresses that knowledge of the laws and regularities of armed conflict permit the commander clearly to see the internal dynamics and the moving forces of the development of military operations. "Instead of the apparent chaos of a countless number of large and small events of armed conflict, there stands before him (the commander -- Editor) an aggregate of processes of various scales of military troop operations which are causatively conditioned and necessarily connected with each other" (page 130).

An understanding of the laws of armed conflict is especially important under modern conditions in anticipation of a possible nuclear war; it is capable of making up, to a known degree, for the deficiencies or absence of experience in the conduct of combat operations.

Such are the basic problems raised in the book "The Essence of Laws of Armed Conflict." Their brief analysis permits drawing the conclusion that this book represents original research on the important methodological problems of Soviet military science which represents a step forward in comparison with the works which are presently available in this field. The presence of a number of new propositions which have been set forth in the book bespeaks the bold and creative approach of the author to the solution of the problem and its high general

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Restrictive level. It can be said with confidence that the work of M.V. Popov will cause great interest among military readers and will be of great value to the officers in the Soviet Armed Forces in their creative mastery of modern military theory.