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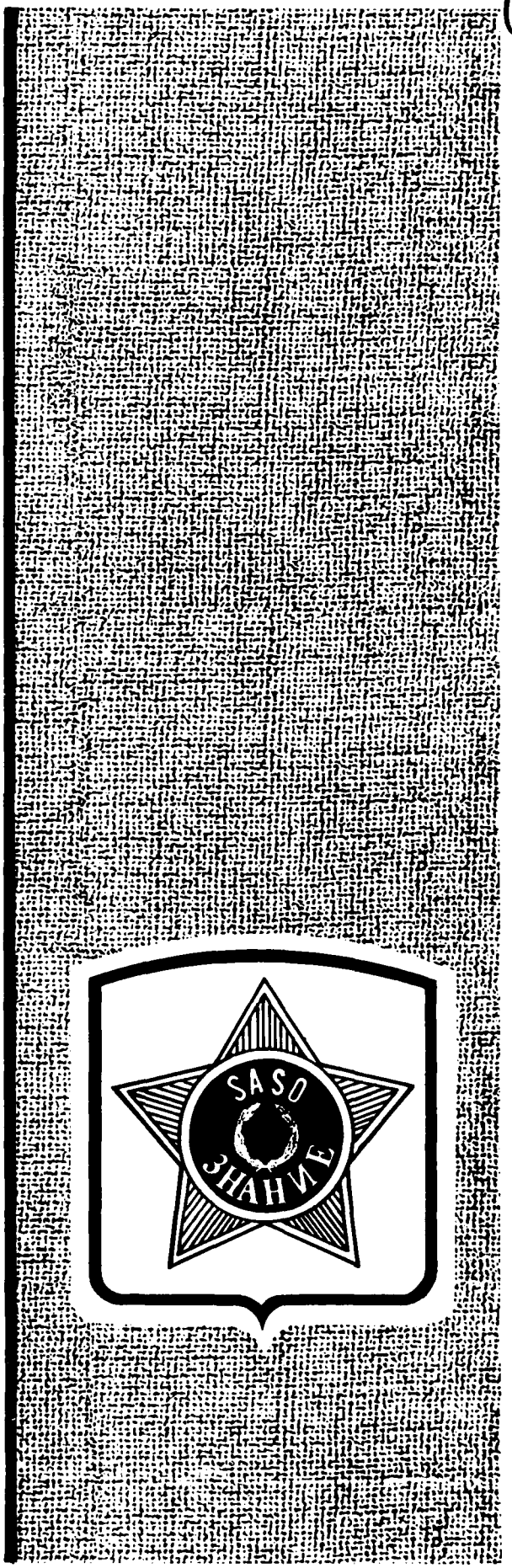
THE METHODOLOGY OF FORESIGHT AND FORECASTING IN SOVIET MILITARY AFFAIRS



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THE METHODOLOGY OF FORESIGHT AND FORECASTING IN SOVIET MILITARY AFFAIRS*

by

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*This article is based upon a larger study, "Foresight and Forecasting in Russian and Soviet Military Affairs," which the author undertook while a reseach fellow with the Center for Strategic Technology of the Texas A & M University System. That study and this essay benefitted from the valuable comments and criticisms of many scholars, including Drs. Richard Thomas, Lynn Hansen, John Erickson, and Alan Rehm. The views expressed here are those of the Soviet Army Studies Office. They should not necessarily be construed as validated threat doctrine.

THE METHODOLOGY OF FORESIGHT AND FORECASTING IN SOVIET MILITARY AFFAIRS

In spite of a growing body of Soviet military literature which expressly addresses the problem of foresight and forecasting in military affairs, very little has been written on this important topic in the West. Professor John Erickson has pointed out that "Forecasting has become something of a favourite Soviet pastime, indeed more than that, for it has been endowed with a certain ideological rectitude . . . ."[1] Forecasting [prognozirovanie], which includes highly sophisticated techniques employed in operations research and systems analysis, in this context, has become a basic tool in the exercise of foresight [predvidenie], and foresight in the political and military realms is viewed as a weapon, which the skilled commander wields against his opponent. While Soviet authors freely acknowledge all the difficulties associated with foresight in military affairs, making it much more difficult than in other realms, they still see the skill as a key to victory over an opponent.

> Foresight (military) is the process of cognition of possible changes in the area of military affairs, the determination of the perspectives of its future development. The basis of the science of foresight is knowledge of the objective laws of war, the dialectical-materialist analysis of events transpiring in a given concrete-historical context.[2]

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[1] John Erickson, "The Soviet Military and the Future or the Future of the Soviet Military -- Pre-Conference Paper," in: Richard Thomas, ed., Proceedings of a Conference on: The Soviet Military and the Future (College Station, Texas: Center for Strategic Technology, Texas A & M UNiversity, 1983), I-1.

[2] Voennyi entsiklopedicheskii slovar' (Moscow: Voenizdat, 1983), 585.

Over the last decade foresight and forecasting have taken on an increasing importance because of the accelerating pace of change in military affairs. As General of the Army I. E. Shavrov and Colonel M. I. Galkin observed in 1977:

> The contemporary period of military construction is characterized by the unprecedented intensity of the renewal of the means of war, the appearance of qualitatively new types of weapons and equipment, by searches for such forms and means of strategic, operational and tactical action, which have never be employed by a single army of the world. New means of the conduct of military actions, new ways of perfecting the organization structure of the armed forces, methods of their combat preparation and raising their combat readiness must be found and theoretically substantiated before they can become the property of military praxis. All this leads to as a sharp rise of the role of military science, which has become the most important factor of the combat might of the armed forces, and scientific troop control is the decisive condition for the achievement of victory.[3]

The relationship between military science and foresight is explicit, for, as these authors emphasize, "In its essence, military science is the science of future war."[4]

To understand this Soviet methodology of foresight and forecasting in military affairs one begins with the central role of Marxism-Leninism in shaping the "worldview" of the Soviet military theorists and forecasters. The starting point for any assessment of the impact of ideology begins with the recognition that Marxism-Leninism forms the prism through which all trends

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[3] I. E. Shavrov and M. I. Galkin, eds., metodologiia voenno-nauchnogo poznaniia (Moscow: Voenizdat, 1977), 3-4.

[4] Ibid., 64.

are filtered and analyzed.[5] The most critical element of the ideology remains its commitment to change the world. For the adherents, it is not enough to understand trends; one must struggle to shift them in favor of socialism. Such basic concepts as "correlation of forces" carry with them this notion of dynamism, change, and the requirement to direct those processes. The Marxist-Leninist approach to systems analysis is quite explicit in its critique of bourgeois or Western applications of the same method without a coherent, conscious ideological position:

> One of the basic deficiencies of all variants of bourgeois system theories . . . , especially those based on general systems theory, it is said, is that they cannot explain changes in social systems, where intersocietal or international; they cannot point out a basic factor that motivates the changes and they cannot discover the mechanism of the changes. [6]

There are several key features which differentiate Soviet and Western approaches to foresight. As the above quote suggests, the first one is the central and conscious role of ideology in shaping the Soviet vision of the future. Under the guidance of the Communist Party, Marxist-Leninist Ideology tolerates no contradiction between objectivity and partisanship (partiinost'). Indeed, it proclaims that only a declaration of partisanship to the cause of socialism and the working class will guarantee the

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[5] V. K. Konoplev, Nauchnoe predvidenie v voennom dele (Moscow: Voenizdat, 1974), 127.

[6] Julian Lider, Correlation of Forces: An Analysis of Marxist-Leninist Concepts (New York: St. Martin's Press, 1986), p. 20.

true objectivity of the forecaster and the actor, whether he be party apparatchik or military commander.

A second critical element of the ideology is its emphasis upon dialectical materialism as a concept fundamental to an analysis of all trends. To begin with, Marxist-Leninist philosophy posits the existence of a reality whose ultimate essence flows from matter, not idea. The point of departure, then, is philosophical materialism, which defines things in the objective world in general and the relationship of human society to them in particular. As an integral part of the overall unifying vision, the notion of the dialectic stresses both cohesiveness and constant change. All phenomena are inter-connected, and all are inter-dependent. Moreover, phenomena interact as parts of a totality, changing along lines of progression and reaction to progression which give rise to still more contending lines of progression. It is this contention, or "inter-penetration of opposites," that Marxist-Leninists label the dialectic.

It is also this vision of changing reality that establishes the intellectual perspective from which various aspects of the physical and social world are understood. Empirical data, that is, information derived from the senses, can be correctly interpreted only within the context of the inter-relationships flowing from dialectical materialism. For example, the future development of the military can be understood only within the context of trends (or contending lines of progression) affecting

economic, social, political, scientific, and technical developments in general and within the two competing world social systems (capitalism and socialism) in particular. These two systems are in turn dominated by the nature of their class relations, which both shape each system's consciousness and mold its institutions. By extension into the realm of the military, dialectical materialism serves as the conceptual basis for a system of laws of military science, which find their expression in Marxism-Leninist teachings about war and the army.[7]

One of the more basic assumptions engendered in the dialectic and its various social manifestations is the idea that war is a continuation of politics, i. e., class politics, by other, i. e., violent, means. Class struggle can assume the form of overt conflict in a systemic war between capitalism and socialism. Or, as is more probable, class struggle can assume the form of overt and/or covert conflict in local wars either of national liberation or protection of a socialist state from internal counter-revolution and capitalist intervention. Within the general scheme, defense of the Soviet Union and the Socialist Commonwealth remains the most fundamental mission of the Soviet and Warsaw Treaty Forces. Conceptions of warfighting capabilities thus go hand-in-hand with a political strategy designed to enhance Bloc security, undermine NATO solidarity,

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[7] V. Morozov and S. Tyushkevich, "On the System of Laws of Military Science and the Principles of Military Art," Voennaia mysl', No. 3 (March 1967), 17.

neutralize the political will of some NATO members, and avoid the onset of hostilities. At the same time, the rise of "chauvinistic nationalism" in the People's Republic of China creates a need to assess the content, direction, and long-range stability of that power's anti-Soviet entente with the leading capitalist powers. Always the Soviet military forecaster must prudently balance his attention between that which is potentially more decisive and that which is more probable, the latter category including conflict in the Third World.[8]

For the Soviet military forecaster, as for any forecaster operating with reference to Marxism-Leninism, there are three specific "laws" of the dialectic which must be applied to any exercise in foresight.[9] Foresight is not prediction [predskazenie], for predictions implies a determined outcome without requiring any action by the subject. Foresight, on the contrary, is a tool or weapon used by the subject to act upon the objective world. "The capacity to engage in foresight is the most

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[8] E. Rybkin, "Marksizm-Leninizm kak metodologicheskaia osnova dlia prognozirovanii voennykh sobytii," Voenno-istoricheskii zhurnal, No. 7 (July 1980), 3-10.

[9] The Soviet literature on forecasting is quite extensive. Relevant works on the role of ideology in social, economic, political, scientific, and technological forecasting include: I. V. Bestuzhev-Lada, "Okno v budushchee, (Moscow: Mysl', 1970); D. M. Gvishiani, "Dialektiko-materialisticheskii fundament sistemnykh issledovanii," in Filosofskie aspekty sistemnykh issledovanii: Trudy filosofskogo metodologicheskogo seminara (Moscow: VNIISI, 1980), 3-8; and D. M. Gvishiani, ed., Nauchno-tekhnicheskii progress: Programmnyi podkhod (Moscow: Mysl', 1981).

important quality of military cadres."[10] Foresight is not easy in military affairs where random events abound and where the commander must constantly confront the vexing problem of inadequate information about the enemy, his forces, capabilities, and intentions. The "laws" of dialectical materialism do not negate these problems but, rather provide a method for dealing with uncertainties. In a struggle with an adversary who approaches foresight strictly on an intuitive basis, these laws are supposed to provide a relative advantage in application. The application of the laws are founded upon concrete historical analysis and are akin to the etudes [etiudy] of a chess master, who uses such exercises to sharpen his ability to see five and more moves in advance in order to link together his opening moves, middle, and end game into a complete whole.[11]

The first of the laws of dialectical materialism is the law of the unity and struggle of opposites, which characterizes the very causes of development. In military affairs this law finds its expression in the constant tension and mutual interaction of

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[10] Voennyi entsiklopedicheskii slovar', (Moscow: Voenizdat, 1983), 585.

[11] Webster's Ninth New Collegiate Dictionary defines etude as study or a piece of music for the practice of a point of technique. In Russian etiud (etude) applies to both music and chess. Thus, Triandafillov gave his essay on tactical aspects of the Perekop-Chongar Operation of 1920 the subtitle of takticheskii etiud [tactical study] thereby making the link between chess and foresight. See: V. Triandafillov, "Perkopskaia operatsiia, (takticheskii etiud)," A. S. Bubnov, S. S. Kamenev, and R. P. Eideman, eds., Grazhdanskaia voina, 1918-1921 three volumes (Moscow: Voennyi Vestnik, 1928-1930), I., 339-357.

means of attack and defense upon one another.[12] The well-known struggle between naval artillery and armor would be a prime example of this law at work, as would be the contemporary struggle between tanks and PGMs. It also finds its expression in the Soviet approach to forms of conflict. Thus, in the early 1930s leading Soviet military theorists-practitioners, including A. S. Bubnov, S. S. Kamanev, M. N. Tukhachevsky, and R. P. Eideman, explored the relationship between guerrilla warfare and conventional warfare as a burning issues of military theory:

> Partisan warfare during the Civil War often assumed a completely independent significance. One can count on the fact that warfare of such a type in future European class wars and in the national-liberation wars of the nations of the East will become the perfect fellow-traveler of regular warfare. Because of this one of the immediate tasks for theoretical work of our military-scientific theory is: the study of the nature of modern "partisan warfare" and the establishment of a forecast for the future.[13]

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[12] Konoplev, Nauchnoe predvidenie v voennom dele, 68-70.

[13] A. S. Bubnov, S. S. Kamanev, M. N. Tukhachevsky, and R. I. Eideman, eds., Grazhdanskaia voina, 1918-1921: Operativo-strategicheskii ocherk boevykh destvii Krasnoi armii, (Moscow: Gosizdat, Otdel Voennoi Literatury, 1928-1930), 18. This did not remain idle intellectual speculation, but during the 1930s was closely tied to the study of the local wars of the period, including the Italo-Ethiopian War, Spanish Civil War and the Sino-Japanese War. Thus, during the Sino-Japanese War, in which Soviet officers served as advisors to the Chinese forces, the application of guerrilla tactics by the 8th Route Army of the Chinese Communist Party, merited serious attention. In 1939, N. Argunov published an article in which he outlined the development of partisan warfare, addressed its impact on the Sino-Japanese conflict, and called attention to the ten basic rules of partisan tactics which had been worked out on the basis of the 8th Route Army's experience. See: N. Argunov, "Partizanskaia voina," Voennaia mysl', III, No. 6, 78-81.

The second law is that of quantitative to qualitative change, which attempts to describe the effect produced by a series of incremental (quantitative) changes gradually accumulating to cause a sudden (qualitative) breakthrough. This law warns the Soviet analyst to avoid extrapolations along simple trend lines and directs him instead to look for points at which sufficient quantity will bring about a qualitative shift. Or to put matters bluntly in relation to military technology, a few tanks do not make for mechanized warfare. The Soviet forecaster must look for those developments which promise qualitative leaps and provide an assessment of when they might be expected. This is one area in which mathematical methods (operations research) have been applied since the late 1950s.[14]

The third law of the dialectic is the negation of the negation. Development never proceeds in a straight line. One trend (thesis) as it asserts itself is the dominant one, leading to the emergence of a counter-trend (antithesis) which negates the first, leading in turn to a final negation of the negation and a new trend (synthesis).[15] Accordingly, the development of rifled weapons radically transformed infantry tactics and negated smoothbore muskets and field guns. However, new breakthroughs in technology led to the development of a whole range of rocket weapons, which, in turn, replaced rifled weapons in a number of

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[14] S. I. Krupnov, Dialektika i voennaia nauka (Moscow: Voenizdat, 1963), 100-126.

[15] I. A. Grudinin, Dialektika i sovremennoe voennoe delo (Moscow: Voenizdat, 1971), 6ff.

combat arms. No weapons system or combat arm is ever seen as definitively decisive but is viewed as but one more aspect within the inter-connected process (or continuum) of development. In 1982, Marshal N. V. Ogarkov, then-Chief of the Soviet General Staff, applied the law of the negation of the negation to his analysis of current trends in the development of military art and the force structure of the Soviet military. He identified this very process at work in the development of aerial anti-tank weapons.[16]

A third critical element of the Marxist-Leninist approach to foresight is the strict canon that while theory must inform praxis, praxis, i. e. practical application, can and must inform theory. As major General V. K. Konoplev observed, "praxis [praktika] is the basis and motive force of foresight." Since the evaluation of all praxis must by its nature involve historical research, the emphasis is upon a method to find and analyze past phenomena in search of trends--but inside an existing theory. The theory can and must be adapted to new circumstances, and it cannot be consigned to an irrelevant role. Under military praxis Konoplev lists: "the production of weapons and equipment, combat and political preparation, training and education of military personnel and finally, what is the main element -- armed struggle."[17]

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[16] N. V. Ogarkov, Vsegda v gotovnosti k zashchite otechestva (Moscow: Voenizdat, 1982), 41-45.

[17] Konoplev, Nauchnoe predvidenie v voennom dele, 6, 13.

As early as 1929, as part of their effort to infuse Marxism-Leninism into military science, Soviet military analysts had begun to incorporate the analytical concept of future war [budushchaia voina] into their efforts at foresight in military affairs. One of the first such works was V. K. Triandafillov's The Nature of the Operations of Contemporary Armies, which became both a basic work in the development of Soviet theory of operational art and a model for the method of engaging in foresight in military affairs.[18] Triandafillov's contribution to Soviet military theory was substantial, but his work should not be viewed in isolation. Like Newton, he stood on the shoulders of others.

Triandafillov's approach deserves substantial attention because of both its content and impact. His book begins with a treatment of technological developments in the decade following World War I beginning with infantry weapons and moving on to artillery, chemical weapons, tanks, communications and engineering support, and aviation. He examines not only the current status of such weapons but also the foreseeable trends in their further development. Triandafillov then turns to the most burning question of the day: whether future armies would be small, professional, mechanized forces or million-man, mass armies. On the basis of an analysis of capitalist societies, he

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[19] V. K. Triandafillov, Kharakter operatsii sovremennykh armii (Moscow: Gosvoenizdat, 1929), and Sovetskaia voennaia entsklopediia, 2 vols. incomplete (Moscow: Gosudarstvennoe Slovarno-Entsiklopedicheskoe Izdatel'stvo, 1933), II, cols. 843-344.

concluded that mass, mechanized armies would dominate future battlefields. Writing in the late 1920s, he divided Europe into two military spheres, i. e., the Western advanced capitalist zone and the Eastern underdeveloped zone, in which he included the Soviet Union. In the West, mass, mechanized warfare was already possible, but in the East underdevelopment of the various national economies meant that armies were based on a "peasant rear." In the East, mechanization would be an addendum to traditional armies so long as the level of economic development precluded effective mechanization of these armed forces. Experiments with small mechanized units to enhance the combat capabilities of the various combat arms were foreseen, as in the case of adding light tanks and armored cars to strategic cavalry.[19] Based on these assumptions, Triandafillov addressed the problems of mobilization and sustainment. He concluded the first section of his book by turning his attention to force structure and addressing the problem of combined arms and the logistical support of a modern army in the field.

Having set the context, he now shifted his focus to the content of the operations of modern armies. Here he defined the densities of various forces during deployment and initial phase of an operation. In his discussion of the operation itself Triandafillov assumed a need to achieve sufficient force to secure a breakthrough of a prepared defense and to sustain an

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[19] Triandafillov, Kharakter operatsii sovremennykh armii, 70-72.

advance into the depths of the enemy position. He posited various norms, i. e., densities of men and fire, to accomplish these tasks, i. e., penetration, breakthrough, exploitation, and pursuit and identified the objective limitations, which affected the conduct of such deep operations. This analysis led him to the conclusion that no single operation could be decisive and that strategic victory would go to the force which could conduct a series of successive operations, tied together by a coherent design. The question of integrating tactical engagements into operational successes and operational successes into strategic victory led him to address in detail two other problems associated with the operational level of war, i. e., troop control and logistic capabilities.[20]

Triandafillov embodied the essence of Soviet military science's approach to foresight in military affairs during one of its most dynamic and innovative periods. Crucial to this approach was the incorporation of an explicit assessment of the international correlation of forces and trends in its development. Soviet analysts assumed and still assume an on-going systemic conflict between the socialist and capitalist systems. The Soviets have, however, shifted focus within their analysis of the likelihood of armed struggle. In the late 1920s Triandafillov asserted that the central military threat to the USSR came from underdeveloped successor states in Eastern Europe which bordered on the Soviet Union. French military assistance

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[20] Ibid., passim.

to such states was assumed, but their low level of development radically limited their ability to absorb modern weapons. By the early 1930s Triandafillov was revising his work to postulate a direct conflict with major capitalist powers as a result of the Great Depression, increased instability in the capitalist system, and a more overtly anti-Soviet policy on the part of a number of major states.[21] By the mid-1930s Soviet military forecasters were agreed that Nazi Germany and imperial Japan had become the chief threats to the USSR. According to M. V. Zakharov, Marshal B. M. Shaposhnikov, who served as Chief of the Soviet General Staff during the late 1930s, revised the threat estimate for the Third Five Year Plan to address this issue.[22] In the immediate post-World War II period, Soviet threat assessments could focus on a single major capitalist opponent and its network of alliances. For a time, the relative stability of the political-military side of the doctrinal equation seemed to make some aspects of foresight and forecasting relatively simple. However, after 1953, changing perceptions of rapid progress in science and technology, which the Soviets have termed the scientific-technical revolution, seemed to call for a drastic revision of some of the more traditional assumptions underlying forecasting.

The traditional approach owed its origins to the first three decades of Soviet military history, when scientific discoveries

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[21] Ibid., 3rd Edition (1937), 234-235.

[22] M. V. Zakharov, "On the Eve of World War II (May 1938-September 1939)," Soviet Studies in History, XXXIII, No. 3 (Winter 1984-1985), 87-121.

had led to new technologies which initially had only immediate tactical application. Only mass production and tactical innovation could endow such "leaps" with operational impact. In the 1920s, A. A. Svechin, the first Soviet author to address the problem of strategy in a comprehensive fashion, distinguished between technological surprise, which was a near impossibility to achieve, and the critical struggle for the technological initiative.[23] Svechin proposed both an active program of technological intelligence to study all foreign developments with military ramifications and the concealment of one's own weapons development programs until such new weapons had been thoroughly integrated into army tactics and were available in large masses so that they would have a capital impact on the course and outcome of their combat employment. The emphasis was upon combined arms application and the achievement of operational results through a combination of new means and methods on a massive scale, quite unexpected by the opponent. Operational techniques included a wide range of approaches to the echeloning of forces depending upon an operation's objective, the availability of forces and means for the offensive, the nature of the enemy's defense, the time available for the planning and execution of the operation, and the terrain. Operational planning relied upon maskirovka both to conceal the effort and deceive the enemy and demanded from Soviet commanders creativity

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[23] A. A. Svechin, Strategiia, 2nd Edition (Moscow: Voennyi Vestnik, 1927), 68-70.

to avoid stereotypical solutions which would reveal to the enemy the scope, scale and/or timing of the operation.

With some success, this framework governed the Soviet approach to the problem of technological initiative both before and during the Great Patriotic War. Stalinist industrialization had simultaneously sustained an impressive program of weapons development and permitted the Soviet military to seek both mass and mobility. The struggle for the technological initiative at the tactical level thus became linked to the problem of achieving surprise at the operational level of war.[24] A well-developed and coherent series of operational successes throughout the depth of the enemy's defenses became the acknowledged path to strategic victory.

All this held true until the 1950s, when nuclear weapons and modern delivery systems, i. e., ballistic missiles, seemed to negate time-proven perception and process. After the death of Stalin in 1953, the Soviets found themselves standing military affairs on its head in assessing a military-scientific revolution which was having an immediate and profound impact at the strategic level. This was the basic line taken by the initial (1962) edition of Marshal V. D. Sokolovsky's Military Strategy.[25]

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[24] M. M. Kir'ian (ed.), Vnezapnost' v nastupatel'nykh operatsiiakh Velikoi Otechestvennoi voiny (Moscow: Nauka, 1986), 86-102.

[25] V. D. Sokolovsky (ed.), Voennaia strategiia, 1st Edition (Moscow: Voenizdat, 1962).

Nuclear-rocket weapons not only led to the emergence of new branches of the armed forces but also recast the content and significance of certain basic analytical categories of military science and art, including concentration of forces in the decisive direction, economy of force, partial victory, strategic deployment, the strategic offensive, strategic defense, and strategic maneuver. In 1964, Major General S. Kozlov saw these changes from the perspective of the military foresight and forecasting process:

> Soviet military science has discerned all these new phenomena of armed struggle. It has defined the essence of the deeply revolutionary processes, which are taking place in military affairs; it has researched and evaluated the conditions under which they inevitably appear. As a result, it has been able to give a coherent, scientifically-based concept of the character of modern war, which is, as opposed to what happened in the past, based not so much on the experience of past wars, as on scientific foresight and a forecast of a possible future.[26]

Explicit in Major General Kozlov's analysis of the dominant combat arms in a "nuclear-rocket war," was a vision of future armed conflict which either negated the significance of past combat experience or rendered it largely irrelevant under the new conditions.[27] During the 1960s, the one-sidedness of such analysis was a subject of intense ferment within the Soviet military, and explained, in part, why Sokolovsky's Military

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[26] S. Kozlov, "K voprosu o razvitii sovetskoi voennoi nauki posle vtoroi mirovoi voiny," Voennaia mysl', No. 2 (February 1964), 64.

[27] Ibid., 65.

Strategy went through three editions in six years. Some of the ferment was probably also the result of shifts in US and NATO doctrine towards "flexible response" with its search for viable alternatives to massive retaliation.[28]

At the same time, the Soviet debate was also driven by the need to re-estimate the impact of nuclear weapons on the whole range of conflicts which could be understood under the rubric of "future war." On the one hand, the quantitative growth of the nuclear arsenals of the two superpowers and the arsenals' continual qualitative modernization within less than two decades created a situation which negated the mass use of such weapons by threatening both sides with "catastrophic consequences." On the other hand, the simultaneous modernization of conventional armaments, which included the development of precision guided munitions, having a destruction power corresponding to small nuclear weapons, again raised the prospect of fighting a relatively long war with conventional weapons.[29]

Over the last decade or so, the reversion to a conventional theater-strategic option should be understood as a true "negation of the negation." As Colonel General M. A. Gareev has pointed out, the revitalization of such categories as massing of forces

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[28] P. G. Bogdanov, M. A. Mil'stein, and L. S. Semeiko (eds.), SShA: Voenno-strategicheskie konseptsii (Moscow: Voenizdat, 1980), 51-52; and S. A. Tiushkevich, Filosofiia i voennaia teoriia (Moscow: Nauka, 1975), 182-183.

[29] M. A. Gareev, M. V. Frunze - voennyi teoretik (Moscow: Voenizdat, 1985), 239-243.

and means on the main direction, strategic deployment, and mobilization has been infused with a new content. Within this process we can discern two conflicting sources of praxis by which to assess the direction of the development of military art. On the one hand, the scope and scale of theater-strategic operations have made the experience of the Great Patriotic War relevent to a host of problems associated with operational art and troop control. On the other hand, the actual use of modern conventional weapons systems such as PGMs, airmobile forces, air defense weapons, and electronic warfare in "local wars" has made such conflicts a particularly vital topic for study in forecasting changes in the nature of warfare.[30] As Marshal S. F. Akhromeev, current Chief of the General Staff, has noted, "One must remember that changes in the nature of wars now take place more rapidly and this means that our reaction to these changes, to the demands of Soviet military art and to the structure of the Armed Forces must be more energetic."[31]

Soviet and Warsaw Pact military specialists have addressed the problem of adapting forecasting techniques to the process of foresight in military affairs. In their approach these authors

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[30] I. Shavrov and M. Galkin, (eds.), Lokal'nye voiny: Istoriia i sovremennost' (Moscow: Voenizdat, 1980). For a discussion of this analytical process in action see: Jacob. W. Kipp, Naval Art and the Prism of Contemporaneity (College Station, Texas: Center for Strategic Technology Stratech Papers, 1984).

[31] S. F. Akhromeev, "Rol' Sovetskogo Soiuza i ego Vooruzhennykh Sil v dostizheniia korennogo pereloma vo vtoroi mirovoi voine i ego mezhdunarodnoe znachenie," Voenno-istoricheskii zhurnal, No. 2 (February 1984), 24.

have looked to mathematical modeling to assist them in weapons development, force structuring and the perfection of the means and methods of armed struggle.[32] In the late 1960s, Marshal Sokolovsky and Major General M. Cherednichenko addressed the problem of evaluating and forecasting the impact of economic and scientific-technical capabilities on the development of weapons systems. The authors made three related points: first, they noted the long lead time required for the research and development of modern weapons systems, which they estimated at 10-15 years. Second, they called attention to the relatively short time span over which a new weapons system had its optimal effectiveness, which they estimated at 5-7 years. Third, the authors asserted that forecasting in the strategic realm had to take into account "military, economic, scientific, technical, . moral, and political factors, the stability of a coalition, the relationship of world political forces, the geographic positions of the sides, the degree of vulnerability among the states and their armed forces."[33]

In the realm of weapons development Soviet authors have paid particular attention to two crucial methodological approaches. The first prescribes the examination of any weapon within its systemic context. This approach can be seen at work in

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[32] I. E. Shavrov and M. A. Galkin, eds., Metodologiia voenno-nauchnogo poznaniia, 372-397.

[33] V. Sokolovsky and M. Cherednichenko, "Military Strategy and Its Problems," Voennaia mysl', No. 10 (October 1968), 37-41.

Lieutenant General I. I. Anureev's writings on weapons of missile and space defense.[34] Although he based his conclusions upon an analysis of US programs in these areas, the author took into account certain trends in the development of weapons technology, which would transform space from an ancillary sphere into an arena of armed conflict. Anureev also employed a systems methodology to address the second crucial component of the Soviet approach to forecasting weapons systems development: the examination of trends in the development of the natural sciences which would directly impact upon military affairs and indirectly through feedback.[35] In this regard he borrowed from conclusions drawn by other Soviet forecasters to note an accelerating trend in the sheer output volume of scientific-technical information. The difficulty confronting the military forecaster could be seen by juxtaposing two related observations. The research and development cycle of a major weapons system was 10-15 years. During that same period, based upon world statistics on the natural sciences for the three preceding decades, the volume of information would have doubled. Indeed, Anureev noted, "by 1985 it may exceed by fivefold the volume of information existing in 1965."[36] Not surprisingly, Anureev championed mathematical

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[34] I. I. Anureev, Oruzhie protivoraketnoi i pritivokosmicheskoi oborony (Moscow: Voenizdat, 1971), 259 ff.

[35] I. I. Anureev, "The Correlation of Military Science with the Natural Sciences," Voennaia mysl', No. 11 (November 1972), 31-32.

[36] Ibid., 34.

simulations, systems analysis, and Delphi techniques as means of forecasting this complex process and its correlation with military science. He identified a series of questions to be addressed, including the forecasting of new areas of scientific inquiry and of new sciences themselves in the process of differentiation and integration, the probable timetable of the practical implementation of basic scientific discoveries, and inter-connections of the sciences.

Anureev also left guideposts to what he saw as the must crucial areas in future military development. In an article on military science and the natural sciences, Anureev drew attention to the link between military science and quantum mechanics, which he associated with lasers and particle beams, and stated that this connection would "lead to the development of new areas of tactics, operational art and strategy."[37] He also directed his readers' attention to the problem of applying advanced scientific-technical means to the development of troop control.[38] It is of some interest that already in 1971 this leading authority on problems of missile and space defense had drawn attention to what he labeled "the project for an American air-space aircraft." In 1973, he went on to author a major Soviet

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[37] Ibid., 34-35.

[38] Ibid., 36.

study of the development and potential applications of multi-use space transports or "shuttles."[39]

Anureev's startling conclusions lead to two final points regarding the application of forecasting techniques to foresight in military affairs. Given the increasing pace of scientific-technological development and the accelerating costs associated with the research and development of modern weapons systems, Soviet forecasters have pointed towards the application of mathematical simulations to the problem of abrupt changes.[40] At the same time, Soviet forecasters have noted the need to extend the range of their forecasts into the more distant future in order to accommodate the demands of the overall planning process. Drawing upon materials from the XXIV Party Congress of 1971, Konoplev pointed to the need for establishing long-range planning of up to 10-15 years in the area of the national economy. Such long-term planning, in turn, would require even longer-term forecasts relating to the direction of the development of the national economy in general and to military affairs in particular. His assertions implied a demand to aid decision-makers by pushing forward the frontiers of military forecasting

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[39] Anureev, oruzhie protivoraketnoi i protivokosmicheskoi obcrony, 75-76; and Rakety mnogokratnogo ispol'zovaniia (Moscow: Voenizdat, 1975). For an examination of the ramifications of such developments for the future air and space defense see: Jozef Smoter, "Operation of National Air Defense in a Possible Future War," Przeglad Wojsk Lotnicznych i Obrony Powietrznew Kraju, No. 9 (September 1982), 5-12.

[40] Yu. V. Chuyev and Yu. B. Mikhailov, Forecasting in Military Affairs (Washington, DC: GPO, 1980), 180-193. The original Russian edition was published in 1975.

to another generation of weapons beyond those currently under development, i. e., another 10-15 years, and beyond.[41]

The scale and complexity of modern weapons systems such as air defense, missile defense, space defense, and automated systems of control have mandated the application of systems design engineering [sistemotekhnika] to their planning, design and elaboration. Based upon the application of systems analysis, mathematical modeling, and operations research, systems design engineering addresses both the characteristics of each system's major component parts and the laws governing the functioning of the entire system. Two leading Soviet specialists on systems design engineering have argued that it is particularly in this area where the art of military leadership must adapt to the scientific-technical revolution in military affairs.[42]

The imperative associated with this process and its implications for the further development of the Soviet Armed Forces are outlined in Lieutenant General M. M. Kir'ian's treatment of military-technological progress over the period 1917-1980. Kir'ian and his fellow authors treated the interrelationships and mutual connections between weapons development, force structure, and military art within seven distinct periods: the Civil War, NEP, socialist industrialization, on the eve of the Great Patriotic War, during

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[41] Konoplev, Nauchnoe predvidenie v voennom dele, 57-58.

[42] V. V. Druzhinin and D. S. Kontorov, Voprosy sistemotekhniki (Moscow: Voenizdat, 1976) 13-20.

the Great Patriotic War, in the postwar period, and during the era of the scientific-technical revolution in military affairs.[43] In his concluding remarks on the era of the scientific-technical revolution, Kir'ian left the impression that the very pace of innovation had created another on-going revolution in military affairs, far deeper in its impact and long-term potential than that associated with nuclear-rocket weapons. He observed:

> The scientific-technical revolution has sharply increased the pace of material-technical equipping and rearming of the Soviet Army and Navy. In the course of the last 10-15 years two-three generations of missiles have been replaced; a significant part of the park of aircraft, submarines, surface ships, artillery, tanks, rifle and other arms, combat and special equipment have been renewed. A fifth generation of computers has been adopted.[44]

This observation, coupled with an appreciation of the Soviet approach to foresight and forecasting in military affairs, should makes us conscious of the fact that in Soviet eyes a struggle for foresight is underway, a struggle which they believe will shape the very nature of the future itself. In a recent article in the Journal of the Ground Forces Colonel Stanislaw Koziej of the Polish Peoples Army provided a vision of the direction of changes in ground force tactics under "the influence of the development and introduction of precision weapons and helicopters on an increasingly borader scale, as well as the rapid tempo of

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[43] M. M. Kir'ian, (ed.), Voenno-tekhnicheskii progress i Vooruzhennye Sily SSSR (Moscow: Voenizdat, 1982).

[44] Ibid., 326.

electronization and automation of the basic processes of combat."[45] Colonel Koziej identifies five basic directions of the transformation of ground force tactics:

> the transformation of traditional ground combat into air-land combat; broadening the role of mobility in all actions of troops; the development and generalization of training of combat actions within enemy formations, especially raiding actions; the initiation of battle at increasingly greater distances; [and] the growth of the significance of the "information struggle," which has as its objective to steer the enemy in the direction of one's own plans and intentions.[46]

Just as there is a struggle for the mind of the opposing commander, so too there is a struggle for the future itself, which sees military power as only one of many means of political struggle and very much addresses perceptions of changes in the correlation of forces. Socio-political asymmetries give rise to doctrinal and strategic asymmetries, and in the Soviet view the side which succeeds in imposing its vision upon the future will have used foresight and forecasting decisively, even if the competing systems never shift from deterrence and low intensity conflict to war-fighting.

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[45] Stanislaw Koziej, "Przewidywane kierunki zmian w taktyce Wojsk Ladowych," Przeglad Wojsk Ladowykh, No. 9, (September 1986), 9.

[46] Ibid..