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USSR Report

MILITARY AFFAIRS

(FOUO 5/82)

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CONTENTS

MILITARY SCIENCE, THEORY, STRATEGY

DEVELOPMENT OF FIGHTER AVIATION TACTICS

Moscow ATAKUYUT ISTREBITELI in Russian 1981 (signed to press 3 Jul 81) pp 1-2, 190-191, 3-4, 5-7, 8; 25-28; 49; 73-75; 96-97, 109; 110-111, 126-127; 128-129, 144; 145-146, 167-168; 169, 185-189

[Annotation, table of contents, foreword, introduction and excerpts from chapters 1-9 as indicated from the book "Fighter Planes Attack", by A. B. Krasnov, Voyenizdat, 20,000 copies, 191 pages]

[Excerpts] This book provides an overview of the development of fighter aviation tactics during World War II and the post-war period in terms of an assessment of foreign military resources. Included is an examination of particular aspects of the work of aircraft commanders in planning for aerial combat as well as controlling it from the ground and in the air.

The book is intended for flight and command personnel of the air force. It might also be recommended for unit commanders and staff officers of other branches of the armed forces as an aid in organizing combat operations utilizing air support, and also for students and cadets at military academies.

Contents

Foreword

Thanks largely to the tireless efforts of the Communist Party and the Soviet people, Soviet fighter aviation has been equipped with modern supersonic jet aircraft. In the hands of ideologically hardened and socialistically dedicated flyers, they are a formidable weapon in combat against any airborne adversary. Of the many factors which enter into the combat effectiveness of a fighter pilot, one of the most important is his tactical skill. Actually, this is so because the decisive role in the achievement of victory in combat belongs to tactics.

Professor A. B. Krasnov, doctor of military science, a veteran of the Great Patriotic War, and a former pilot himself, recounts in his book the course of development of fighter aviation tactics.

The unique aspect of this particular book consists in the fact that the author does not restrict himself to a dispassionate exposition of the problems before him. He undertakes a brilliant analysis of opposing tendencies in the development of tactics used in battle against a powerful adversary, he makes use of parallels and contrasts, he uncovers the unifying element which, in the final accounting, makes possible his transition from incomplete analyses to broad generalizations and superbly compelling conclusions. And, most important of all, he ivites the reader to think. The author does not offer hastily conceived responses to complex tactical problems, he thinks along with the reader--making him a participant in searches for optimal solutions and concentrating his attention on as-yet unsolved problems.

These nine chapters are, in their own way, nine self-contained problems in tactics.

The first three chapters of the book are an original outline of the development of fighter aviation tactics since World War II. The rich, thoughtfully selected, and extensive factual material from the history of domestic and foreign aviation traces changes in fighter missions, orders of battle and tactical measures in terms of the development of aviation technology, and shows how the art of aerial combat has improved. The author successfully correlates experience gained from the past to the reality of modern conditions, thereby providing a deeper understanding of the degree of consistency underlying the development of tactics.

In succeeding chapters, the author examines means for improving the tactical skill of fighter pilots. With great lucidity, the author discourses on the origins of foresight on the part of a commander, alternate planning for aerial combat, the art of the use of weaponry, the intelligent use of time factors, the element of surprise, and on other integral components of tactical skill. A major role is assigned to the business of controlling fighter combat from the ground and in the air.

The interrelationship of the commander to modern automatic control systems is a matter which will draw interest as it takes on a particular urgency in the era of scientific and technological revolution in military affairs. Especially likely to attract attention are those parts of the book which analyze tactical training methods for flying personnel in light of current requirements for the education of airborne combat crews.

The precise application of logic in examining any number of problems, the ability of the author to draw upon material from the most diverse areas of science and technology--all of this makes the book highly absorbing and interesting. This book should prove useful for flyer, unit commander, and staff officer, as well as for the youth who wishes to know more about aviation. It is highly instructive, thought-provoking, analytical, and makes independent conclusions. In this, its value is indisputable.

Marshal of Aviation, I. Pstygo

Introduction

A large group of bombers under fighter escort was heading for its assault objective. It had been detected by ground spotting posts only upon its approach to a base of enemy fighters, which were quickly dispatched to intercept it. Gaining altitude rapidly, the fighters banked into the sun, then swooped onto the enemy. From the airfield below, one could readily observe part of them engage the bomber escort, while the rest attacked the bombers. The air battle had begun...

This particular scene could be observed quite frequently at the beginning of the Second World War. The air speed of bombers of that era did not exceed 300 km/hr. They advanced on their objectives in massive groups employing close-order flight formations, preferably at great altitudes, where their detection and recognition from the ground were difficult. In addition to tight flight formations (reduced vulnerability to fighters), bombers employed defensive armament and evasive maneuvers to repulse fighter attacks. Combat was carried out with mutual visual contact between the aircraft of opposing sides. At night, fighters were able to attack only those aircraft which could be illuminated by searchlights from the ground.

The nature of aerial combat has changed appreciably since that time. Today, fighters operate at great distances from their bases, in difficult weather conditions, and at any time of the day; at times, they open fire and destroy an enemy without even making visual contact with him. The control of aerial combat requires the use of ultramodern electronic equipment. Of course, as in the past, the fighter pilot must hone his flying skills to the point of perfection in order to repel an enemy. However, finely honed flying skills are merely the basis for aerial combat. In the modern era, tactical preparation plays an ever larger role in any attack.

Fighter attacks in modern warfare are extremely swift. A fighter pilot is alloted mere seconds prior to entering the thick of battle. In these seconds, he must evaluate the situation and decide how best to proceed in combat. This involves judgements about how to make a stealthy approach and achieve an advantage in position for the start of an engagement, about the type of attack to employ, how to forestall possible target maneuvers, as well as other, no less complex, tactical problems. It is precisely for the sake of these seconds separating the pilot from the moment at which the enemy is detected to the point of opening fire that essentially all of his professional training is conducted. Each unsuccessful attack is not only a waste of the efforts of all who participated in this training, as well as a needless expenditure of strength and nerve by the pilot himself, but, more importantly, a threat that the enemy will be able to strike with impunity at fighter-protected objectives.

This is the reason for assigning a major role to tactical preparation in the training of combat pilots, since it allows for the collective use of all knowledge and skills obtained in the study of many different disciplines. Of course, an in-depth mastery of tactics was not essential in the past, but its significance has now increased. This fact serves to explain more than the rapid development of aviation technology. Today, the success of any combat encounter depends in great measure on the ability of commanders and all pilots to foresee the development of events, to make full use of the capabilities of their weapons, and on skillful combat control.

The science of fighter aviation tactics has developed at an especially rapid pace in recent years. Many rigidly fixed ideas about methods of achieving victory in air warfare are changing, and it is sometimes not easy, in comparing new developments with firmly established concepts based on past experience, to discover the cause-and-effect relationships existing between tactics and aviation technology, or to reconsider the usefulness of well-established tactical measures in light of a change in aviation tactics by the other side, when neither the sum total of experience nor common sense consideration provides a clue as to how to proceed, what to do or what not to do in order to avoid dangers and carry out the combat mission. Such situations have occurred more than once in the history of tactics.

How has the deveopment of tactics proceeded in the past, and how is it continuing in the present? How are problems and difficulties which arise in the course of that development being overcome? Why did its former significance become obsolete and lost? These questions, which are the subjects of systematic discussion in the foreign military press, the author has attempted to answer in this book. To ensure that these answers are as fully comprehensive as necessary, the book addresses a wide range of factors affecting the development of foreign fighter aviation tactics, but primarily, aviation technology, aerial combatant tactics and ground PVO. Under the influence of these and numerous other logically interconnected and constantly changing factors, new tactical measures are being developed and tactical requirements with regard to technology are being formulated.

This book is not a duplication of previous textbooks or procedural manuals, nor is it a code of regulations and recommendations for the science of tactics. The author seeks to motivate the reader to ponder and reflect, to assist him in a re-evaluation of "older" concepts in tactics, to instill the desire to search for new ideas and arrive at independent conclusions. But, the search for answers to the problems of tactics, like any other search, leads to understanding. For this reason, the reader will not always find in this book unambiguous evaluations, while certain other problems of tactics are analyzed from divergent, sometimes conflicting, points of view.

Chapter 1. Tactics and Combat Missions

The scope of fighter aviation combat missions is broad and multifarious. Behind each of these missions stands its own organization, its own complex of combat operations and tactical procedures.

The development of tactics employed in the execution of the most important of the standard missions, beginning with the era of the Great Patriotic War, is examined in the pages that follow.

Chapter 2. Tactics and Technology

1. The background of technological capabilities

In the brilliant azure of the sky spins the carousel of aerial combat. The combatants can see each other quite clearly, they can even distinguish heads in helmets and eyes. They are struggling to extract everything they can from the technology at their command. Tracer fire flashes over the cockpits. A new group of

aircraft enters the combat zone. Its leader dips his wings twice--this is the signal, "Attack after me"... This is the way aerial combat engagements were conducted at the beginning of the last war.

Today, the skies belong to missile-launching fighter-interceptors. These word combinations have become commonplace for us. Pilots take off at supersonic speeds for a predesignated target area, locate an enemy within a range of many tens of kilometers and, using target tracks displayed on a radar screen to plot tactical maneuvers, attack invisible enemy aircraft. Guided missiles destroy an enemy in any weather conditions and at any time of day. Aerial combat tactics have changed beyond recognition.

The developmental processes of aviation technology are ever ongoing. The replacement of obsolescent aircraft, which not long before had seemed to be the height of technological perfection, ushers in new aircraft, with even greater combat capabilities. But changes in technology necessarily lead to changes in fighter aviation tactics. Initially, these changes may be piecemeal, barely noticeable, but they accumulate gradually and over time supplant entrenched tactical procedures, as was the case, for example, in the era of piston-driven aircraft. On the other hand, they may take the form of a rather abrupt qualitative change. A quantum leap of this sort occurred in the transition of fighter aviation to jet aircraft.

During the Great Patriotic War, and even in the years preceding it, modifications in fighter aviation tactics due to technological influences arrived relatively slowly. Along with speed, the rate of climb and service ceiling of aircraft increased, as did the power of air weaponry, but in the achievement of any substantive distinctions between one technological prototype and another, years elapsed. Thus, every five to six years, flight speed increased by an average of 100 km and ceiling by 1000 m. For example, the I-3 fighter, which was put in service by the Soviet Air Force in 1928, had a maximum speed of 278 km/hr and ceiling of 7200 m, while its modification, the I-15, put in service in 1934, possessed figures of 367 km/hr and 9000 m, respectively. Five years later, the I-16 fighter(fig. 5.1) featured a speed of 460-490 km/hr and a ceiling of almost 10,000 m. The "Yakovlev" and "Lavochkin" fighters(figs. 5.3 and 5.4) from the era of the Great Patriotic War operated at speeds of approximately 600 km/hr and ceilings of up to 11,000 m *. By the same token, the transition to new tactical procedures similarly took place over the course of rather long intervals of time.

For almost 25 years, the aerial combat tactics employed by fighters had been based on horizontal maneuvers. Only after the introduction of aircraft capable of speeds of 500 km/hr and better, did fighters progress to combat in the vertical planes. The transition from machine guns to canon entailed an increase in the fire power of fighter aircraft and made possible an extension of the overall range of weaponry, but fighter pilots, as they had before, sought to use their weapons from minimal ranges, where the likelihood of destroying targets was greatest. Fighters continued to operate in tight combat formations, subdivisions and units, maintaining visual contact with each other and energetically maneuvering in combat. In the postwar years, while the fighter aviation arsenal retained a good many piston-driven

* Soviet Aircraft, Moscow, DOSAAF, 1974

aircraft with speeds already reaching the vicinity of 600 km/hr, tactical measures were for the most part outmoded. Any further increases in the speed of piston-driven aircraft became practically impossible due to the limitations imposed by engine weight and scale.

Only with the appearance of jet aircraft(figs. 5.5-5.8), did fighter aviation tactics undergo significant changes. The flight speed of fighter aircraft immediately increased by 350-400 km/hr and climb rates nearly doubled, while ceilings rose. The history of fighter aviation had never before seen such a dramatic increase in the capabilities of aviation technology. But scientific and technological progress continued to bring forth ever newer advances in military technology. Foreign military experts rank the development of supersonic fighters, radar predictors and air-to-air guided missiles among the most important of all advances affecting the status of fighter aviation tactics in the 1950's. It is their collective opinion that this resulted in many theoretical tactical concepts losing their importance, while others required substantial reworking*.

Chapter 3. Countertactics

In the military sector, one witnesses the constant application of one of the fundamental laws of Marxist-Leninist dialectics: "development is a contest of opposites". Thus, in conformity with this law, there are two opposite, yet dialectically related contestants to be considered: air power directed against ground forces and other objectives(let us call it assault aviation), and fighter aviation, which is intended to protect them from air strikes. Assault aviation tactics are a very important factor affecting the development of fighter aviation tactics. In following closely the aviation tactics against which fighter aviation is deployed, its past, present and even its future, we can also make objective evaluations of methods used in the development of fighter aviation tactics. A word of reservation here: we are not interested in all tactics employed by assault aviation, but only in those which are implemented in the fierce hostilities accompanying PVO penetration to the strike objectives. This particular aspect of assault aviation tactics also exerts a direct effect on fighter tactics.

Chapter 4. The Ability to Foresee

1. When unexpected conditions are encountered

"Target group, ahead and to the right... Commence attack!" The radioed instructions were heard by the flight commander, Capt. S. Klochkov. They were followed a short time later by commands to two other flights.

These commands were given by Lt. Col. Brusentsov as he oversaw the operations of the control tower crew and gazed intently at the plotting board displaying the tactical air situation. The "enemy" was employing jamming countermeasures, making the situation in the air uncertain. The commander had no way of knowing what type of combat flight formation the enemy aircraft were in, or which of his tactical group would

* "Interavia", 1974, no 12.

encounter fighters. What, if any, information had his pilots to act on as they scrambled their flights to intercept individual targets? He was assuming that, as in previous training excercises, the "enemy" would seek to penetrate PVO defenses in separate small groups and in individual unescorted aircraft. In that case, the predetermined defense plan had to be the right choice if it was to ensure successful repulsion of the assault forces.

But then Capt. Klochkov reported:

"I see the target. Eight aircraft..."

Brusentsov's knitted brow revealed his concern. The balance of strength was clearly not in our favor. At this moment, the noisy bustle of the control tower was interrupted by a new alarming report:

"I am under attack from a pair of fighters"--transmitted the commander of the second flight.

Lt. Col. Brusentsov moved close up to the plotting board. "Where in hell did this pair come from?"--he wondered aloud. "And what is going on with the third flight? Maybe it has not sighted its target, and is still continuing the search?" It was already becoming clear: a serious miscalculation had crept into his planning.

Let us now attempt to analyze what has happened. At first glance, the actions of the commander are above reproach. It is a fact that he did not have at his disposal complete information about the "enemy"--he had no knowledge of his plans or tactical strength. The "enemy"--as later became clear--intended to strike with eight aircraft under escort of two fighter groups. It was precisely this that the Lt. Col. was not able to foresee. In point of fact, after being apprized of the situation, he redirected the third flight to assist the flight led by Capt. Klochkov, and scrambled an additional flight from the airfield. The pilots subsequently attacked the strike force and engaged the fighter escorts in combat. Nonetheless, the moment of opportunity had been lost. A well-synchronized launch into combat at the pre-assigned line had not materialized. And most important of all--as a result, the commander was not able to achieve superiority in strength in order to decisively rout the "enemy".

There can be no doubt that Lt. Col. Brusentsov was placed in a difficult situation as a result of insufficient information. But it must be obvious that modern aerial combat cannot possibly be force-fit into some sort of a priori routinized scheme. Opposed warring sides are constantly striving to hide their intentions, to create in the other side a false impression of their operations, and to deliberately deceive them through the use of diverse tactical procedures.

And despite the situation in which Brusentsov found himself, there remained the possibility for successful accomplishment of his mission without drawing upon additional fighter forces. For this, he needed to have a deeper insight into the very complex situation, to secure the missing information from his own or neighboring forces(he had the time needed for last-minute target reconnaissance), and then to piece together the fragmentary data or indirect indicators to reveal the "enemy" plan: from what direction; using what forces; in what combat formations; which

objectives the "enemy" would strike, as well as the kind of tactical measures he might employ. If a commander finds that he cannot obtain sufficiently reliable data for a clear-cut analysis of the situation(and this is exactly what happened in the situation just described), he is then obliged to evaluate all possible courses of action an "enemy" might take and to determine corresponding courses of action to be taken by fighter aircraft against each of them, i. e., he must foresee the development of events both in regard to their nature and their chronology. In other words, combat success and the extent to which the planning behind it conforms to a constantly variable situation depends on the ability of the commander to foresee events.

Chapter 5. Complete Utilization of Weaponry Capabilities

1. The commander, planning and weaponry

Tactical flight training had come to its most tension-filled moment: the "enemy" had begun a massive air assault. Displayed on the plotting board was a distinct, straight target track, the tactical responsibility for which belonged to the fighters of Lt. Col. Priskul'skiy. The control tower crew quickly and efficiently supplied the necessary data to the commander, and when the target approached the fighter-launch point, they scrambled to meet the "enemy". The self-assured actions of the control tower crew, the pilots' reports, and even the brightly flashing indicator lights of the control boards and instrument panels--all seemed to speak of imminent success. But suddenly the commander was startled. He watched on the plotting board as the target track to which the fighters had been directed abruptly split apart and one of the lines sharply curved away at a wide angle--the "enemy" group had split into two parts and one of them had changed course. Now, in order to attack the "enemy", the fighters would have to greatly increase their flight speed. But in the situation as it now stood, the tactical range of the interceptors on afterburners would not permit this: there simply would not be sufficient fuel for the return trip to their home base.

Now what course of action must the commander take? He was faced with the necessity of making an assessment of the flight capabilities of the fighters at their range limit, and adopting a new plan of action. He took his time in deciding on this plan. But, in fact, it portended of additional difficulties in effecting the intercept.

In the meantime, the combat capabilities of the fighters allowed them to carry out their assigned mission. But, in order to accomplish this, they had to operate at the limit of their range, and then land, not at their own, but at another airfield. The commander, however, had not been able to utilize those capabilities. The situation had become critical. At a subsequent point in the exercise, the chief of staff had to intervene.

The effectiveness of a course of action taken by a commander depends on many factors. One of the more important among them is his ability to take into account the capabilities of aviation technology. The maximal utilization of these capabilities is the basis for successful fulfilment of any tactical mission. It is futile to expect victory when a commander consciously avoids courses of action which require

fighter operations at the upper limit of their tactical flight range, as well as maximum possible usage of the operational ranges of on-board avionics instrumentation and weaponry. In order to adopt a sound and reliable combat operations plan, a commander must possess--among many other qualitites--an impeccable background in military technology. But, having possession of even the most ultramodern weaponry comes to naught if one does not know how to manage it.

The fact that a commander who is making tactically skilled and unrestricted use of the capabilities of his weaponry can seize victory in combat against even a technologically superior opponent is widely known, and there is hardly any need to comment further on the matter. The annals of history also provide ample testimony on this account.

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Complete utilization of weaponry capabilities implies the acceptance of planning based on technical knowledge, the skilled control of all aspects of flight--from the simple to the complex--the ability to destroy an enemy in the face of formidable electronic and combat countermeasures, under any weather conditions and over the entire spectrum of flight ranges, altitudes and speeds as they apply to weaponry applications. Moreover, the more skillfully a commander handles weaponry himself, the more confidently he controls combat operations, and the better he is able to train subordinates.

Chapter 6. The Importance of Minutes and Seconds to a Commander

1. In the airfield control tower

This mission, having begun like most others, seemed not to presage anything unexpected. When the tracks of airborne targets appeared on the plotting board and on the tracking screens of the control tower, Lt. Col. Bocharov, directing the operations of the control tower crew, evaluated the situation and made the decision to scramble fighters. In pairs, one after another, the aircraft were launched into the air. Bocharov, counting off the seconds of the fighters' launch time on his watch, smiled to himself: his pilots had beaten their normal time limits. At that moment, even he could not appreciate just how important this specific ability was to him--the ability to count the seconds. The vectoring of the fighters to the targets took place in the usual sequence. But suddenly a new target appeared on the board--in fact, it was quite close to the defensive reaction line. Apparently, it had been traveling at a low altitude and the radar tracking stations were late in detecting it. Judging by the rapid movement of the target tracks on the plotting board, it was not difficult to see that the target was flying at great speed. There was not a second to lose.

The commander was perfectly aware that success in such a situation depended on the speed of his actions--he had no doubts about his pilots. It was obvious that there was not enough time to scramble fighters from the base to intercept the low-flying target. Searching for the most practical solution, Bocharov once again glanced at the plotting board. Closest to the newly detected target was a pair of fighters

under the command of Sr. Lt. Derbenyev. This pair was proceeding to intercept another target which, however, was still at a considerable distance from the demarcation line. After assessing the possibility of launching other fighters in pursuit of this target, the commander--having convinced himself of its feasibility--immediately gave the order to the tower crew to revector the Derbenyev fighters to the low-flying target. All targets were intercepted, and the "enemy" was not successful in carrying out the intended air strike.

It would almost seem that such a course of action would have suggested itself to Bocharov, but behind it stands the intense mental activity demanded of a commander, a multitude of calculations and recalculations of positions and flight conditions affecting the fighters, and the precise control of crews in the air.

Indisputably, it is difficult for a commander in situations marked by a critical time deficit, such as, for example, when the adversary approaches fighter defensive lines at low altitudes and high speeds. Should the commander delay in his assessment of the situation, show indecisiveness, hesitate in issuing combat orders--or the pilots be slow in getting airborne--the result is inevitable: even the most well-conceived combat operation may end in failure for the fighter forces.

The time element always plays a critical role in combat operations. Even in the remote past, commanders have found themselves in conflict with time deficits. Success on the fields of battle belonged to those military leaders who knew the value and proper use of time. "Money is dear; a man's life--even dearer; but time is dearest of all"--said A. V. Suvorov. "The slightest delay provides the enemy with the means to offer resistance, while for us it creates new obstacles" *.

One may say without exaggeration that aviation today functions not in terms of days, not in terms of hours, but in terms of minutes and seconds. Our time has seen extraordinary growth in the possibility of grave consequences resulting from intelligent planning which was, however, neither timely nor suitable to a rapidly changing situation. Today there is nothing which is increasing in value more than time.

* * *

Time may neither slow down nor speed up. The hands of the clock run on always at the same unchanging pace, but now within the same space of time, the approach of the enemy is ever nearer, changes in the situation are ever more critical. The burden of minutes and seconds increases on a commander from day to day. They are becoming "heavier". The minimal time spent in adopting a course of action, the launch, the convergence, maneuver and attack--these are the specific indicators which characterize the ability of a commander and each of his pilots to use the time factor and to gain a few additional minutes and seconds to seize victory.

The reader would do well to examine the manner in which he adopts a course of action, how he spends the time alloted to him in a combat training situation. Minutes, lost in time-consuming assessments of a situation, evaluations of technical reports. Long seconds lost to a commander's hesitation during the critical developments of a lightning-quick attack. Think what may be gained from learning the value of time.

* Suvorov, A. V., Papers, Moscow, Voyenizdat, 1975, vol. 4, p. 116, 338.

Chapter 7. The Element of Surprise--the Mother of Victory

1. First to make visual contact

The training critique, for which the students had assembled, had come to an end. As they filed out of the lecture hall in groups, the officers engaged in a lively exchange of opinions.

The young officers clustered around one colonel, a veteran aviator.

"Tell us, what sort of tactical measures did fighters use in your day to gain the element of surprise, comrade colonel?"--asked one of them, a swarthy, thin lieutenant colonel.

Twice that day he [the lieutenant colonel] had been obliged to listen to the senior commander conducting the critique rebuke him for being unaware of past experience and unfamiliar with methods of achieving the element of surprise in aerial combat.

"Well, of course, it all depends on the situation"--answered the colonel, pensively surveying the officers. Judging from the multitude of variegated rows of combat decorations, it was not difficult to recognize a veteran of the Great Patriotic War. "Usually, we tried to come up on the enemy unnoticed, stealthily, out of the sun, from behind clouds, in the twilight, or we came at him from the dark side of the horizon. We achieved surprise attacks by closing at great speed, maneuvering and, most importantly, by being the first to make visual contact".

"Sure, in the past it was advantageous for fighters to attack from out of the sun; they could feel certain of their superiority over an enemy"--interjected another officer. "But today, with on-board radar tracking systems, detecting fighters presents no special difficulties. In fact, if we were to carry out complicated maneuvers in approaching targets, we would only hasten the time of our own detection. And using the sun or a cloud as a screen--you yourselves know--does not hinder radar detection."

"And what about speed, climb rate and ceiling in modern aircraft? They have increased greatly in comparison with the piston-driven machines of the Great Patriotic War"--offered another officer in support of the first. "Today, when bombers strike against ground targets and employ powerful long-range missiles to repel fighter attacks, those tactics seem somewhat anachronistic. And is it possible to speak in general terms about fighter tactics that only concern the use of the element of surprise?"

The combat veteran smiled to himself, wanting to reply that it wasn't so, but there was no time. The buses which were to take the officers to their quarters had arrived and, not bothering to conclude the discussion, everyone departed.

The reader should join in a discussion of this subject and give some thought to it himself.

Heated discussions revolving around the fact that the appearance of potent avionics systems and radical changes in aviation technology have obviated the use of the element of surprise are not so very unusual. Could it in fact be that the surprise factor has lost its importance? Let us attempt to answer that question.

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The element of surprise: as alarming and unnerving as a combat alert signal, this expression carries with it a multitude of problems and dangers, and its role, in all probability, cannot be overemphasized. The controversy surrounding the surprise factor in modern air warfare is of critical as well as topical importance, and will likely remain so until such time as the conflagrations of aerial combat appear in the sky.

Chapter 8. Skillful Control of Aerial Combat

1. The use of modern weaponry--a collective skill

What does a commander do in the control tower? Applied to the other personnel composing the combat team, this question would seem to have a more or less obvious answer. Plotters and trackers tirelessly conduct target tracking; navigation officers, glued to their instruments, vector the fighters to aerial targets; radio telegraphers and telephone operators work feverishly to ensure uninterrupted communications. But what about the commander? The only role left for him--and it is brief indeed--is to issue commands, such as: "949--commence target attack!" But this is simple enough for a child to perform.

Let us not be hasty in our judgment. Instead, let us use our mind's eye to adjourn to the control tower, where we shall peer through the door of the combat control center at a moment most germane to our topic: the interception of an "enemy" target had just begun. In the dim light, indicator lights blink off and on, countless numbers and letters fluoresce across digital display panels, and various screens glimmer with an eerie greenish light. The large upright plotting board displays a confused mass of target tracks. Every minute, new, rapidly moving tracers wind their way into the mass. These are the airborne targets with all of their identifying characteristics: numbers, altitude, time of initial tracking--and among them are some which have been ordered intercepted and "destroyed".

The commander is in the "red room" in his own work area. He has at his command a sufficient number of fighters to repulse an even more powerful air strike. Very deliberately he listens to reports from his technical specialists and gazes thoughtfully at the plotting board and tracking indicators. His data are quite complete, but we can see that he is spending an inexcusable amount of time in evaluating it, and will therefore be late in implementing a course of action. Moreover, this course of action turned out to be less than the best on several points. The selection of the fighter forces assigned to carry out the mission was made without an exact accounting of the strengths and tactical capabilities of the "enemy". The delay in implementing his command decision naturally led to a delay in launching the crews. His composure cracking, the commander glared angrily at his crew as they labored frantically to put his plan into action. Their performance was

faultless. Over the loudspeaker he listened to the voices of his pilots, who, with delicate precision, were carrying out the commands given them by navigation officers vectoring them to the targets. But he could also see on the plotting board the tracks of targets which had already reached the assigned combat defense line. The scrambled fighters were still too far away, and, in addition, their combat strength was not evenly matched to that of the "enemy"...

This example is not typical, but it clearly illustrates the fact that no matter how precise and well-coordinated the efforts of a combat crew, they cannot compensate for miscalculations which are built into a command decision. The specific causes of such miscalculations are already essentially familiar to us: The inability to foresee events and detect the enemy's plan of attack, as well as to correctly assess and fully utilize one's own combat capabilities, in addition to the time factor. Although, as we look deeper, we see that this inability is only one result of gaps in the tactical competence of the commander. Under more complex conditions, they inevitably give rise to incorrect assessments of situations involving noise jamming and meteorological or radiation factors.

But now it is time to once again close the control tower door and attempt to analyze what we have witnessed.

It is the commander who oversees the actions of the control tower crew. He is the sole organizing force behind combat operations. His tactical intelligence and organizational capabilities determine just how effectively aviation technology and weaponry will be used in combat.

Does this mean, however, that the course of action followed by a commander is the only determining factor in combat success? We shall also attempt to deal with this question.

* * *

The air control center exists for combat. It may be compared to a nerve center, or to a large research laboratory, where each has his own work, but all work together--commonly and collectively. It is here that combat planning originates, here a commander's well-conceived idea is translated into the precise and laconic formulas of combat commands. He is aided in quickly implementing sound planning by the automatic control systems at his disposal. In this highly complex world of emotionless display screens, panels and intelligent electronic devices, a commander must carry out his extremely sensitive mission. Should fighters not be launched to intercept a target, should a resourceful enemy evade defensive measures, it will be the commander who is held responsible for eventual success or failure in combat, albeit it does not depend on him alone. Dozens of technical specialists--each in his own particular area--are responsible for bringing the mission to an adroit resolution.

Chapter 9. Achieving Victory in Combat

5. Fighter aviation tactics--a scientific breakthrough

The stages in the development of tactics--where are their dividing lines? How long a period of time will serve to enumerate them? Sometimes it is decades--sometimes

months. There are also very brief, but nonetheless critical stages which occur during wartime or when aviation technology is undergoing radical changes. The science of fighter aviation tactics was enriched by new approaches to combat operations developed in the wartime dogfights with the forces of fascism, and it was the beneficiary of remarkable evolution in the post-war years. Like a timeless military roll-call, the development of tactics continues in our day.

In examining the history of tactics, we have seen an inexorable movement of tactical thought, conceived in battle against a powerful and devious opponent and giving rise to new, inchoate, but eventually tried and proven tactical procedures. The reader has probably noted how wide a field of view is presented by a causal outline of the evolution of fighter aviation tactics: the interrelationships of tactics and technology; the development of mutual interaction with ground-based PVO facilities. And the most important link in this unbroken chain of influential factors remains always the tactical skill of fighter pilots.

"In tactics there are no prescriptions"--some commanders, when they wish to describe the complexity and multiformity of tactical skills, are wont to repeat these words which they have long ago learned by rote. This expression has almost become axiomatic. Even though these are the final pages of this book, the reader is once more requested to give thought to a question. Could not the reason for this be, as it is said, that the case is just exactly the opposite? Prescriptions, i. e., tactical recommendations, are far too numerous, while situations in combat are such that only a single specific tatical procedure can be applied to any one of them. But, on the other hand, what works well at first, less well the second time, and is actually harmful the tenth time around is plainly a rigid stereotype. The import of this then is obvious--even the most well-conceived tactical procedure, many times repeated, becomes ineffective. This is precisely what is meant by those who speak of the absence of prescriptions in tactics. But it follows from this that what is needed is not "written prescriptions", but an entire mobile "drug store" right at the scene so as to have at hand at any given moment the necessary tactical procedure. This also is what constitutes the tactical skill of a commander, a pilot, or a control tower officer, essential to them just as is the air they breathe to be able to select quickly and judiciously those very "prescriptions"--which, supposedly, are not to be found in tactics--and apply them effectively in combat.

Every year, the air arms of the military services are replenished by massive infusions of highly trained personnel who are experts in various specialties. They have been entrusted with awesome weaponry which they will employ in combat. Having studied the lessons of the past, they have learned to revere and they seek to enhance the combat traditions established by front-line veterans. But under the onslaught of scientific and technological progress, any attempt to cling to past achievements--referring to them in resounding terms as a "combat tradition"--will ultimately lead to failure. For all of the immense importance of historical tactical measures, there is a critical need to find new keys to victory over a powerful, crafty and fierce opponent who is constantly improving his own tactical capabilities; there is need to develop all of the elements which contribute to tactical know-how, or, in other words, to conquer the frontiers of scientific knowledge in this field.

Tactics is the science of besting an enemy in any--including the most trying--circumstances, even against great odds such as when the enemy has the advantage of numerical superiority or the element of surprise. Attempts to find the means to victory in such circumstances are properly classified among the "eternal questions" of tactics. No matter how much is said or written about these questions, they will never be settled. Every commander, flyer, and control center officer is more than capable of resolving them. It is hardly within the scope of this book to provide them with prescriptions, much less to teach them. But, after all, how many obstacles and disappointments, how much difficult and tedious labor, perseverance and inspiration lie hidden within what is called a scientific breakthrough?

Now, after examining the makeup of tactical skillfulness, we may draw conclusions about what is involved in conquering the frontiers of scientific knowledge--it means:

being selflessly dedicated to the great ideals of communism, recognizing one's high personal responsibility for the defense of the socialist homeland, correctly perceiving the meaning of current political and military events, confidently handling oneself in certain situations, extracting useful knowledge from them, and employing it in one's day-to-day work;

being able to anticipate and turn the course of events to one's own use, to confidently apply dialectical methods to situation estimates, to make use of modeling to derive quantitative estimates, to efficiently and eclectically conceive combat planning, to make sound decisions and firmly put them into effect;

fully utilizing the capabilities of one's weaponry, acheiving its maximal effectiveness in combat, maintaining it in constant readiness for use, rapidly and unerringly operating aircraft controls and equipment;

recognizing the value of time, not admitting delays to enter into decisions and actions, gaining precious time by speeding up all flight preparation processes, finding time for careful analysis of alternate combat plans, as well as the intelligent use of technical control equipment, teamwork in the control center, and lightning-like quickness in intercepting and attacking;

making prudent use of the surprise factor, employing safeguarded technology and unexpected tactical procedures, stealth, and operational quickness in order to gain the initial detection advantage and force the action in a beneficial way; successfully countering the use of the element of surprise by the enemy, not allowing the implementation of rash decisions and actions;

skillfully and firmly controlling aerial combat from the ground and in the air, while achieving precise and harmonious operations on the part of all combat team members within the framework of a collective combat effort and under the guiding influence of the commander, making creative use of the abundant potential of automated systems while combining knowledge, experience and tactical thought with formal logic and the operational speed of computers;

possessing a sense of the new, seeing imminent as well as distant prospects in tactics, learning from situations approximating combat while resisting oversimplifications, developing combat preparedness and a readiness to assume valid risks within

the limits of flight safety regulations and the planning of the commander, comprehensively and objectively evaluating the tactical training of flight personnel.

These then, in my view, constitute a basic listing of the component elements of tactical know-how, which set multifarious and exacting requirements for fighter aviation personnel. It would be incorrect to suppose that these requirements can be satisfied spontaneously, that combat training in and of itself leads to the development and cultivation of the requisite skills. Combat aviation personnel, like soldiers, are made--not born, but only if the training calls for tenacity, will power and logical tactical thinking, as well as a burning desire to develop these qualities in combat training missions.

Victory by scientific means is not merely a romantic notion conveying the idea of a furious, irrestible assault. It is an element which is inseparable from the crucial role and personal tactical skill of a commander. In any situation, he must withstand and surmount the difficulties confronting him. The fortitude, self-control and composure shown by a commander, his boldness and resoluteness in achieving established goals are the formative factors which instill the same qualities in his subordinates.

A commander's responsibility is onerous indeed! He is at once required to be both an organizer responsible for the military and political education of subdivisions and units under him, and an educational methodologist concerned with training subordinates. There is also a heavy burden of professional responsibility riding on his shoulders whenever he undertakes a course of action. It must be the optimal solution. And what is the upshot of all this? This position requires an accounting of all factors of a situation, the ability to improvise, to make choices based on a wide stock of past associations, and, when confronted with unexpected circumstances, to come up with new plans which do not incorporate previously implemented courses of action. And no matter how complicated the situation, the fate of the battle resides in his hands and depends on his organizational ability and efficiency, as well as on his ability to make use of the key elements of socialist competition and its proven method--competitiveness. Thus, tactical preparation is becoming something more than just a training process. It will involve the creative use of technology and active searches for innovation in tactics. As the quality and effectiveness of such a process is realized, there can be no limit to the further perfection of tactical skills.

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GROUND FORCES

BOOK EXCERPTS: ARTILLERY SERGEANT'S HANDBOOK

Moscow SPRAVOCHNIK SERZHANTA ARTILLERII in Russian 1981 (signed to press 21 Jan 81) pp 1-6, 73-82, 220-224

[Annotation, table of contents, introduction and excerpt from Chapter 2 from book "Artillery Sergeant's Handbook," by Ivan Nikolayevich Anashkin and Mikhail Nikonorovich Belokur. USSR Ministry of Defense Order of Labor Red Banner Voyennoye Izdatel'stvo, 20,000 copies, 224 pages. Passages enclosed in slantlines printed in boldface.]

[Excerpts] The Handbook sets forth the rights and obligations of sergeants, training methodology, and questions of combined-arms, technical and special training to the extent necessary for performing duties as squad (team, crew) commander in artillery subunits.

The Handbook is intended for squad (team, crew) commanders and reserve sergeants.

Table of Contents

Introduction

It is a great honor for every citizen to be a soldier of the Soviet Army and fulfill a sacred duty to the Motherland in conformity with the Constitution of the Union of Soviet Socialist Republics and the USSR Law "On Universal Military Obligation." It is an even greater honor to perform duties as a soldier-commander. Command cadres represent the backbone and foundation of the Soviet Army. The quality of personnel training and indoctrination, discipline, efficiency and, in the final account, the state of combat readiness of the subunits and units depend on their training level.

NCO's are at the level of junior commanders and represent the largest detachment of command cadres. They are the assistants of officers in training ideologically persuaded, capable and courageous defenders of the socialist Motherland. NCO's are the privates' immediate superiors. They help them study weapons, combat equipment, regulations, manuals and instructions. They organize and perform the daily detail service together with the privates and perform

daily work to strengthen military discipline, firm military order, and efficiency. One of the very important tasks for NCO's is to develop the privates' patriotism, proletarian internationalism, and readiness to give their all and even their lives if necessary to defend the interests of the socialist Motherland.

To be an NCO is not only an honor, but also a great responsibility. In order to perform his duty the NCO must have appropriate political, military and specialized knowledge, be able to pass it on to subordinates, have high moral qualities and set a personal example.

For successful training and indoctrination of subordinates the NCO needs not only good training, but also a knowledge of the principles of military pedagogics.

Basic Training Principles

/Party and scientific spirit./ Training bears a class character in its goals and tasks. Every class with privates must be thought out and arranged so that material to be studied contributes to their development of a Marxist-Leninist outlook, love for their Motherland and hatred for her enemies, and conviction as to the superiority of the socialist system and its army over the capitalist system and its army, and of the force and might of their weapons.

/Teach the troops what is needed in war./ This training principle is one of the basic ones and reflects the need to train personnel in a difficult tactical situation and with great psychological stress, i.e., in a near-combat situation.

/Awareness and activeness of the trainees./ A high awareness of the honorable duty of defending the achievements of socialism acts as the primary source of all personnel's vigorous participation in the training process.

To assure the privates' better assimilation of subject material, one must strive for their intelligent understanding of the goals and tasks of every class, the practical importance of knowledge and skills acquired, an understanding of training which precludes mechanical assimilation of material, and the ability to apply one's knowledge in practice. There also has to be extensive use of the competition method in performing individual tasks and norms, and the privates' abilities to critically evaluate their own and comrades' actions must be developed.

/Graphic effect./ This is above all a complex of measures providing visual and aural effect in the process of training personnel. Capable application of these measures makes it easier to assimilate training material and intensifies the psychological-pedagogic effect on trainees.

/Systematic nature and consistency./ Success in training is possible only with the systematic and consistent presentation of training material. This means that training material must be presented to trainees in such a way that new

knowledge rests on that they previously acquired, and the techniques and actions already learned contribute to the assimilation of subsequent ones.

/Simplicity./ Training material is assimilated easily if it is drawn up with consideration of the trainees' experience and knowledge and is simple in content and scope. Simplicity of training is helped by a rule borne out in life: from the known to the unknown, from the simple to the complex.

/Firmness of knowledge, abilities and skills/ is assured by the combat training process, which envisages a systematic repetition of covered material, daily application in practice of what has been learned, multiple repetition of exercises, and drills to develop stable skills in the soldiers.

/Collectivism and the individual approach./ Privates spend a greater part of the time training as part of a military collective, which brings together people with different abilities, habits and cast of character. The psychology of the military collective (public opinion, mutual relationships, nature of reaction to events within and without the collective, sentiments, habits) takes shape in the process of their interaction and under the effect of various factors (influence of the commander, the party and Komsomol organizations, and the entire system of indoctrinational work).

Training success largely depends on the ways and methods used to see that soldiers assimilate knowledge and develop skills and abilities, i.e., on training methods and forms.

/Basic training methods are as follows:/ verbal presentation of material (narrative, explanation), discussion of subject material (discussion, seminar), display (demonstration), drills, practical group problems and exercises, and independent problems.

/Basic training forms are as follows:/ classroom (theoretical) and practical (field) activities, field firings and missile launches, exercises; servicing days and days of periodic technical servicing, self-training, and the check and evaluation of knowledge, abilities and skills.

Basic Principles of Indoctrination

/Party spirit and ideological direction./ This principle is the leading one in the entire system and methodology of personnel indoctrination. It reflects the dominant role of the policy of the Communist Party and Soviet government in indoctrinating personnel and requires the commander above all to have a firm knowledge of the indoctrination goals and clearly picture those qualities which much be developed in subordinates.

/Indoctrination of personnel in the process of military labor./ Each serviceman's strict, precise observance of procedures and rules established by Soviet laws, the military oath and military regulations is a necessary condition for high troop efficiency, their combat teamwork, and constant readiness for immediate actions.

/Indoctrination in the collective and through the collective./ This principle requires the commander's constant work to unite subordinates into a cohesive, firmly knit family and develop in them feelings of troop comradeship, brotherhood and collectivism.

/Reliance on positive elements./ The essence of this principle is to take advantage of the best positive qualities of a soldier and rely on them in indoctrination work.

/Exactingness and respect toward people./ A combination of high exactingness toward subordinates with respect for their personal dignity and concern for them--two interconnected aspects of the indoctrination process are merged in this principle.

/Unity, coordination and continuity./ To achieve coordination in indoctrination work means to present uniform regulation requirements on subordinates, to make proper use of indoctrination principles and methods, and exert an influence on soldiers through the common efforts of commanders and the party and Komsomol organizations.

/Basic indoctrination methods are as follows:/ persuasion, encouragement, coercion, and the commander's personal example.

The range of the junior commander's duties thus is broad and requires him to have a high theoretical and practical training, extreme composure and, finally, good methods skills in training and indoctrinating subordinates.

The basic rights and duties of NCO's are highlighted in the Handbook in a separate chapter with consideration of the fact that a knowledge of regulations is the basis of combined-arms training.

Chapter Two. Combined-Arms Training

5.4. Camouflage of Combat Formations

Camouflage includes a complex of activities performed for purposes of concealing friendly forces from the enemy, providing for surprise in their operations and reducing personnel and equipment losses, as well as for purposes of leading the enemy astray with respect to our strength, means, actions and intentions.

Camouflage activities achieve their purpose only when they are carried out vigorously, continuously, diversely and convincingly. It is very important to be able to take advantage of the concealing features of terrain, its natural masks, and authorized and improvised means of camouflage.

/Use of the terrain's concealing features/ consists of locating objects to be camouflaged behind natural masks, which can be forests, mountains, ravines, settlements, local terrain features and so on.

Camouflage of combat formations and equipment must be performed above all with the help of improvised means and materials (twigs, grass, snow).

/Authorized camouflage sets/ are used for camouflaging command-observation posts, firing positions and means of traction against enemy air and ground reconnaissance. They are of the following types:

MKT-L--a summer set of netting for camouflage against backgrounds of vegetation and bare ground;

MKT-S--a winter set of bleached netting for camouflage against backgrounds of snow;

MKT-T--a summer set of cotton net with a 50 x 50 mm mesh filled with pieces and strips of cloth for camouflage against backgrounds of vegetation.

All camouflage covers of the sets have the same 12 x 18 m dimensions and include 12 standard 3 x 6 m elements. The set includes connecting cords, metal pins and a packing cover. Elements of the camouflage cover are interconnected into a common cover by closed, quick-release seams with the help of connecting cords.

One MKT set can be used to camouflage two or three command-observation posts, the firing position of one piece with an all-around field of fire, or a truck or prime mover in a shelter. Arrangement of an overall camouflage net using the MKT is shown in Fig. 14 [figure not reproduced].

[Caption to Fig. 14]: Fig. 14. Kinds of masks: a. Vertical; b. Horizontal; c. Overall camouflage net.

Individual camouflage gear includes the camouflage overalls and white camouflage suit, used for concealing scout-observers and radio telephone operators.

NCO's must know camouflage rules and demand that personnel observe them; they must limit the movement of people and equipment in areas under enemy surveillance; they must prohibit the trampling down of grass, cutting of vegetation, or laying of new trails and access roads outside of specially allocated areas; and they must ensure strict observance of rules of light discipline at night.

6. Defense Against Mass Destruction Weapons of the Probable Enemy

6.1. Radioactive and Chemical Contamination

/Radioactive contamination./ The terrain, air and various objects are contaminated by radioactive substances chiefly as a result of their fallout from a radioactive cloud which formed after a surface nuclear burst. The radioactive mushroom cloud is very noticeable at the moment it forms and during movement, when it assumes a dark color, but it is impossible to detect radioactive substances on the terrain by smell, color or external appearance. Special instruments are used for these purposes: radioactivity indicators, roentgen meters (Fig. 15), and radiation meters (Fig. 16).

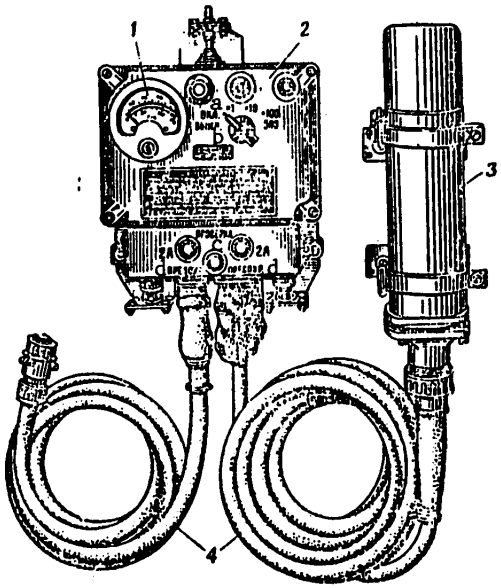


Fig. 15. DP-3B roentgen meter:

1. Measurement device
2. Measurement panel
3. Remote unit
4. Cable
a. On
b. Off
c. Test
d. Fuze

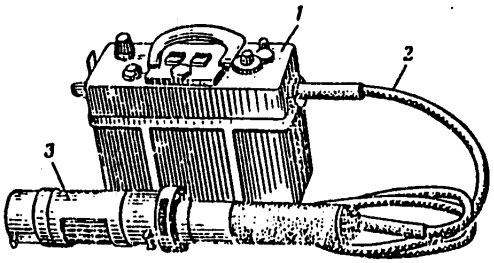


Fig. 16. DP-5B radiometer-roentgen meter:

1. Measurement panel
2. Flexible cable
3. Probe unit

On noticing the flash of a nuclear burst a person must take immediate shelter in a trench, crater, ditch or other nearby refuge; in the absence of cover lie down quickly on the ground, face downward, legs toward the burst.

When a person is in the open on terrain contaminated by radioactive substances, he must put on a respirator (Fig. 17) or protective mask (Fig. 18); and a respirator (protective mask), protective cape and gloves (Fig. 19) during the fallout of radioactive substances.

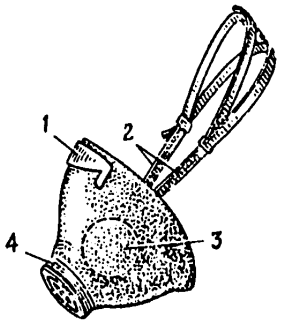
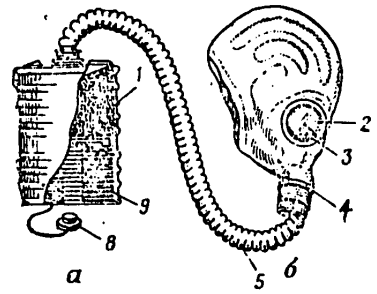


Fig. 17. R-2 respirator:
1. Nose clip
2. Head band with straps
3. Inlet valve
4. Outlet valve



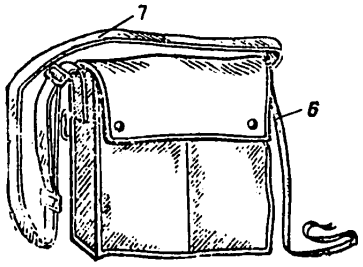


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Fig. 18. Combined-arms respirator:
a. Respirator filter canister
b. Facepiece
c. Pack
1. Absorbent
2. Eyepieces
3. Rim
4. Valve holder
5. Connecting tube
6. Cord (harness)
7. Strap
8. Rubber plug
9. Filter

/Chemical contamination./ Means by which the probable enemy employs OV [toxic chemical agents] may be missiles, artillery rounds, mortar rounds, chemical mines, aerial bombs, aircraft sprays and so on.

a b c

Fig. 19. Use of the protective cape:

a. As a cape
b. Worn with sleeves
c. As coveralls

Having high toxicity, modern OV have an injurious effect even in very small concentrations. Therefore one can determine their presence reliably only with a chemical reconnaissance instrument (Fig. 20). But one also has to know certain signs indicating the enemy's use of chemical weapons, the primary ones being:

A faint muffled sound and rapidly dispersing cloud at the location of bursts of artillery or mortar rounds, aerial bombs and missiles;

A rapidly settling cloud or trace left after an aircraft flies over;

Oily spots on leaves, the soil, or buildings and near the craters of exploded bombs and artillery or mortar rounds;

A change in natural coloration of vegetation (green leaves acquire a brown color, red berries turn blue);

The appearance of strong smells of bitter almonds (prussic acid), rotting hay (phosgene), mustard or garlic (mustard gas) and so on;

Irritation of the nasopharynx, eyes and skin, contraction of pupils, heavy feeling in the chest and so on.

With any of these signs, immediately put on the protective mask and skin protective gear without awaiting a signal or command. It must be considered that injurious concentrations of OV may remain for several hours or days (especially in winter) in ravines, hollows, dense forests, bushes and trenches.

/Warning signs./ Authorized warning signs--rectangular panels or cloth flags colored yellow are put in place to warn personnel about terrain contamination. Paper triangles are attached to the panels and small pieces of cardboard are

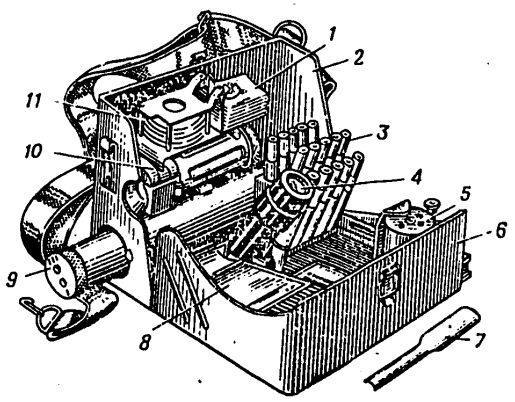

Fig. 20. VPKhR troop chemical reconnaissance instrument:

1. Smoke filters
2. Case
3. Heater cartridges
4. Flashlight
5. Heater
6. Lid
7. Trowel
8. Paper casings
9. Hand pump
10. Pump attachment
11. Protective caps

inserted in the flag pockets with an inscription of what is contaminating the sector, the type of OV, radiation level, date and time the sign was set up. At night authorized warning signs are illuminated with flashlights. Boundaries of contaminated sectors may be denoted by inscriptions on buildings and local features.

6.2. Personnel Actions with Contamination by Toxic Chemical Agents

On being stricken by V-gases (sarin), symptoms of which are a contraction of the pupils, loss of sharpness of vision, a sharp pain in the eyes and a heaviness in the chest, immediately put on the protective mask and, using the syrette in the personal CW decontamination kit, introduce an antidote into the thigh muscle.

On discovering drops of OV on the skin or clothing, immediately treat the contaminated areas using the individual decontamination kit (Fig. 21). On discovering a reddening of the skin area, one must wash the contaminated area with soap and water. If drops of OV get into the eyes, immediately wash them several times with clean water from a canteen, then go to a medical station.

Fig. 21. Individual decontamination kit (IDP):

1. Tin container
2. Paper napkins
3. Glass ampules
4. Lid
5. Instructions for using the kit

With injury from prussic acid (a bitter, metallic taste in the mouth, throat irritation, dizziness, headache, nausea) immediately put on the protective mask, crush an ampule with the antidote and insert it under the helmet facepiece of the protective mask.

With injury from phosgene (a sweetish taste in the mouth, coughing, dizziness, shortness of breath), one must put on the protective mask and leave the contaminated area.

A toxic chemical agent with psychochemical action (BZ) gives rise to mental disorder in the victim. A protective mask protects reliably against BZ.

A toxical chemical agent with irritant action (CS) causes strong eye irritation. A person must leave the contaminated area, stand facing the wind and wash the eyes with water or a two-percent solution of baking soda.

6.3. Decontamination of Clothing, Weapons and Equipment

When personal weapons, instruments, artillery hardware and prime movers become contaminated with radioactive substances they are wiped with pads of rags or oakum soaked in a decontaminant solution, gasoline, kerosene or water. Processing is from the top downward, repeating it two or three times with soaked and then dry pads. Individual or group decontamination kits are used for decontaminating guns and prime movers.

When personal weapons and combat equipment are contaminated by toxic chemical agents, they are fully decontaminated using individual or group decontamination packets (kits) or pads out of rags soaked with decontaminant solution (soapy water, gasoline, or kerosene), with subsequent wiping with a dry rag or oakum.

Clothing, gear and footwear contaminated by toxic chemical agents are wet down and wiped with decontaminant solutions from the individual decontamination kit. Clothing and gear decontaminated by "sarin" OV vapors are sprinkled

(powdered) with powder from the individual decontamination kit, then shaken off. Articles to be decontaminated also can be soaked in water for 3-5 minutes, then wiped dry with a soap and baking soda solution or aired out for an hour in summer or for up to three hours in winter.

All work of gas or radioactive decontamination is performed wearing the protective mask, protective overboots and gloves and, in some cases, a protective cape as well.

Observation posts, trenches and connecting passages are decontaminated (radiation or gas decontamination or disinfection) by cutting away a layer of contaminated soil up to 3 cm thick (up to 4-6 cm of snow) from the berm, slopes and bottom. If the slopes have revetment, a layer of soil is cut from the berm, the revetment of slopes is cleaned with a damp broom or a damp bunch of straw or grass, then a layer of soil is cut from the bottom. The soil which has been cut away is collected in a specially dug ditch, pit or shell crater.

Full decontamination of personnel, weapons and combat equipment is performed at areas for gas and radioactive decontamination and personal cleansing.

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