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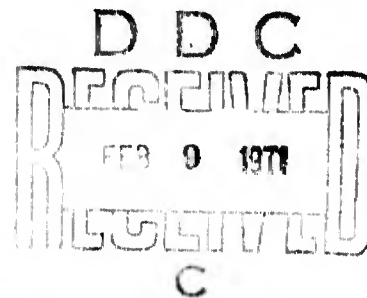
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# US ARMY FOREIGN SCIENCE AND TECHNOLOGY CENTER



INFANTRY WEAPONS OF THE SOVIET ARMY IN THE  
GREAT FATHERLAND WAR

COUNTRY: USSR



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The article is an editorial abstract of an article in the Soviet journal *Voenny-istoritscheski shurnal*. The author, Engineer D. N. Ocootnikow, Colonel (RET) explains with great expertise the changes which took place in the system of Soviet infantry weapons during the Great Fatherland War. The sober, technical evaluation of the combat effectiveness of different weapons and the description of their constructive further development makes the continuous and far sighted work of Soviet weapons designers obvious. By utilization of all the advantages of socialist society in consistent application of socialist military science, this path logically led to the preeminent position of Soviet military technology in the world of the present.

#### Editorial Staff

One of the factors, which insured the victory of the Soviet Union over fascist Germany and imperialist Japan, was the quality of Soviet weapons. Infantry weapons assume an important position in the Soviet system.

Notwithstanding the introduction of new types of combat techniques the reinforcement of the artillery, the weapons of the infantry retain the largest portion and played a major role in the war. If losses resulting from infantry weapons in World War I amounted to 28-30% of general losses, in World War II they grew to between 30-50%.

#### 1. The Pre-War System of Infantry Weapons

At the beginning of the Great Fatherland War the Red Army possessed a system of infantry weapons that, building on the heritage of the Old Russian Army with due regard for the experiences of past wars, had been

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improved and supplemented by a younger generation of Soviet weapons designers. It included the following models:

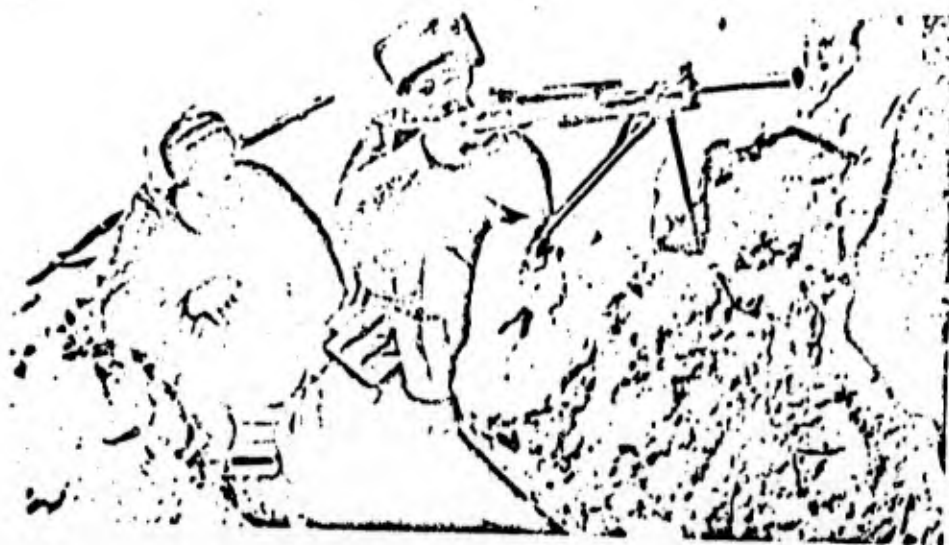
- 1) the TT#M 1933 7.62 mm pistol and the 7.62 mm Nagant revolver as personal weapons of the officers and non-commissioned officers;
- 2) the 7.62 mm M 1891/30 rifle, the 7.62 mm M 1938 carbine, and the 7.62 SVT M 1940 rifle as standard weapons of the line units;
- 3) the 7.62 M 1891/30 rifle with telescopic sights PU or PE and the 7.62 mm SVT M 1940 rifle with telescopic sight PU as weapons for snipers;
- 4) the 7.62 mm PPSH M 1941 submachine gun as standard weapons for infantrymen armed with machine pistols;
- 5) the 7.62 mm DP light machine gun as the crew served weapons of the infantry group and platoon;
- 6) the 7.62 mm Maxim M 1910 heavy machine gun and the 7.62 mm DS M 193 heavy machine gun as the crew served weapons of machine gun units;
- 7) the 12.7 mm DShK M 1938 machine gun on an all-purpose mount and the four-barrelled air defense M 1931 (7.62 mm Maxim heavy machine gun) machine guns as air defense weapons of infantry units;
- 8) the 7.62 DT tank machine gun as the infantry weapon in tanks and armored personnel carriers.

The pre-war system of infantry weapons corresponded essentially to the requirements placed upon it. However, it possessed two obvious deficiencies: the multiple versions of the same type of weapon and the lack of any tank defense resources.

The first deficiency was the result of the fact that new models had not been tested in long periods of troop usage and therefore, they had to be supplemented by the old proven types.

The second deficiency was based in the main on an incorrect evaluation of armored tactics and techniques of the probable enemy and an underestimation of the importance of the employment of anti-tank defense resources in mass by the infantry. In the pre-war period concrete methods for creating production of anti-tank rifles were delineated. The designers (S. V. Vladimirov, N. W. Rukavishnikov, and others) created some prototypes of large caliber anti-tank rifles for the 14.5 mm cartridge developed at that time; it could penetrate up to 40 mm of armor. But not

one of these rifles was put into production. According to the views of that time, combat with tanks was completely the responsibility of the anti-tank artillery.



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Figure 1. DP Light Machine Gun in Place. The Two Infantrymen Handle the SVT automatic carbine.

## 2. The Improvement of Infantry Weapons During the Course of the War

The system of infantry weapons forms a clearly defined complex of infantry combat resources adapted to each other. Mutually supporting, they guarantee the accomplishment of combat missions under all combat conditions and with all types of combat. The primary missions, which are assigned to the infantry in combat, therefore formed the basis for the structure of the system of infantry weapons.

[1, 2] state that if combat at close range becomes the primary mission of the infantry, its weapons must be adapted to these conditions. The tendency existing up to the beginning of the war for increasing the range of infantry weapons was succeeded by a tendency in the initial period of the war to reduce the range of infantry weapons. In the case of standard weapons of line units it was conditioned by the numerical increase in machine guns. This tendency for machine gun fire was revealed as the result of the significant increase of the density of artillery and mortar fire<sup>1</sup> and also of the development of other powerful combat resources (armor, air forces). The combat regulations of the

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<sup>1</sup> The density of artillery at the beginning of 1942 on the average amounted to 40-50 pieces per kl of front, in the final phase 250-300 pieces and more per kl of front.

infantry stipulated for the attack as well as for the defense a range for an infantry group of 800 meters for the light machine gun, 600 meters for the best shots, and 400 meters for all others [3].



Figure 2. Anti-Tank Defense in the Battle of Moscow PTRD Anti-Tank Rifle.

The zone of fire for the heavy machine gun, the normal caliber infantry weapon with the greatest range, was limited to a range of 800-1,000 meters. "The machine gun section directs effective fire up to 1,000 meters; however, it is better to open surprise fire at ranges of 600 meters and less." [4]

Naturally there were also many examples in the war of the delivery of heavy machine gun fire at long range (mountain combat, crossing water obstacles, etc.). But even in these special cases the range for the heavy machine gun does not exceed 2,000-3,000 meters. Consequently, the pre-war tendency to increase the range of the heavy machine gun as much as possible (up to 5,000 meters) was proven incorrect as results of the employment of heavy machine guns in covered firing positions.

#### 2.1. Heavy Machine Guns

The decrease in range made it possible to reduce the number of types of cartridges. After the cartridge with a heavy bullet was discontinued,

a significantly lighter bullet guaranteed fire up to 3,500 meters. At the same time it proved necessary to replace the heavy Maxim heavy machine gun by lighter, more modern model. The DS heavy machine gun, which was issued on the eve of the war, was not accepted by the troops because of a series of deficiencies and was taken out of production in 1941. Success in solving this problem was achieved only in 1943. P. M. Goryunov in collaboration with M. M. Goryunov and W. E. Voronkov created the simpler and lighter (44.5 kg) water cooled SG-43 heavy machine gun with a metal cartridge belt.



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Figure 3. Soviet Soldiers with DS Heavy Machine Gun in Street Fighting in the City of Breslau, Which Had Been Converted into a Fortress.

The SG-43 heavy machine gun was not inferior to the Maxim machine gun with respect to combat characteristics and reliability, and it gained acceptance from the troops. But the machine gun mount proved troublesome and did not guarantee a stable firing platform. The machine gun itself did not have an adequate barrel life (25,000 rounds). This deficiency was eliminated in 1945.

## 2.2. Light Machine Guns

The DP light machine gun lived up to the expectations in the initial period of the war. With it, however, some deficiencies were revealed (insufficient stability of the bipod and its unreliable attachment, shorter life of the closing spring caused by heating during firing as a result of its position underneath the barrel, minor deficiencies in the locking action, great mass of the magazine when empty and low capacity). The machine gun was modernized in 1944 by A. I. Schilin and received the designation DPM. This design was superior in all tactical-technical respects to the German units, MG-34 and MG-42 machine guns, in their like machine gun models; however, like the heavy machine gun, it as well did not correspond to the increasing mobility of the infantry. When normal caliber cartridges were employed, the mass of the light machine gun with a combat load of 300 cartridges could not remain under 20 kg. For this reason in 1943 work began on a platoon weapon system (among these weapons a light machine gun) for cartridges of reduced power (M 1943 cartridge).

## 2.3. Development of a Company Machine Gun

The heavy machine gun was acknowledged to fall into the category of heavy infantry weapons. When the combat formation for attack was assumed, the heavy machine gun could be employed only in the second line or in the form of machine gun groups on the flanks of the combat formation as a result of its tactical-technical characteristics. Thus the requirement evolved for a company heavy machine gun that is sufficiently light for employment in the first line in the attack and that at the same time has sufficient fire power to be able to accomplish the functions of a heavy machine gun to a certain degree. The designers, W. I. Schilin, P. P. Polyakov and A. A. Dubinin converted the DPM light machine gun to belt fitting for this purpose. It was manufactured during the war; however, it was adopted only after the war as the M 1946 7.62 mm company machine gun.

## 2.4. Air Defense Weapons

The large caliber DShK air defense machine gun was employed successfully during the course of the entire war for defense of mobile and fixed installations. With its employment in combat, some deficiencies were revealed (inadequate durability of small detail parts, trouble with the all-purpose amount, difficulty in changing barrels, and others), which were eliminated when the weapon was modernized.

The four-barreled air defense machine gun with the Maxim machine gun was employed at the beginning of the war in the defense of cities and other important installations. Later it gave way to larger caliber weapons as armored aircraft were introduced.

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Figure 4. Soldiers of the Fascist Armed Forces Frequently Preferred the Dependable Soviet Infantry Weapons to German Small Arms.

## 2.5. Rifles

At the beginning of the war the non-automatic M 1891/30 rifle with a magazine feeding device and the self-loading M 1938 carbine<sup>1</sup> formed the basic models. Towards the end of the war the carbine (340 mm shorter and 0.4 kg lighter than the rifle) was given preference. It was modernized in 1944 (introduction of a non-removable bayonet and other minor changes). Beyond that, there were also tests to improve the maneuverability of the rifle by simply shortening the barrel.

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<sup>1</sup> The automatic carbine was developed in 1938 from the non-automatic rifle with magazine feeding device. The latter was in turn the Dragoon rifle improved in 1930 by Mosin.

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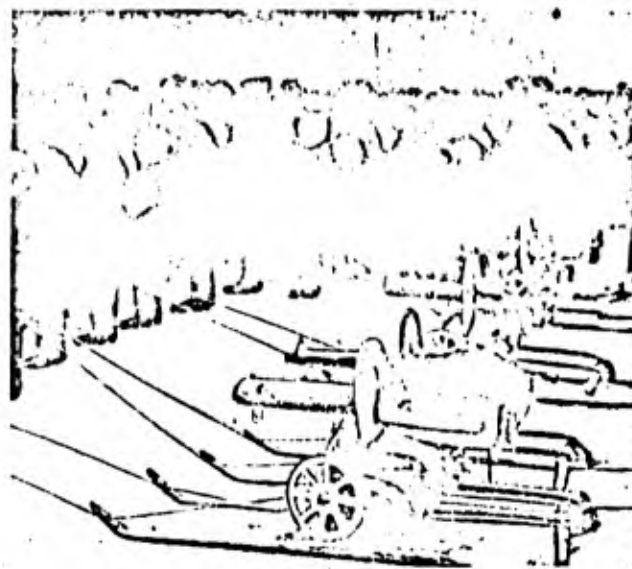


Figure 5. Machine Gun Unit of the Soviet Army with the Maxim Heavy Machine Gun in the Winter of 1941/42.

The semi-automatic self-loading carbine did not gain general acceptance by the troops during the war because of a series of deficiencies [complicated design, susceptibility to stoppage]. However, that did not mean rejection of the principle of the self-loading carbine. The semi-automatic self-loading carbine corresponded to two non-automatic rifles with magazine feeding device in fire power. It made possible marching fire, which is extremely difficult with non-automatic rifles. It freed the infantrymen from some activities that had been necessary previously and permitted him to engage the target without having to remove his eyes from it while loading. Thus, the experiences of the Great Fatherland War confirmed and emphasized the necessity of replacing the non-automatic rifle with a self-loading carbine. However, the transition to the self-loading carbine proved extremely difficult even for the case of keeping the combat mass of the non-automatic rifle and could not be accomplished at that time.

#### 2.6. Submachine Guns

In the course of the Great Fatherland War the place of the submachine gun as a basic type of infantry weapon was determined. The first battle showed that the submachine gun is effective as a close combat weapon primarily at night, in fog, in forest and rough terrain, but also in fighting in built up localities. The submachine gun 41 satisfied requirements with regard to combat characteristics (accuracy, penetrating

power, range of fire); however, there were a series of complaints in connection with the maneuverability and utilization (high weight of the weapon and especially of the magazine, inadequate portability for air-landed troops and special units, difficulty in changing magazines, particularly at night or while moving, non-interchangability of magazines and their susceptibility of impact and dirt, excessively high rate of fire, independent opening of the lock, unintended firing when the butt end of the weapon struck the ground). In addition, it was obvious that with the rapidly increasing requirement for submachine guns the submachine gun 41 was uneconomical to produce (high portion of machining, 60-70% decrease in the raw mass of metal through machining).

In order to obtain improvement, the drum type magazine of the submachine gun 41 was replaced by a clip or a post type magazine of 35 cartridges. However, that did not eliminate the multiple deficiencies that occurred. In 1942 competition for the development of a new model submachine gun was announced. It was to be lighter, less trouble to carry, better for employment by all arms in the services, equipped with an easily interchangeable magazine, dependable under all combat conditions as well as simpler and more economical in production and was not to be inferior to the combat characteristics of the submachine gun 41.

The designers, I. K. Besrutschko-Vysotski, V. A. Degtyarov, A. A. Saizev, S. A. Korovin, N. W. Rukavishnikov, A. I. Sudajev, G. S. Schpagin, and others participated in the competition. In the years 1942 and 1943 there were some comparative tests. Two models took part in these tests: PPS, a design of Sudayav, and PPsh 2, a design of Schpagin. Both models passed the tests; however, Sudayev's submachine gun had a number of advantages and was adopted as the 43 or PPS submachine gun for the Soviet Army. The submachine gun 43 was lighter in comparison with the submachine gun 41 (weight with loaded magazine 3.3 kg instead of 3.94 kg), shorter (length 820 mm instead of 840 mm), had a lower rate of fire (650-700 rounds per minute instead of 1,000-1,100 per minute), was more suitable for production, and could be used anywhere. The submachine gun 43 also had an effective range of 200 meters. In the course of the war, however, the requirements relating to combat characteristics of this type of weapon changed. Thus, the combat regulations of the infantry stipulated a range of 400-500 meters rather than 200 meters for the submachine gun. "The fire of a platoon is organized so that no uncovered or dead space exists in a strip of 400 meters in front of the most forward line". It states further: "In approaching the defensive position of the enemy, the platoon opens concentrated fire at 500 meters on those enemy weapons that are positioned in the most forward line." [5,6]

#### 2.6.1. Methods of Increasing the Density of Fire Between 200 and 500 Meters

Because the standard submachine guns had an effective range of only 200 meters, the urgent problem of creating a zone of concentrated fire at ranges between 200 and 500 meters was shown to be unsolved.

One trial put a sector sight graduated up to 500 meters on the existing submachine gun. However, this was not a complete solution. The probability of destroying targets at 500 meters even under the best flying conditions did not exceed 18-19% with existing designs. The effective range also increased only 25 meters through improvement of the coefficient of form from 0.8 to 0.5.

An additional test of the conversion of the SVT rifle to an automatic rifle (AVT) was undertaken 1942. But this also failed to produce the desired effect because of the cartridges used (high dispersion, rapid heating of the barrel, lack of a reliable magazine with a large capacity).

In the years 1942/43, W. F. Lyuty, N. M. Afansyev and V. S. Deikin created a model of a submachine gun with belt feeding and a bipod. With it, they succeeded in increasing the range of effective fire in comparison with that of the standard submachine gun by better stability (bipod support) and in the rate of fire (belt feeding). But was actually no longer a submachine gun but a machine gun with pistol cartridges, which could not replace but could only supplement the submachine gun.

Finally the designer succeeded in increasing the effectiveness of the pistol cartridges. However, the replacement of the submachine gun by an automatic weapon for the so-called "medium cartridge" was completed therewith. The development of this cartridge and the automatic weapons firing it at an effective range of 400-500 meters began in 1943 and ended only in the post-war period.

#### 2.7. Anti-Tank Resources

From the first days of the Great Fatherland War the pressing requirement arose for anti-tank weapons of the infantry that could be employed in mass. The pre-war developments of the efficient 14.5 mm cartridge and an effective muzzle brake, which absorbed two-thirds of the recoil energy, permitted the outstanding Soviet designers, V. A. Degtyarev and S. G. Simonov to create anti-tank rifles in a short time. In July and August 1941 tested anti-tank rifles were adopted immediately for troop use: the single-loading weapon of Degtyarov (PTRD) and the self-loading weapon of Simonov (PTRS). The simple design of the PTRD permitted it to be put into mass production rapidly. Up to the end of 1941 the troops received several thousand PTRD which played an important role in the battle for Moscow.

In the same year preparations for production of the PTRS were also made. These weapons filled a gap in the system of infantry weapons. With the BS-41 cartridge (projectile with metal-ceramic core), likewise a 1941 development, the penetration of 40 mm of armor at ranges up to 300 meters was guaranteed. (The penetrating power of the German anti-tank rifle PZB-39 did not exceed 20 mm.)

The anti-tank rifles had to be adopted without complete range testing, and they had serious deficiencies initially: there were wedge cartridge cases with the PTRD (the cartridges had to be lubricated before firing; there were double firings with the PTRS. These deficiencies were eliminated, and up to 1943, when the armor of the enemy vehicles was not more than 30 to 40 mm thick, the PTR (anti-tank rifles) proved to be the most effective anti-tank weapon of the infantry. The German army command also recognized the excellent combat characteristics of the Soviet PTR (anti-tank rifle). The technical inspector of the German Army wrote: "The Soviet Simonov anti-tank rifle...can be characterized as the most complete and most effective weapon among all currently existing anti-tank rifles of 13-13 mm caliber".

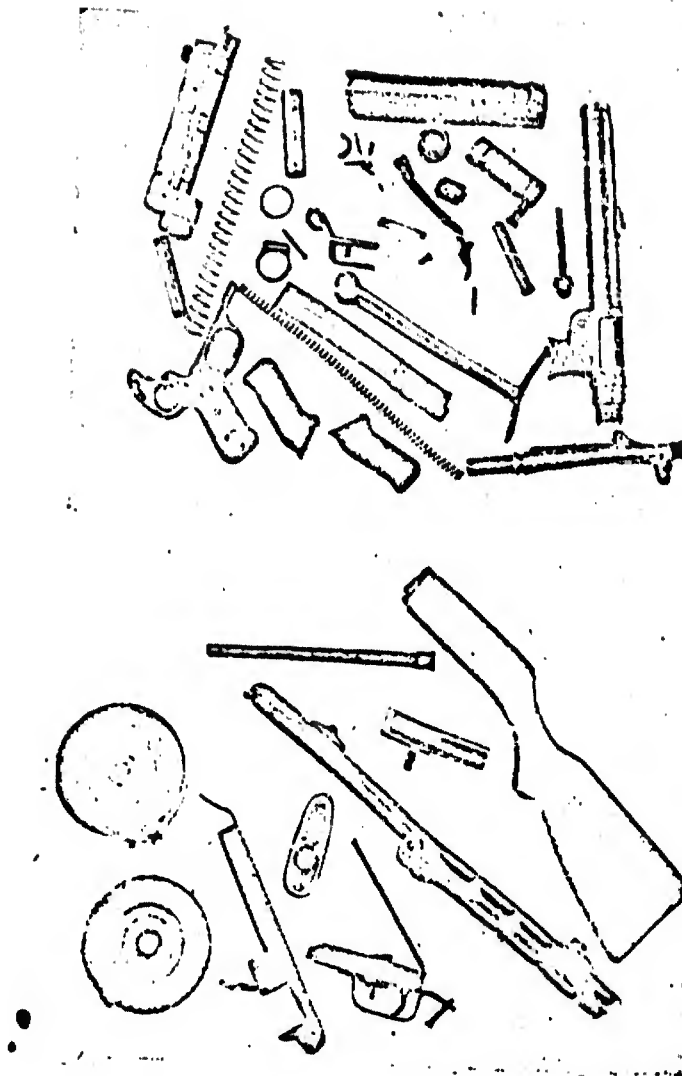
An additional increase in the penetrating power of anti-tank rifles by enlarging the caliber or also by increasing the initial velocity led, however, to the actual incorporation of the anti-tank rifle into the artillery system. This brought on a crisis in 1943 in the anti-tank armament of the infantry. The solution to the dilemma was found at the end of the war when the designers developed new types of anti-tank weapons: cumulative anti-tank grenades, rocket launcher type weapons, and recoilless rifles.

### 3. Development Trends of the Post-War Period

As the experiences of the Great Fatherland War show, the Soviet infantry weapons were not only not inferior to the armament of the enemy, but surpassed it. German specialists wrote in a comparison of their armament with that of the Soviet army: "Our weapons frequently appear to our troops to be excessively complicated and consequently to be excessively sensitive ... In all components of the armed forces the Russian weapons proved simple, operationally reliable, and easy to employ."

The uninterrupted growth of the armament production in the war years was due to the creation of a firm industrial base which was possible prior to the war. Thus, the Soviet army attained not only qualitative but also quantitative superiority in infantry weapons over the fascist armed forces. The majority of models passed the test of combat successfully and had a place in the weapons system of early post-war years.

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Figures 6 and 7. Comparison of the Completely Disassembled German 40 Machine Pistol and the Soviet Submachine gun 41 Permits One to See the Advantages of the Soviet Infantry Weapons System Oriented Toward Simplicity, Ruggedness, and Reliability (40 Machine Pistol Above, Submachine gun 41 Below).

The experiences of the war led to a significant change in the methods of weapons employment in combat. New developmental trends evolved, which can be summarized roughly as follows:

- 1) further increase in the maneuverability of weapons in conjunction with the growing tactical mobility of the infantry on the battlefield;

2) increase in the effectiveness of fire by determining the proper relationship between density and accuracy, and the proper selection of cartridge power, standardization, and the creation of all-purpose weapons;

3) making infantry weapons completely automatic and development of basic types of standard weapons, improvement in production technology in conjunction with the growing possibilities of mass production.

In the years of the Great Fatherland War the Soviet weapons designers, while completing and modernizing existing models, at the same time laid the foundation for the development of new, more nearly perfect systems of infantry weapons, which take old battle experiences into account and correspond to new combat conditions.

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## 13. ABSTRACT

This article which an abstract by the German Editors of the magazine Militaertechnik of a Soviet article begins by discussing the pre-war system of infantry weapons and follows with a discussion of further development of infantry weapons during the course of World War II. The weapons discussed in the article are: heavy machine guns, light machine guns, a company machine gun, air defense weapons, rifles, machine pistols, and anti-tank weapons. The article closes with a section on development trends of the post-war period.

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