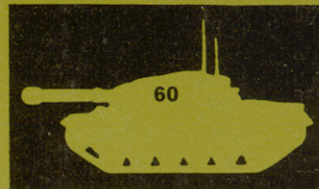


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Russian Armoured Cars (to 1945)

by John F. Milsom



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The BA-10 had a turret originally designed for a light tank.

Russian Armoured Cars (to 1945)

by John F. Milsom

THIS *Profile* covers the development of Russian armoured wheeled and semi-tracked vehicles to the end of World War II. It will be readily appreciated that information concerning Soviet armoured fighting vehicles is not easily forthcoming, and that which is available cannot be substantiated and is often conflicting.

In 1972 the Russian and East German military press published a series of articles concerning Soviet armoured car development, which illustrates a long-standing controversy over Soviet designations. These articles attribute entirely new designations to armoured car models long referred to by other nomenclatures. Due to the high security previously surrounding Soviet military affairs, the foreign press has, until recently, either relied upon unsubstantiated sources or pure speculation over the designations of such equipment. For this reason armoured car models mentioned in this *Profile* carry (where known) their true Soviet designations with previously awarded nomenclatures following in parentheses.

DEVELOPMENT BEFORE THE FIVE-YEAR PLANS

The earliest officially-recorded Russian armoured car was a project put forward to the Imperial Russian Artillery Committee during November 1899 by an engineer called Dvinitzky. This was basically a small-calibre quick-firing gun with an armoured shield mounted on a motor car. A prototype was never completed.

It was not until 1904 that attempts were made to introduce armoured cars into the Russian Army. This was stimulated by the outbreak of the Russo-Japanese War. The commander of the Cossack body of the Manchurian Army, M. A. Nakashidze, designed an armoured car and submitted it for approval. The High Command showed no interest, and he dispatched his drawings to France where the production of his vehicle was undertaken by the firm of Charron Girardot et Voigt. Thirty-six vehicles were initially ordered, but, for finan-



The Russo-Baltic armoured car had three machine-guns—one at each side and one in the front of a fixed turret. The first was built before World War I.

cial reasons, this was reduced to three prototypes. These were shipped via Germany and only one arrived, the remainder being “lost” in transit (later reappearing during German Army manoeuvres). Developed from experiences of combat in Manchuria, the vehicle proved to be of exceptionally good design. It had a large ground clearance and the wheels were protected by armoured discs as opposed to the usual practice of using wooden-spoked wheels. A portable bridging device facilitated the crossing of obstacles, such as trenches up to 3 metres in width. A machine-gun was mounted in the rotating turret, and another was stowed inside the vehicle. The armour was 4.5 mm thick, giving the car a combat laden weight of 3 tons. Its maximum speed was 50 kph.

In 1905 Nakashidze submitted an official report to the War Department wherein he requested an evaluation of the possible future value of armoured cars in the Russian Army. Following this, in 1906, a trial was carried out with experimental armoured cars along roads and across country, on a route from St. Petersburg to Venki. Experimental machine-gun firing was carried out at the Imperial Officer School. The results of this trial were favourable and an armoured car was subsequently entered in the Krasnoseliskikh manoeuvres during July 1906. The commission which tested the car stated that it was extremely valuable for reconnaissance in the rear and flanking areas of the enemy, for liaison between fronts, for disordering attacking enemy cavalry, for partisan work, and in the pursuit. Following this evaluation, it was proposed to redesign and improve the armoured car at the Izhorski Zavod, but the proposal was turned down by the War Department.

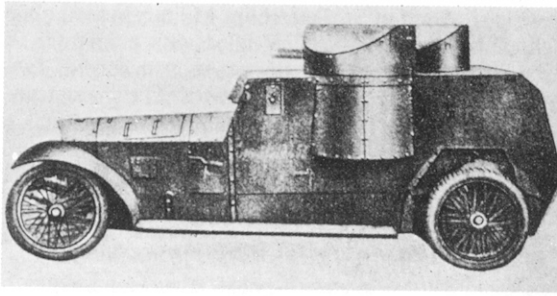
Between 1913 and 1914 a certain Colonel Dobrzhan-skiy submitted to the War Department a special paper on the use of armoured cars, together with proposals for a new armoured car model, but nothing came of this.

The production of armoured cars in Russia took place soon after the beginning of the war, in 1914. The first

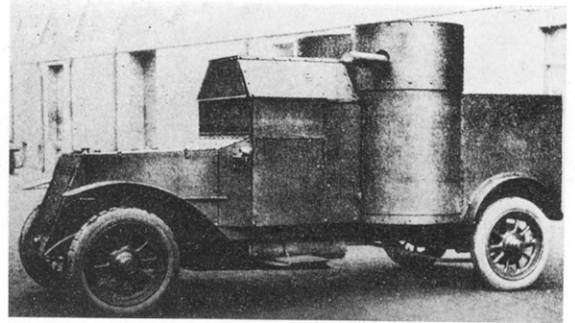
Russian-built armoured cars, armoured at the Izhorski Zavod in Kolpino, were assembled at the Russo-Baltic firm in St. Petersburg. These were four-wheeled cars with pneumatic tyres and armed with three 7.62 mm water-cooled Maxim machine-guns firing through loopholes in a fixed turret. The armour ranged from 6 to 12 mm and the vehicle was powered by a 45 hp engine. It had very good driving characteristics. The Russo-Baltic Company also carried out research on the improvement of the tactical/technical characteristics of armoured wheeled vehicles. As the result of this work an extremely efficient application of armour and a relatively good cross-country performance were achieved. By 1918 the Izhorski Zavod had produced a total of 115 armoured cars. These cars were initially formed into an armoured car company which was first employed on the North-Western Front on October 19, 1914.

During the period 1914–1916 several armoured cars were purchased from abroad, principally from England. These included 25 Sheffield-Simplex, 36 Armstrong-Whitworth, 30 Jarrot (Isotta-Fraschini), and an unknown quantity of Austin, Lanchester, Renault, Packard and Fiat types. Such vehicles formed the major part of the 100 armoured cars later employed by the White Russians. Most of these vehicles were unsuited to the Russian roads and this, coupled with a lack of technical know-how resulting in poor maintenance, gave rise to frequent breakdowns and malfunctions. One of the major problems was associated with the axles.

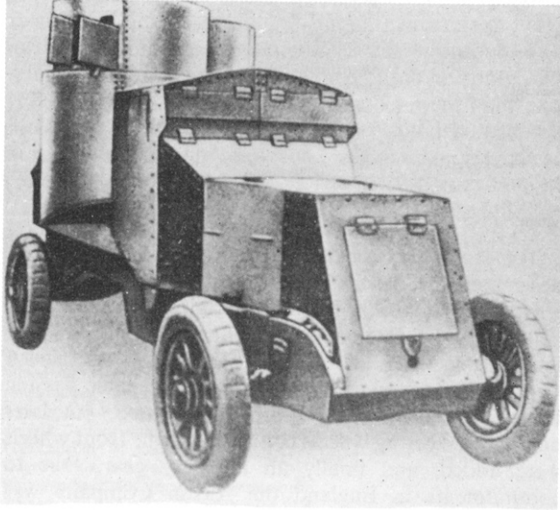
The Sheffield-Simplex, which weighed 5.9 tons, was based on the British Sheffield-Simplex 30 hp passenger car chassis and was armoured in Russia. The car was powered by a new 60 hp 6-cylinder engine and had a maximum speed of 25 mph. It had a crew of 5 men and two turrets (arranged diagonally) each mounting a 7.62 mm water-cooled Vickers-Maxim machine-gun. A novel feature was the use of rubberine-filled self-sealing tyres.



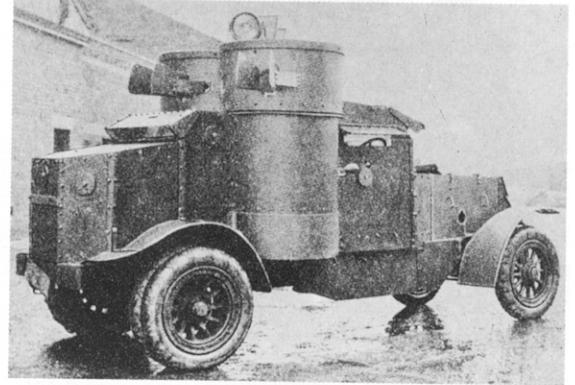
Sheffield-Simplex: 25 of these armoured cars were purchased from Britain in the first half of World War I. They were armoured in Russia.



The Austins were built with two types of armoured hull. The early type above restricted the traverse of the machine-guns because of the height of the driver's cab. The later type below allowed a greater traverse. Note also the double rear wheels on the new model.



Austin armoured car with diagonally-arranged turrets, armoured in Russia at the Putilov works.

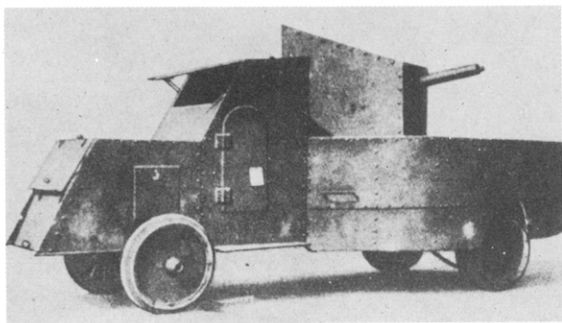


The Larsky-Ehrhardt was a German Ehrhardt touring car armoured in Russia, 1915.

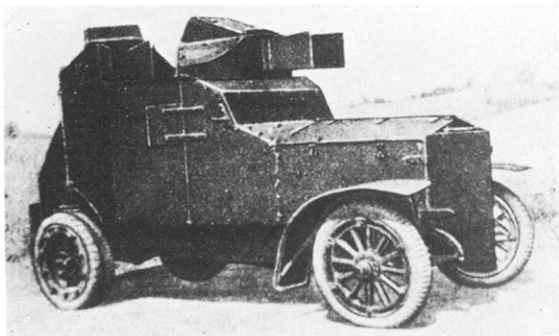


Lanchester armoured cars in service with the Russian Army, 1915.

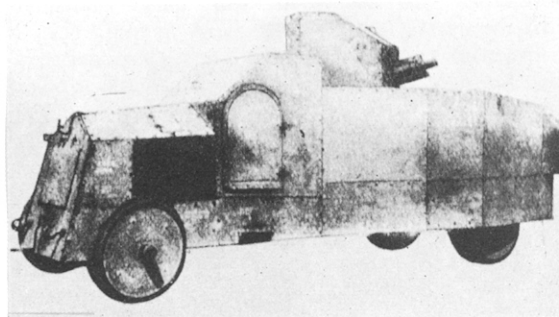




Packard heavy armoured car.



Fiat armoured car with diagonally-arranged turrets.



Pierce-Arrow heavy armoured car based on a commercial lorry chassis. Note similarity in appearance to the Packard, though the armament in this case was a 57 mm gun.

In 1914 negotiations were completed with the Armstrong-Whitworth firm to build an experimental armoured car. One was built and delivered to the Russians. This was a 4-wheeled vehicle with dual, solid rubber-tired wheels at the rear, and a revolving turret. Little else is known about this car.

The Jarrot (Isotta-Fraschini) armoured car was designed and built by the English firm of Charles Jarrot Ltd, and was based on the Italian Isotta-Fraschini 120 hp chassis. It had solid tyres and numerous mountings for machine-guns. Only one vehicle was delivered, in November 1914.

Perhaps the most important armoured car used by the Russians at this time, was the Austin. The first Austin armoured car was four-wheeled with solid-rubber tyres and 5 mm armour. Two Vickers-Maxim water-cooled machine-guns formed the armament, and these were located in two turrets mounted side by side across the hull. The early models had tyre covers. Experiments

were carried out at St. Petersburg Military Automobile School with pneumatic tyres filled with a mixture of gelatine and glycerine, but this was not successful. Two types of armoured hull were employed. The characteristics of this vehicle were as follows:

	1st Model	2nd Model
Weight:	4.14 tons	5.30 tons
Length, overall:	15.5 ft	16.0 ft
Width, overall:	6.4 ft	6.65 ft
Height, overall:	7.86 ft	7.86 ft
Ground clearance:	15.7 ins	15.7 ins
Crew:	4 men	5 men
Armament:	both types had Vickers-Maxim water-cooled machine-guns, one in each of two turrets, mounted side by side, with 270 degree traverse	
Ammunition:	usually about 6000 rounds carried	
Engine:	both models had an Austin water-cooled 4-cylinder developing 50 hp	
Fuel capacity:	both models—15.8 gallons	
Drive:	on rear axle only	
Steering:	steering on front axle, Forward direction only	steering on front axle, Forward or reverse
Wheels:	4 rubber-tired wheels	4 rubber-tired wheels, double at rear
Maximum speed—		
forward:	31 mph	31 mph
reverse	5 mph	5 mph
Range:	150 miles	150 miles

The second model of the Austin armoured car was designated the Austin-Putilov. Some of these cars had 5 mm chrome-steel armour. The original English Austin cars could be steered only from the front, and the Russians specified additional steering from the rear. A rear steering wheel operating a drum and cable passing to the normal steering controls was tried, but later duplicated steering wheels connected to the front wheels were added, and finally an auxiliary gear. Due to commitments in England the Austin Company was unable to furnish sufficient numbers of completed cars to Russia, and hence the Russians decided to buy chassis in England and armour them at the Putilov works. The cars were similar except that the hulls were slightly modified and that the turrets were placed diagonally across the hull roofs.

The Lanchester cars were of a pattern very similar to those of the Royal Naval Air Service. There was a small observation turret above the main one.

The Packard heavy armoured car consisted of a Packard truck chassis with flat armour-plates riveted on, and armed with one Maxim machine-gun in a shield on a pedestal mount. Several others were built with better armour arrangement and an additional Maxim machine-gun in the rear of the hull. These cars had armour 6 mm thick and solid rubber tyres.

Two types of Fiat passenger car were armoured and fitted with diagonally-arranged turrets. These cars carried two Maxim 7.62 mm water-cooled machine-guns, and were sometimes referred to as the Fiat 60 × 90. The characteristics of these vehicles were as follows:

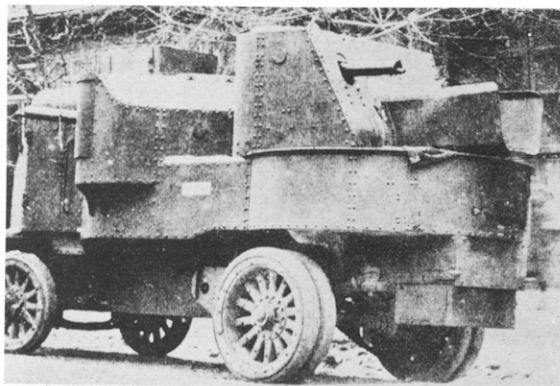
Weight:	5.3 tons
Length, overall:	15.7 ft
Width, overall:	6.25 ft
Height, overall:	8.2 ft
Ground clearance:	14 ins
Crew:	5 men
Armament:	two 7.62 mm water-cooled Vickers-Maxim machine-guns, one in each of two turrets, mounted diagonally, with 270 degrees traverse
Ammunition:	generally about 6000 rounds carried
Armour:	up to 7 mm
Engine:	Fiat water-cooled 4-cylinder developing 60 hp
Fuel capacity:	9.5 gallons
Drive:	on rear axle only
Steering:	steering on front axle, forward or reverse
Wheels:	front wheels with pneumatic tyres, double rear wheels with solid rubber tyres
Maximum speed—	forwards: 38 mph; reverse: 9 mph; Range: 88 miles

In 1914 the Pierce-Arrow heavy armoured car was introduced, based on a commercial lorry chassis and armoured with 9 mm plate. This car, which was controlled only in a forward direction, was armed with a quick-firing 57 mm gun. The original turreted cars were found to be too heavy and most of them were remodelled in Russia by removal of the turrets and building up flat-sided armour. Some of these vehicles had naval 3-pounder guns in shields at the rear of the chassis.

In the autumn of the same year the Putilov facility was organised for undertaking the manufacture of a new armoured gun car, called the Putilov-Garford. This vehicle was based on the chassis of the U.S. Garford heavy truck and was armed with either a 57 or 76.2 mm assault gun plus one machine-gun in the turret, and two further machine-guns mounted in side sponsons. The vehicle proved to be top heavy and could be controlled only in a forward direction. A number were built and considerable use made of them; they could be adapted to run along railway lines (the Germans reported these vehicles as still being in use as late as 1936 as armoured trains). The characteristics of this vehicle were as follows:

Weight: 8.6 to 11 tons (according to armament)
 Length, overall: 18.7 ft
 Width, overall: 7.55 ft
 Height, overall: 9.20 ft
 Ground clearance: 12 ins
 Crew: 8 men
 Armament: one 76.2 mm or 57 mm gun plus one MG in rotating turret at rear, two further MGs, one in each side sponson
 Ammunition: main armament—60 rounds; machine-guns—9000 rounds
 Armour: 7 to 9 mm
 Engine: Garford water-cooled 4-cylinder petrol, developing 35 hp
 Fuel capacity: 80 gallons
 Drive: on rear axle only
 Steering: front axle, forward direction only
 Wheels: solid rubber tyres, wheelbase 11 ft
 Maximum speed: roads—11 mph; rails—20 mph
 Range: 75 miles

Another English armoured car used in Russia during 1914 was the Peerless. This was a truck chassis with a box-like hull, armoured over the engine, and had a small cylindrical turret mounting one water-cooled 7.62 mm Vickers-Maxim machine-gun. The four wheels had solid rubber tyres. A further three machine-guns



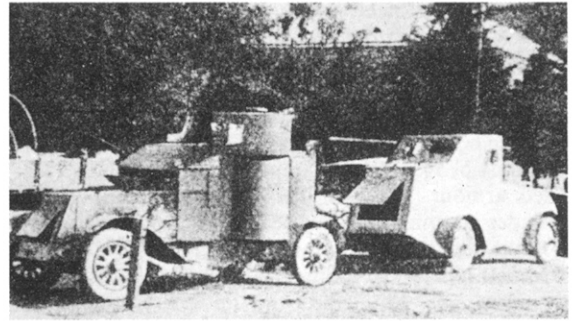
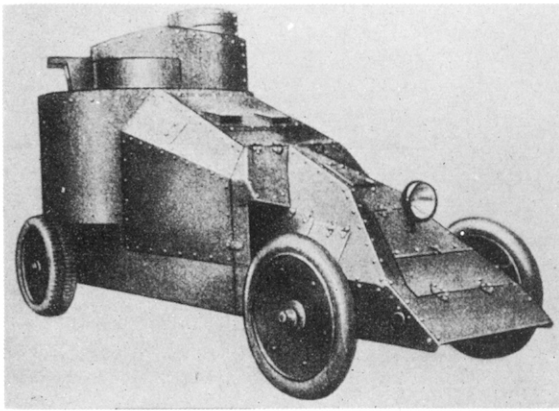
The Putilov-Garford had a formidable armament. There were right and left machine-gun sponsons behind the cab, a third machine-gun in the upper right of the turret at the rear, and a 57 mm gun in the armoured chute at the base of the turret.



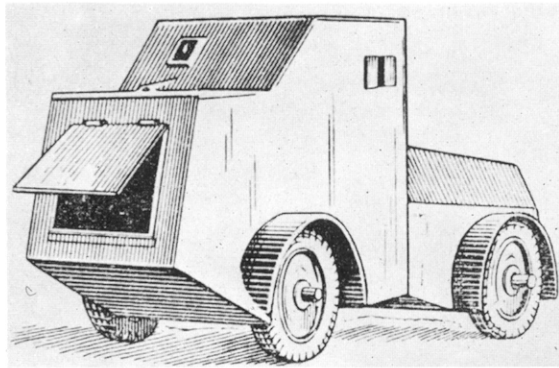
Putilov-Garford in difficulties. These vehicles could be adapted to run on railway lines.

Putilov-Garford, based on U.S. lorry chassis, 1915.





Poplavko-Jeffery AB-9 armoured car to the right of an Austin armoured car.



Renault-Mgebrov armoured car with its forward sloping armour which provided better protection than contemporary designs in other countries.

Drawing of the Poplavko-Jeffery AB-9 armoured car.

were located in the hull—one on either side and one at the rear. Unlike earlier types this vehicle had dual controls for steering forwards or backwards. The car weighed $7\frac{1}{2}$ tons, was about 20 feet long, 7 feet wide and 9 feet high. It had armour 8 mm thick and was manned by a crew of 5.

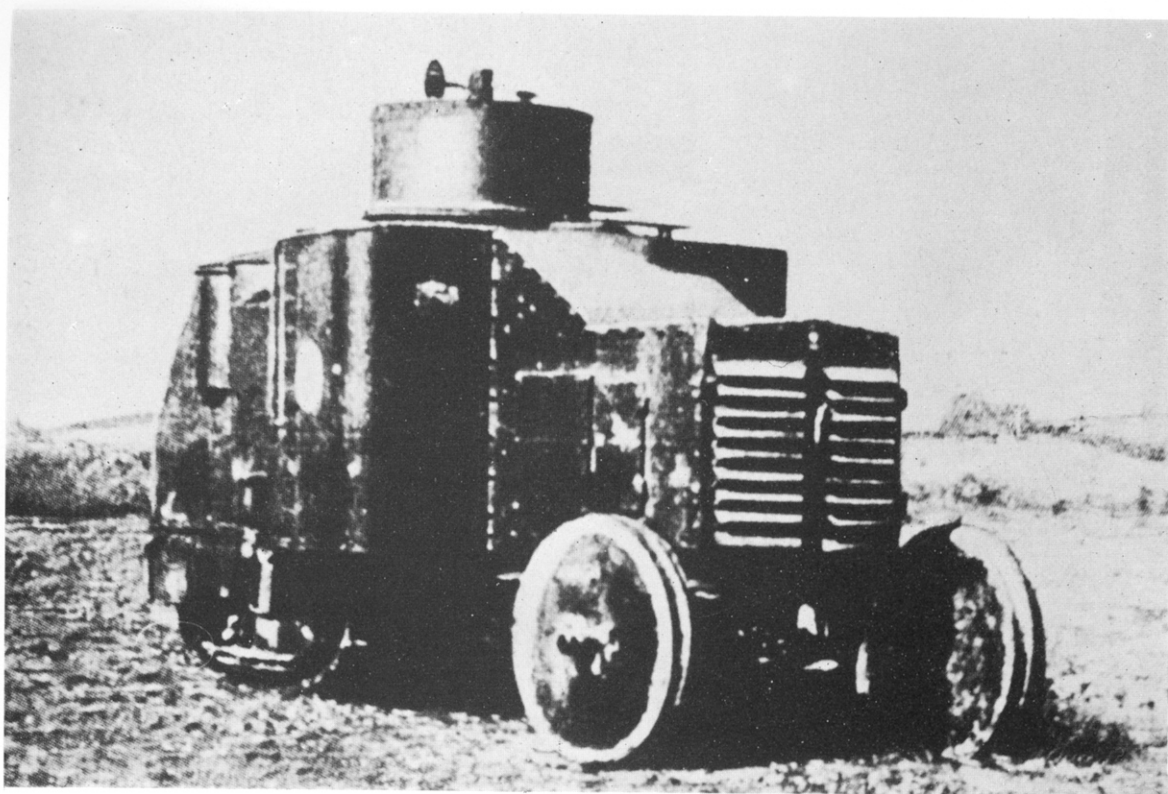
During 1915 two armoured cars were built entirely by the Russians; one designed by Captain of Cavalry Mgebrov, on the chassis of the Renault M-1915 armoured car, and the other by Staff Captain Poplavko. The Renault-Mgebrov armoured car looked unusual because of the Renault hood which made possible the forward sloping armour on this car. The Russian placement of armour was skilful in its application in that it provided an angled surface against enemy fire to a far greater degree than similar designs in other countries. Mgebrov, who was killed at the front during 1915, did not see his car completed; it went into production during 1924.

During December 1915 an officer of the 7th. Avto-bronie Battalion on the South-Western front, Staff-Captain Poplavko, put forward a proposal for a new armoured car. The armoured hull was designed for overcoming barbed-wire obstacles. To increase the mobility Poplavko decided to use a chassis with 4-wheel-drive (Jeffery). An armoured car of this type was built shortly afterwards and subsequently tested. Owing to the special hull shape, the car, whilst travelling at 5-6 mph, could break and deflect barbed-wire coils, and, with the aid of a special bridge, could cross ditches and trenches. Poplavko was summoned to St. Petersburg, where he directed the construction of his armoured car. The vehicle was tested during July 1916 at the Izhorsky Proving

Grounds. It weighed 8 tons, had a 5-man crew and 16 mm armour. Powered by two petrol engines the car was armed with two 7.62 mm Vickers-Maxim machine-guns. Trials were carried out on muddy terrain, and the armoured car overcame barbed-wire obstacles 5 rows deep (with a coil height of 3-6 feet). Following the successful conclusion of the trials, the War Ministry ordered 30 of these cars and these were formed into a special Avto-bronie battalion during October 1916 and dispatched to the South-Western front.

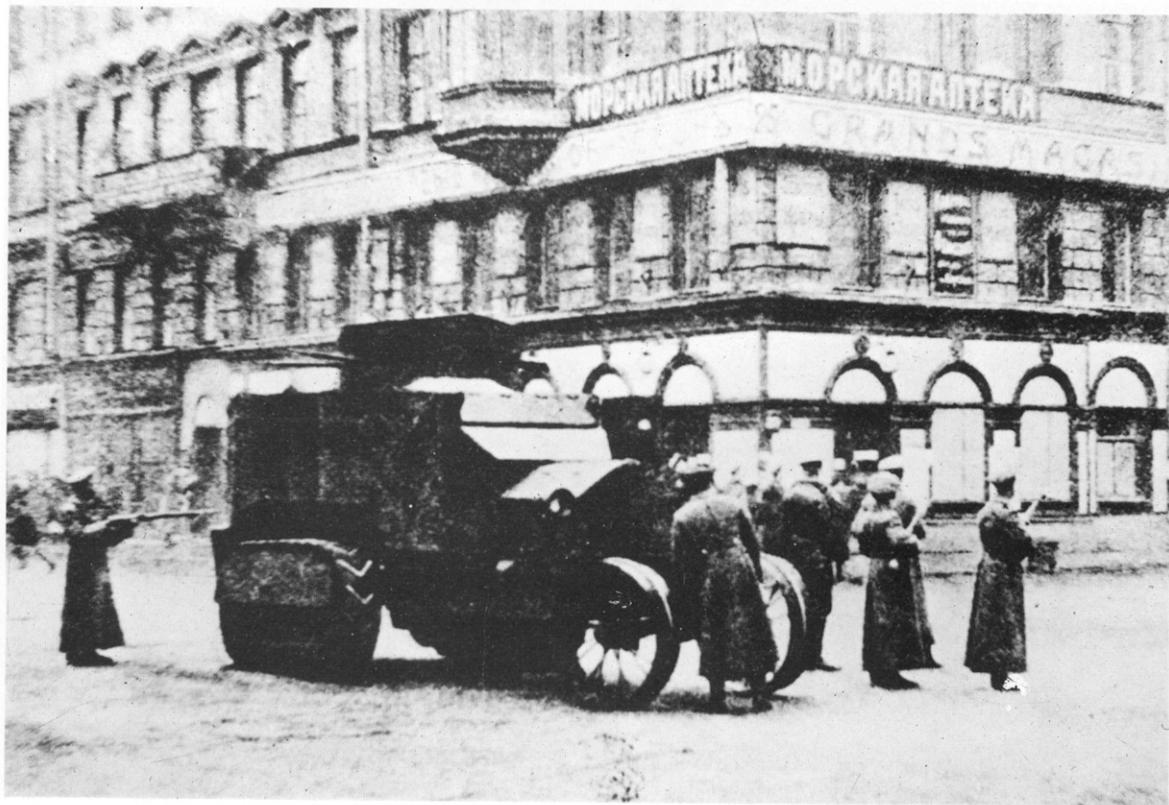
Poplavko also designed another armoured car based on the Jeffery chassis in 1917, called the Poplavko-Jeffery armoured car (AB-9). This car weighed 8 tons and had a crew of 8 men. Its most outstanding features were its four-wheel drive and double steering with a high-speed reverse. It was armoured with 16-18 mm plates and mounted two 7.62 mm water-cooled Vickers-Maxim machine-guns in ball mountings. Another unusual feature was that, like the earlier model, it was powered by two engines. It was a low vehicle with flat armour plate and had a superstructure built around the crew seats. Solid rubber tyres were originally used, but these were later replaced by bullet-proof pneumatic tyres. Double controls were provided for driving in either direction. The gearbox provided 5 speeds in forward and reverse. The car was 19.3 feet long, 7.75 feet wide and about six feet high.

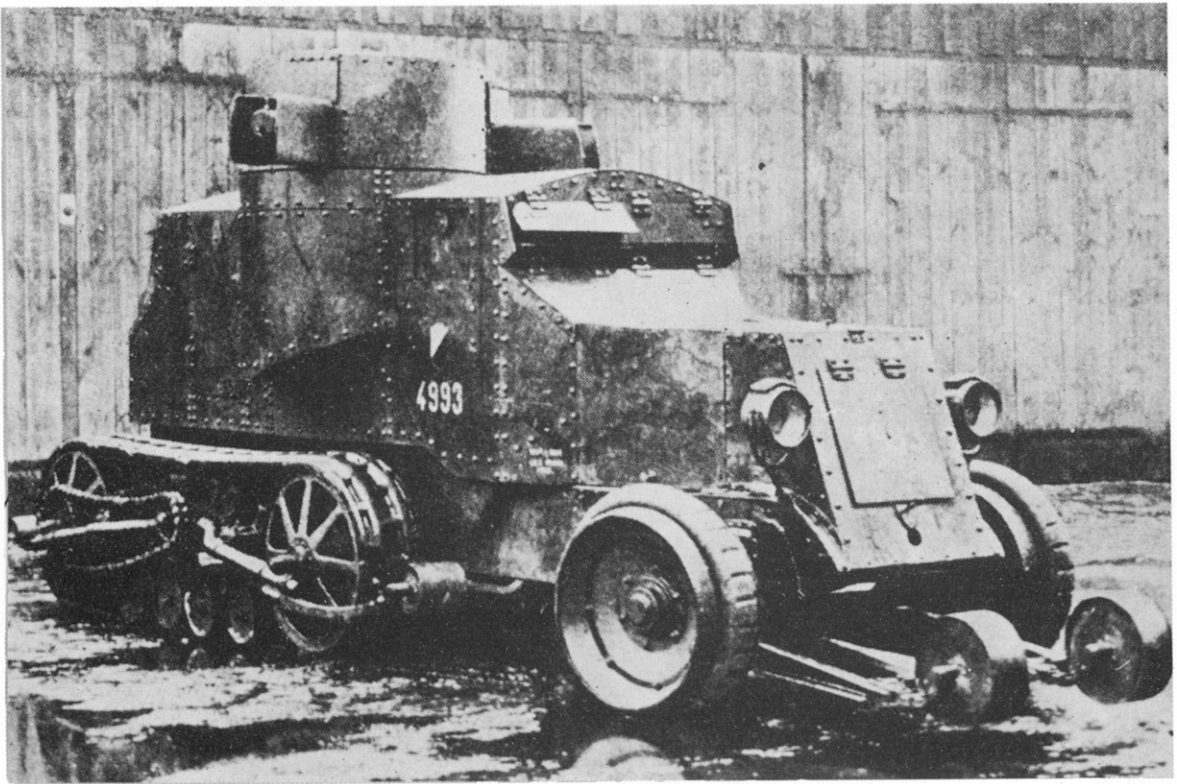
During 1915 the Russians produced their first semi-tracked armoured car, which was designed by an engineer named Colonel Gulikevich. In July of that year, Gulikevich handed over to the Main Artillery Department a report in which he proposed an armoured track-laying



Prototype of the Gulikevich half-tracked armoured car, 1915.

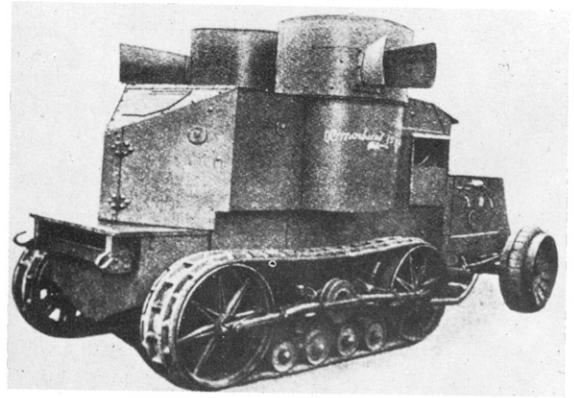
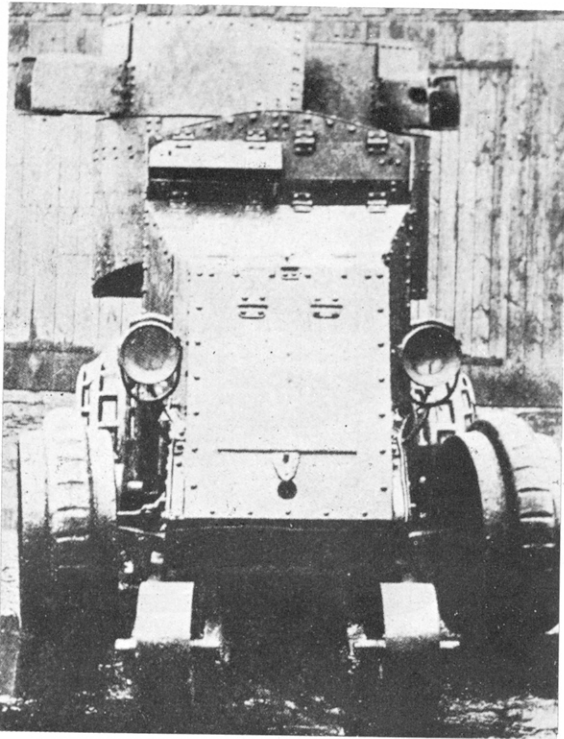
Gulikevich half-tracked armoured car taking part in riot control operations in a Russian street.





Austin-Putilov half-tracked armoured car. The small wheels in front were added to improve obstacle-crossing ability. This model had diagonally-arranged turrets.





Three-quarter right rear view of Austin-Putilov half-tracked armoured car with turrets arranged side by side.

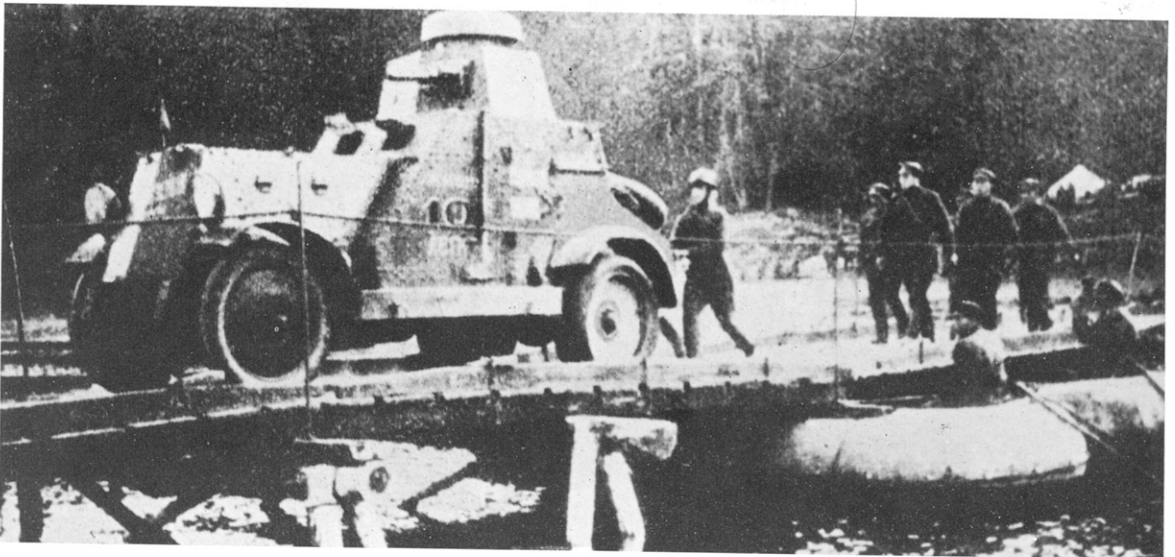
Front view of Austin-Putilov half-tracked armoured car with diagonally-arranged turrets.

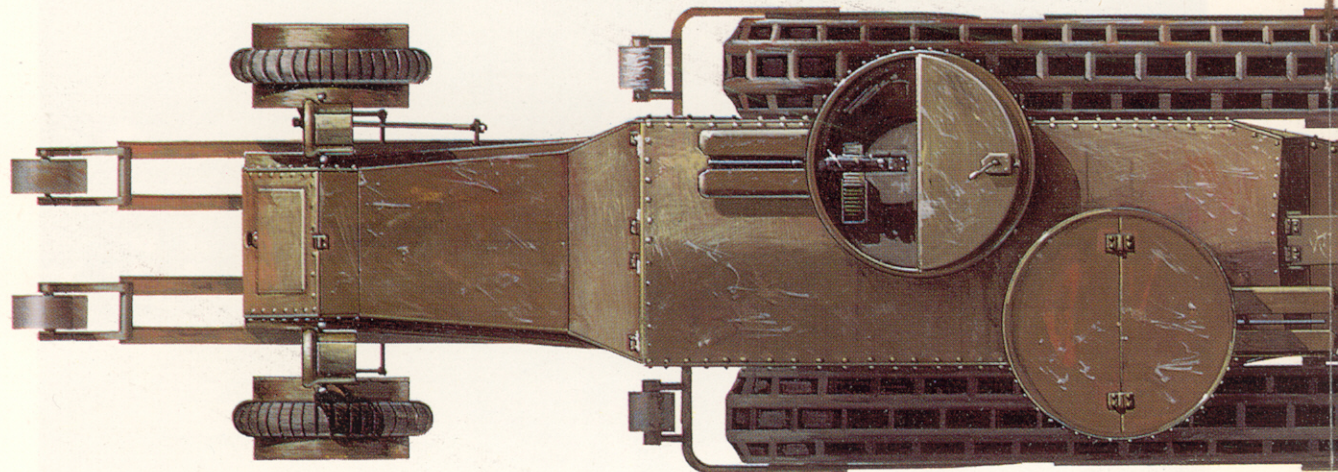
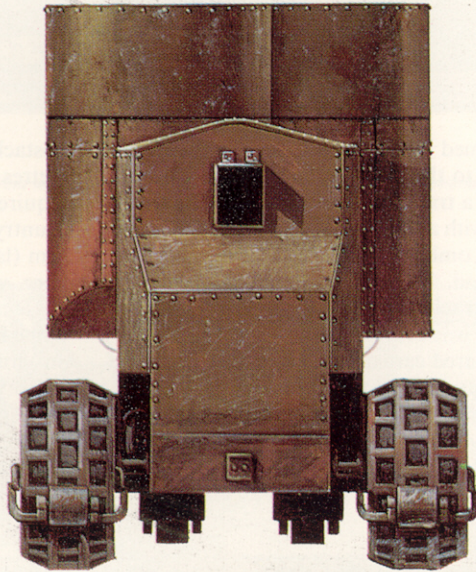
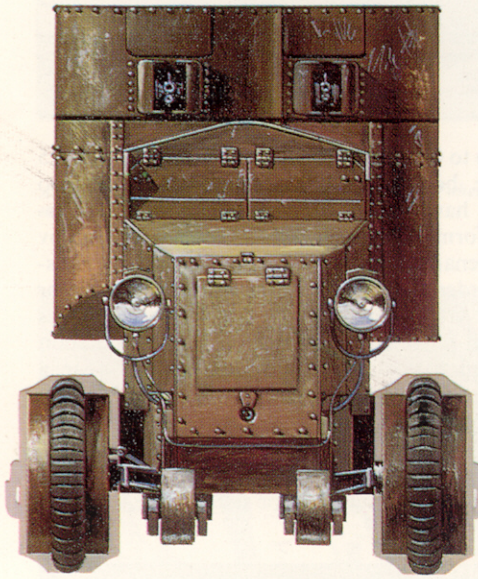
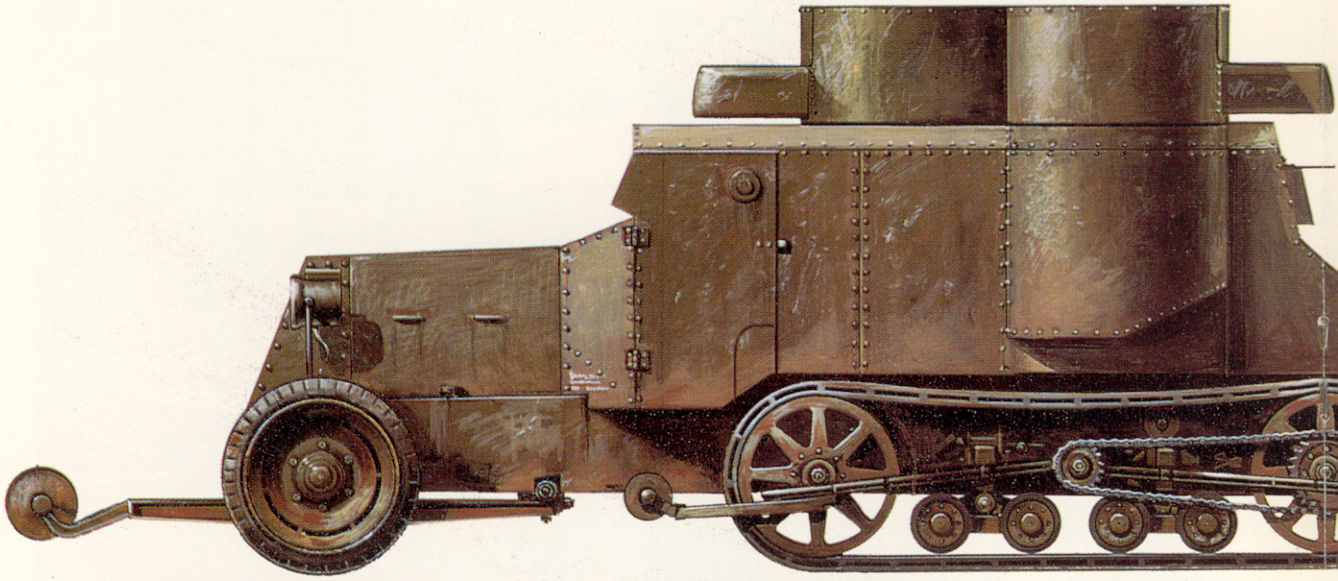
(Below) The four-wheeled BA-27 was produced under the First Five-Year Plan of 1927. Seen here is a BA-27 crossing a pontoon bridge during manoeuvres.

combat vehicle armed with a light gun and several machine-guns. Due to the poor industrial situation and the non-existence of a tractor industry, however, Gulikevich compromised with a half-tracked armoured fighting vehicle, based on a Lombard truck chassis and armoured at the Putilov Zavod. This had steel tracks with the drive on both the track section and the front wheels. Gulikevich's system was eventually applied to a number of improvised armoured cars during the Great War.

The Russian Commission for War Industry issued a directive for the creation of an improved track system to improve the mobility of armoured cars. It was required to overcome the failure in cross-country performance of existing wheeled vehicles and to be able to ascend vertical

obstacles up to 0.5 metres and to cross trenches up to 4.5 metres wide, both in forward and reverse. It was also required to have a high road speed and good cross-country performance. During 1915, therefore, the Putilov firm (later renamed Kirov by the Soviets) in St. Petersburg, was ordered to produce armoured half-tracks for the Russian Army. Three-hundred half-track assemblies of the French Kégresse type were ordered for installation on armoured cars during 1916. During this year a prototype was test run for 1500 kilometres and proved to be very successful. The armament consisted of two machine-guns and the armour was up to 7 mm thick. In the production vehicles, two turret arrangements were used—either placed diagonally or side by side. In order

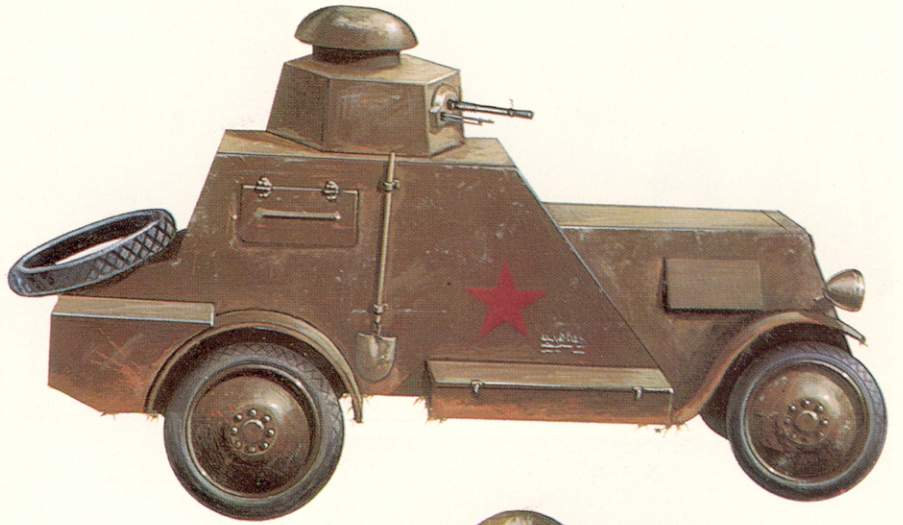




Left: Four views of A
armoured car

Right: (top) BA-27
(middle) BA-20
(bottom) BA-6

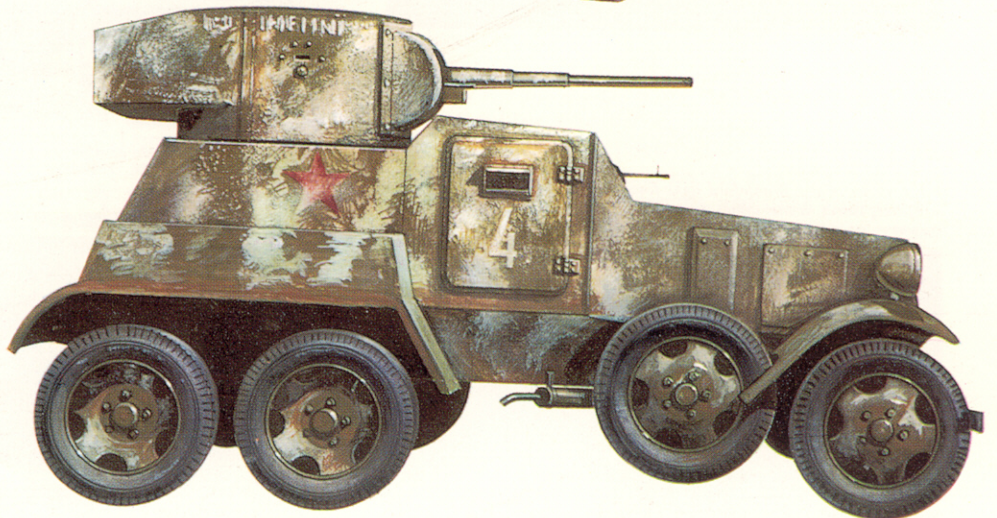
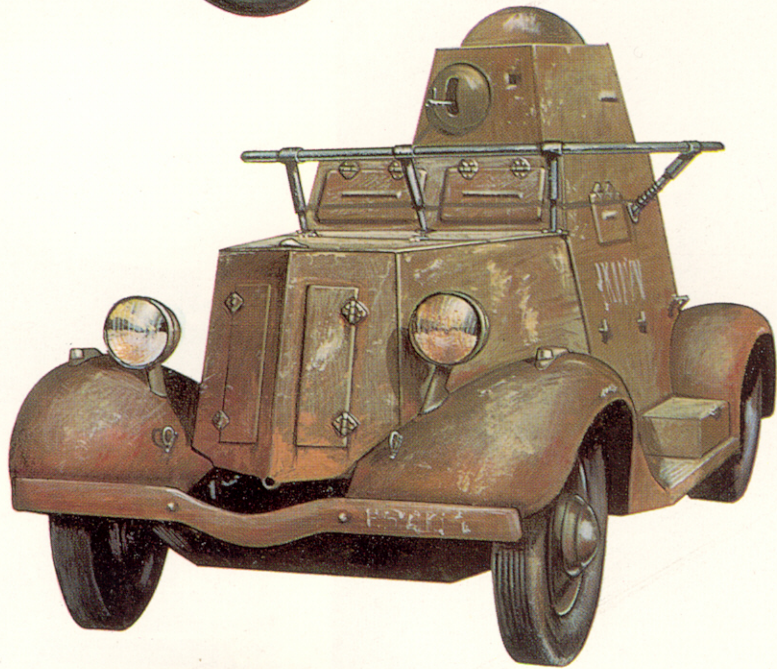
Terry Hadler © Profile

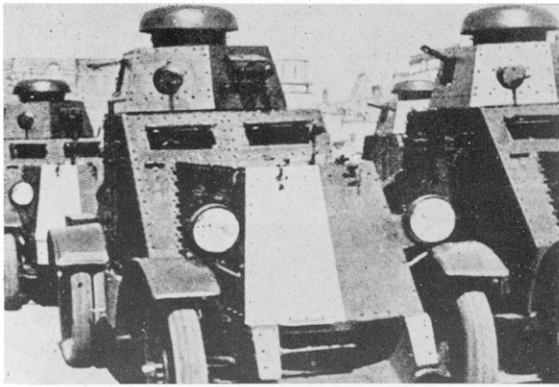


Austin-Putilov half-tracked

20(V)
6 with T-26B light tank turret

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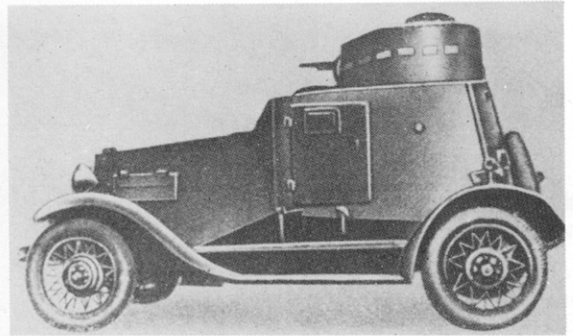
Front view of BA-27 armoured cars on parade in Red Square, Moscow.



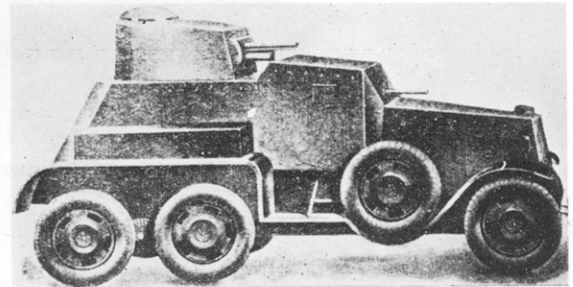
Three views of the FA-1 model of the Bronieford light four-wheeled armoured car.



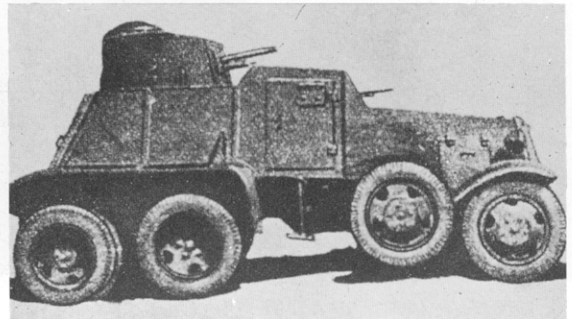
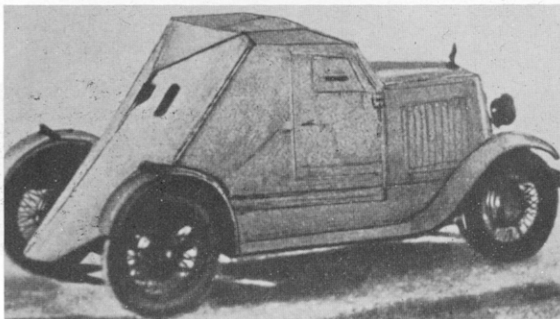
FA-2 model of the Bronieford light four-wheeled armoured car without a rotating turret. It was sometimes referred to as the Bronieford armoured saloon.



BA-3 six-wheeled medium armoured car, with riveted armour.



Later model of the BA-3 medium armoured car.



to improve their mobility these vehicles were provided with additional wheels or skis for overcoming ditches or travelling over loose snow. Sixty of these Austin-Putilov cars were completed and delivered to units.

In October 1916 the Putilov firm built a new turret for these armoured cars, mounting a machine-gun in such a way that it could fire both at ground and at aerial targets. Turrets of this type were ordered for mounting on thirty-six half-track armoured cars (two turrets per vehicle) during the autumn of 1916. These half-tracks, based on the British Austin armoured cars, were completed by the October Revolution, and several were employed in the defence of Petrograd during the autumn of 1919. They were often referred to as "Russian Type Tanks".

The success of these half-tracked armoured cars resulted in a directive in the autumn of 1916 to equip all basic models of armoured cars with half-track assemblies, but owing to the devastation caused during the revolution this undertaking was not completed.

The characteristics of the Austin-Putilov half-tracked armoured car were as follows:

Weight: 5.8 tons
Length, overall: 20.6 ft
Width, overall: 6.23 ft
Height, overall: 7.88 ft
Ground clearance: 10 in
Crew: 5 men
Armament: two 7.62 mm water-cooled Vickers-Maxim machine-guns, one in each of two turrets, mounted either diagonally or in juxtaposition, with 270 degrees traverse
Ammunition: generally about 6000 rounds carried
Armour: up to 7 mm
Engine: Austin water-cooled 4-cylinder developing 50 hp
Fuel capacity: 15.8 gallons
Drive: tracked section only
Steering: front wheels and clutch and brake on tracked section
Running gear: solid rubber-tyred front wheels, rubber tracks and coil-spring suspension on bogies (track width: 11.8 ins)
Maximum speed: 16 mph
Range: 50 miles
Trench crossing ability: 5.8 ft
Fording depth: 2.0 ft
Grade ability: 30 degrees
Vertical step: 1.4 ft

During the Civil War the Soviets made every effort to convert available lorries and cars to armoured vehicles, and made considerable use of the resultant improvisations. Some conversions were thorough and undertaken by the various steel plants and heavy-duty machine shops. Prominent among the latter were the railway construction and repair plants such as Obukhav and Izhor.

With the success of the Soviet forces, on January 31, 1918 the People's Commissariat issued a special directive covering the formation of the first central command organisation for armoured sections, resulting in the foundation of the Armoured Department Council (Tsentrobron). The first armoured section in the Soviet Army was equipped exclusively with armoured cars and armoured trains. In August 1918 Tsentrobron was placed under the command of the Directorate of Military Engineering, and by November the new armoured force was in possession of 38 armoured car detachments with a total of 150 armoured cars. With subsequent defeats of White forces this number gradually increased. The Putilov half-tracked armoured cars were successfully employed in the battle against Udenich during 1919. In October of the same year, five half-tracked armoured cars were attached to the 2nd Rifle Division, 7th Army, and took part in the battle around Petrograd. Half-track armoured cars were also employed successfully during the counter-offensive to take Karlino.

DEVELOPMENT UNDER THE FIVE-YEAR PLANS BEFORE THE SECOND WORLD WAR

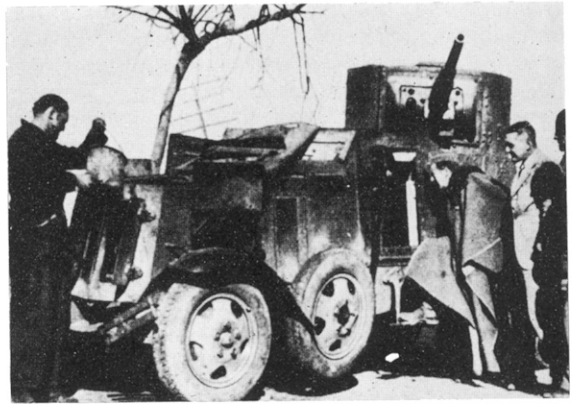
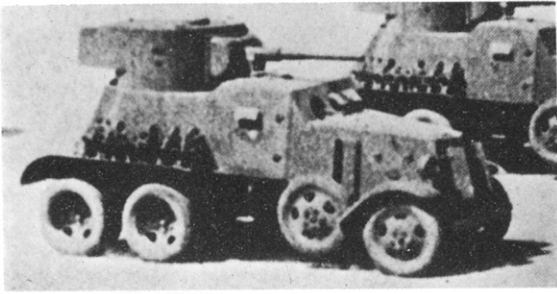
No further official armoured car development took place until the introduction of the First Five-Year Plan in 1927, when the production of armoured cars was undertaken on a relatively large scale. During the initial discussions over the equipment of the Red Army, it was envisaged that mechanised brigades would each have 56 armoured cars and mechanised corps would have 215. In order to turn out such large numbers of armoured cars, models were developed which were easy to mass-produce and, wherever possible, utilised standard commercial vehicle components.

The Red Army received its first 1927 armoured car series based on the GAZ-A 4-seater, 4-cylinder engined car. Ford vehicles so armoured were called "BA" (Bronievotomobil = armoured automobile), although the "A" was often dropped, so that vehicles were called e.g. B-20, rather than BA-20.

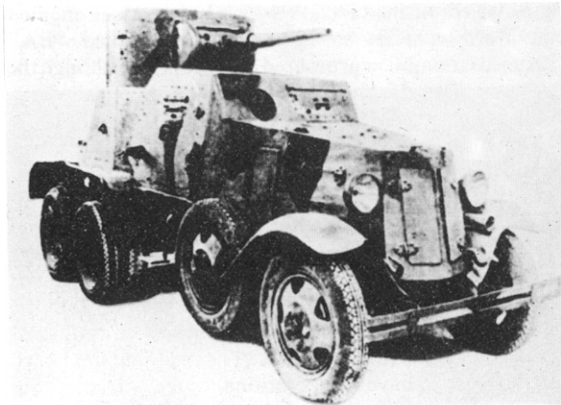
The mobile cover provided by armoured cars was considered to be of particular value to the infantry and cavalry, but they were to be used principally for communication and reconnaissance work in advanced positions. The main advantage of the armoured car was considered to be its mobility, which would make it possible for the infantry and cavalry to keep up with the tanks and to support them, developing well co-ordinated operations in defence or attack. The medium and heavy models were to have an operational range of from 125 to 190 miles, enabling them to operate to a depth of 95 miles from their base, and return for more fuel or for maintenance, although with intermediate bases on route longer ranges would be possible. On a good road an armoured car was expected to achieve an average speed of 25 mph, though speeds of 40 mph and more would be of great advantage. In order to increase the manoeuvrability of armoured cars (when used in conjunction with tanks), the tank experts insisted that these should be equipped with removable tracks for the rear wheels. This would, to a certain extent, make them independent of firm terrain and able to traverse fields, snow, sand and ploughed land. (These experts did not seem, at this stage, to be willing to adopt the half-track which they had found cumbersome during the Civil War, and which had proved expensive to manufacture and difficult to maintain.) The armoured cars were to utilise commercially-produced car and lorry chassis, and were to be fitted with removable flanged wheels to enable them to travel on rails. The normal wheels were to be provided with tough, resilient rubber tyres or multi-chambered pneumatic tyres, and sometimes tyres containing a liquid which would harden over bullet-holes. All armoured cars were to be immune to shell fragments, and small arms bullets at ranges above 200 metres. The armament was to consist of machine-guns on lighter cars and 37 or 45 mm anti-tank guns on the heavier models, located in fully-rotating turrets. The interiors were to be electrically-lighted, and ammunition stowed in readily accessible containers, while tools were to be carried for lighter repairs. Observation slits were to be provided in the turrets and other areas of the armoured cars occupied by crew members.

Engineers from the GUPV (The Soviet Tank Design Board), working alongside German engineers, designed a series of armoured cars at the secret Kazan tank establishment. These were rather improvised designs.

Under the early five-year plans the Soviets built up a

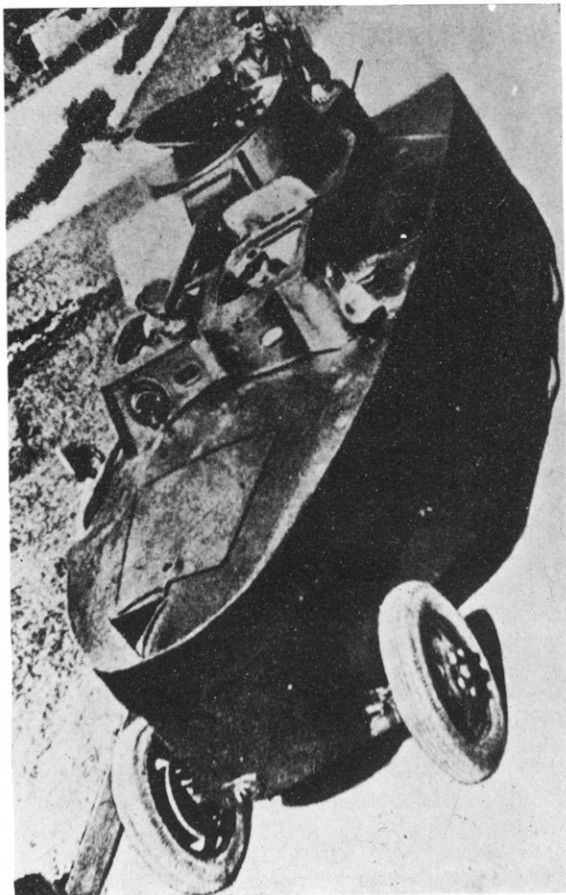


BA-6 armoured car in service in Spain during the Spanish Civil War.



BA-6 armoured car with T-26B light tank turret.

Three-quarter front view of BA-6 armoured car. (top left)



BAZ Amfibi on land.

huge tank force comprised of various models of tanks and armoured cars. These were built in the new giant automobile and tractor combines founded from 1929 onwards. Initially, these armoured cars were classed as mobile artillery, but later on the Soviets began to employ them for their true role—reconnaissance.

The first four-wheeled armoured car was the BA-27 which, in its original form, had a riveted hull and turret (the same as that used on the MS-III light tank). In the turret was mounted a short-barrelled 37 mm gun, and to the right of this, in a ball mount, a 7.62 mm air-cooled tank machine-gun. One fault of this vehicle was that the rear fuel tank obstructed the gun, but even so the vehicle was very self-contained and could be produced in a very short time. A large number of these cars were turned out, and commanders' models had radio equipment. The characteristics were as follows:

Weight: 4.5 tons
 Length, overall: 14.82 ft
 Width, overall: 5.93 ft
 Height, overall: 8.0 ft
 Ground clearance: 10 ins
 Crew: 2 to 4 men (depending on role)
 Armament: short 37 mm tank gun and coaxial 7.62 mm DTMG (in separate ball mountings)
 Ammunition: 250 rounds of 37 mm, 3000 rounds of 7.62 mm
 Armour: 6 to 13 mm
 Engine: AMO-3 6-cylinder water-cooled developing 60 hp at 2200 rpm
 Fuel capacity: 16 gallons
 Drive: rear axle
 Steering: front wheels
 Wheels: 4 bullet-proof, pneumatic tyred wheels; rear pair double-tyred
 Maximum speed: 28 mph
 Range: 80 miles

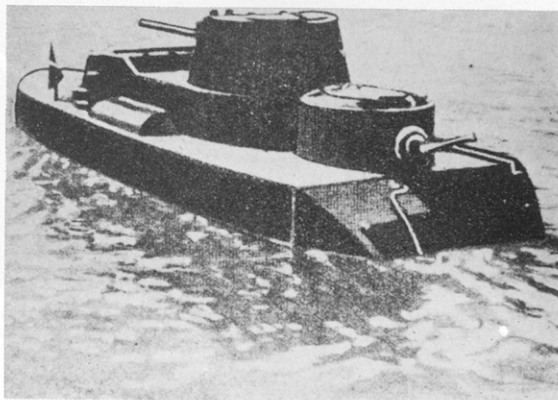
During 1930 the Bronieford armoured car was placed in mass production. Like the BA-27, the Bronieford was also based on the Model A chassis but was produced in two variants. The turreted model was called the FA-1 and was armed with a DTMG. The turret was so small that its roof armour (as well as that on the driver's compartment) was domed to provide room for the crew. A special railway version of the FA-1 was produced, designated FA-1 Sh.d (Shelesnaya Doroga = railway). Some vehicles had no rotating turret and in this form were designated FA-2. These cars were modernised BA-27s with angled side armour and spoked wheels as opposed to the solid type employed on the former. These cars were 4-wheeled with drive on the rear axles only. The turretless FA-2 was also known as the Bronieford armoured saloon; it had an open top with a pedestal-mounted 7.62 mm DT tank machine-gun. Both models went into production during 1932, at the Gorki automobile works.

The characteristics were as follows:

	FA-1	FA-2
Weight:	3.2 tons	2.1 tons
Length, overall:	12.15 ft	9.88 ft
Width, overall:	5.41 ft	4.27 ft
Height, overall:	6.32 ft	5.09 ft
Ground clearance:	8.66 ins	8.66 ins
Crew:	2 men	2 men
Armament:	Optional: usually one or two DTMGs. FA-1, one MG mounted in turret; FA-2 both MGs fired through loopholes	
Ammunition:	Optional	Optional
Armour:	8-9 mm	5-6 mm
Engine:	GAZ A 4-cylinder water-cooled developing 40 hp at 2200 rpm	
Fuel capacity:	2.5 gallons	2.5 gallons
Drive:	rear axle	rear axle
Wheels:	pneumatic-tyred spoked	wheels, bullet-proof
Maximum speed:	47 mph	53 mph
Range:	156 miles	156 miles

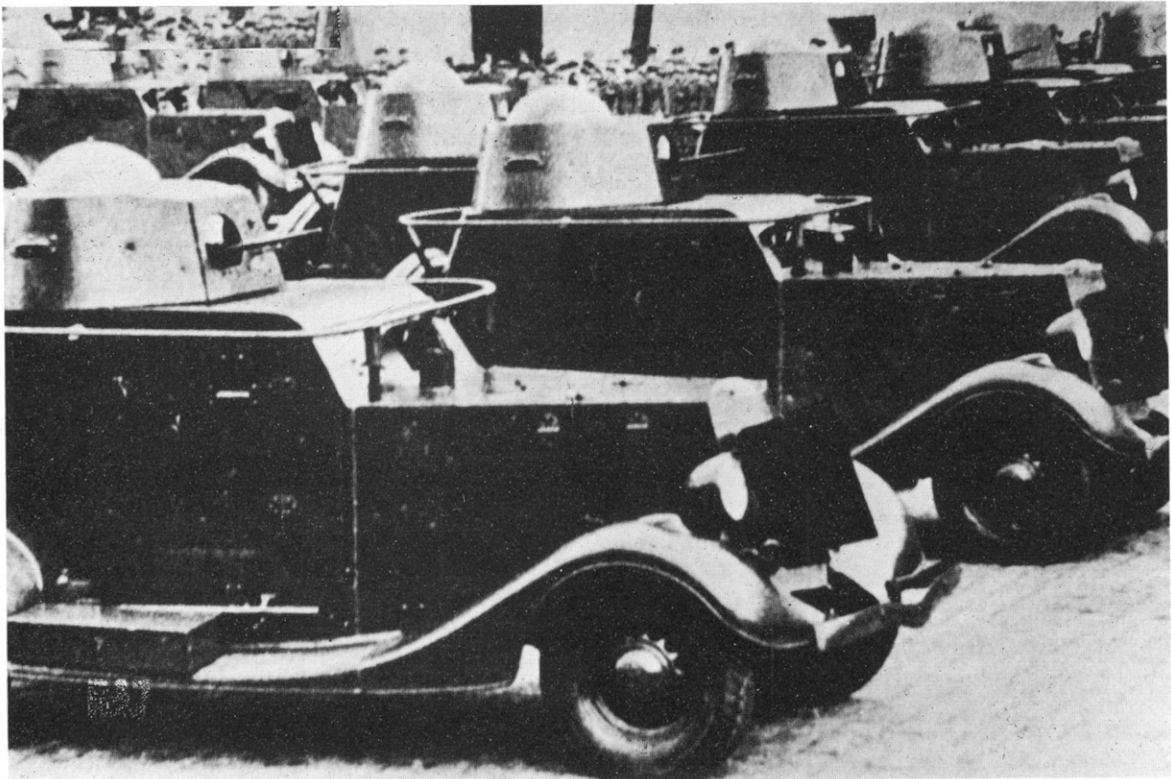


Front and rear views of BAZ Amfibi afloat.



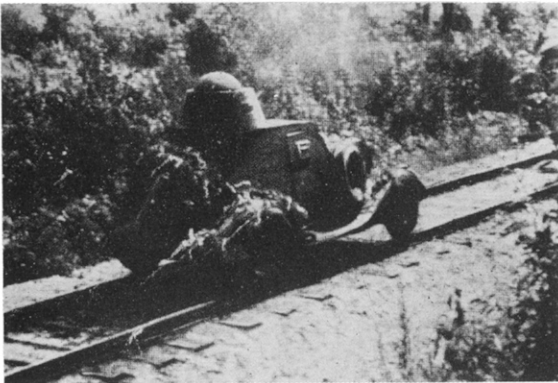
BA-20V with frame aerial round the hull. The BA-20 was a re-designed version of the Bronieford.



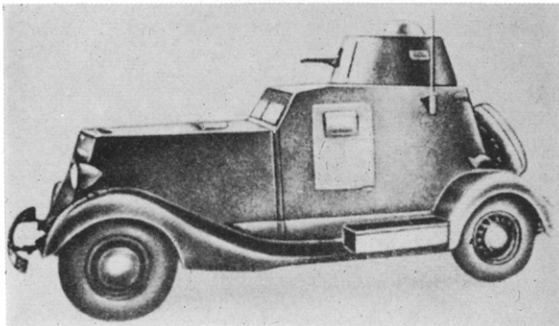


BA-20V armoured cars on parade. The BA-20 (or B-20) was a modified Bronieford with a new turret and domed cupola. Armament was a single machine-gun. The "V" signified that the car had a radio and was fitted with a frame aerial round the hull.

BA-20 Sh.d. was a special version of the BA-20 adapted to run as a rail-car. Sh.d. = Shelesnaya Doroga = railway.



BA-20M was a newer model of the BA-20. It had an aerial on the left-hand side in place of the frame aerial of the BA-20V.



Redesign of the Bronieford led to two other light armoured car models, the D-8 and the D-12. A further medium armoured car—the D-13, and the modernised BA-27M were also turned out during 1932.

During the period of the First Five-Year Plan other armoured cars were produced such as the BA-3, BA-6 (previously referred to as the BA-10), and the BA-9, all of which were medium armoured cars based on the GAZ-AAA 6-wheeled commercial lorry chassis. This 6-wheeled lorry chassis was reinforced for cross-country use, and had improvements in the suspension system.

The BA-3 model had riveted armour (ranging from 6 to 15 mm) and had a small turret mounting either a 37 mm or a 12.7 mm DshK heavy machine-gun. A further 7.62 mm machine-gun was placed in the hull to the right of the driver. The wheels were provided with pressed-steel hubs, and when travelling across country tracks could be attached to the rear wheels to improve the performance. These were stored on the rear mudguards when not in use. This car was also built at the Gorki works.

The BA-6 had a square-cut welded hull with a new turret—taken from the T-26B light tank. Some cars had the turret of the BT-3 tank. All models mounted a 37 or 45 mm semi-automatic tank gun. The BA-6 had a buggy-whip type aerial and a standard all-round periscope located in the turret top for the commander. It was employed during the Spanish Civil War and some were sold to Turkey. A special railway version was designated BA-6 Sh.d. The characteristics of the BA-3 and BA-6 were as follows:

	BA-3	BA-6
Weight:	5.2 tons	7.0 tons
Length, overall:	15.3 ft	15.4 ft
Width, overall:	6.9 ft	6.56 ft
Height, overall:	7.2 ft	7.22 ft
Ground clearance:	8.5 ins	8.6 ins
Crew:	4 men	4 men
Armament:	37 mm short tank gun 12.7 mm DshK HMG (both models had two 7.62 mm DTMGs, one in turret, one in hull next to driver)	37 mm or 45 mm long tank gun
Ammunition:	49 × 37 mm or 850 × 12.7 mm and 2000 × 7.62 mm	49 × 37 or 45 mm and 2000 × 7.62 mm
Armour:	6-15 mm	8-15 mm
Engine:	GAZ-M1 4-cylinder water-cooled developing 50 hp at 2800 rpm	GAZ-M1 4-cylinder water-cooled developing 50 hp at 2800 rpm
Fuel capacity:	52 gallons	52 gallons
Drive:	both rear axles	both rear axles
Steering:	front wheels	front wheels
Wheels:	6 bullet-proof, pneumatic-tired wheels, 4 rear wheels double-tired with detachable tracks	6 bullet-proof, pneumatic-tired wheels, 4 rear wheels double-tired with detachable tracks
Maximum speed:	35 mph	35 mph
Range:	160 miles	160 miles

There was an amphibious model of the BA-6, designated the BAZ, or "Amfibi". This vehicle was influenced by German vehicles tested at Kazan. It was an armoured cross-country amphibious car and had a boat-shaped hull. The chassis was that of the Ford AAA 3-axled lorry. At the front were two sponsons (about 18 inches high). In the right-hand sponson was mounted a partially-covered DTMG, in the left was located the driver. Immediately behind the sponsons, almost at the centre of the hull, was the fully-rotating turret, mounting one 37 mm anti-tank gun. Behind this, at the rear of the hull, was mounted an auxiliary turret rotating through 270 degrees and armed with one DTMG. The crew of this car consisted of one vehicle commander (who also fired the gun), two machine-gunners, and the driver. Not very many of these cars were made. The characteristics were as follows:

BA-10 six-wheeled armoured car being inspected by British troops while its Russian crew take a becomingly modest pride in their vehicle. The photograph could well have been taken in Persia in 1941 after Russian and British contingents (including Indian Army troops) had entered Teheran simultaneously on September 17 of that year. Note the white cross on the turret lid for air identification.



Rear view of BA-20M. This new model of the BA-20 was welded throughout—another point of recognition as well as its whip-type aerial on the left-hand side.

Weight:	7 tons
Length, overall:	21.3 ft
Width, overall:	6.9 ft
Height, overall:	7.2 ft
Ground clearance:	8.5 ins
Crew:	4 men
Armament:	37 mm gun and two 7.62 mm DTMGs
Ammunition:	49 × 37 mm, 3000 × 7.62 mm
Armour:	6-14 mm
Engine:	GAZ-M1 4-cylinder water-cooled developing 50 hp at 2800 rpm
Fuel capacity:	52 gallons
Drive:	land: both rear axles water: 2 brass propellers, 15 inches diameter, at rear
Steering:	land: front wheels water: single rudder at rear
Wheels:	6 bullet-proof, pneumatic-tired wheels, with steel discs. Rear wheels double tyred
Maximum speed:	land: 35 mph water: 6.5 mph
Range:	160 miles (land)

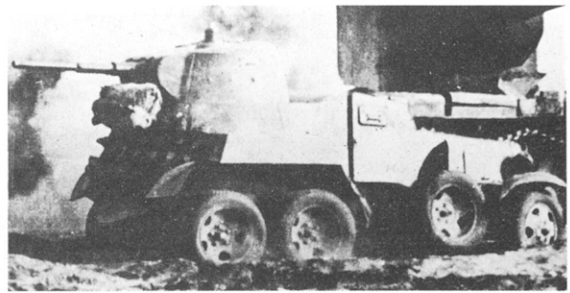




Three-quarter left rear view of BA-10 showing tracks fitted round its rear wheels for cross-country movement. All the six-wheeled armoured cars could be similarly fitted.

As with these other early cars, the vehicle was built at Gorki. Some were fitted with radio equipment.

During 1931 a redesigned version of the Bronieford appeared, designated the BA-20 (or B-20). This utilised the chassis of the GAZ M-1 Ford car then entering production. It was a modified Bronieford with a new turret, single machine-gun, domed cupola and, in some cases, a frame aerial around the hull (in this latter case the vehicle was called the BA-20V). Some early production BA-20s had the old BA Bronieford turrets. A special railway version was called the BA-20 Sh.d. Later on the basic design was modernised and the new model was referred to as the BA-20M. This car was welded throughout and had an aerial on the left-hand side of the hull, in place of the large frame-type previously used on the BA-20V. The characteristics were as follows:

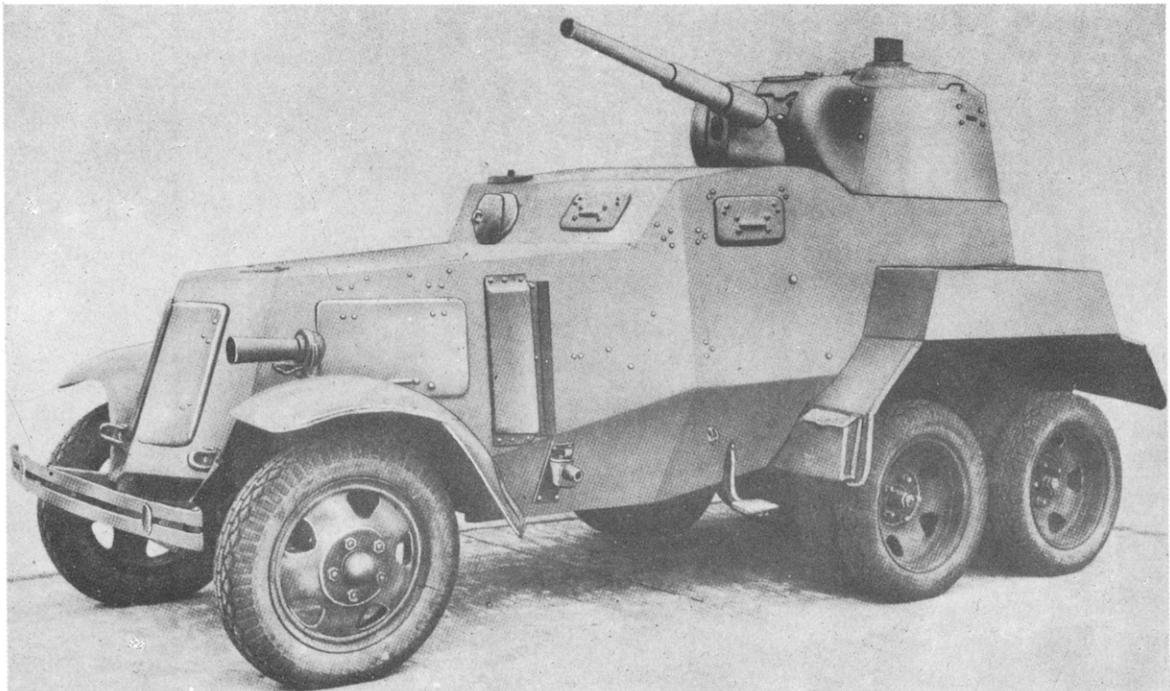


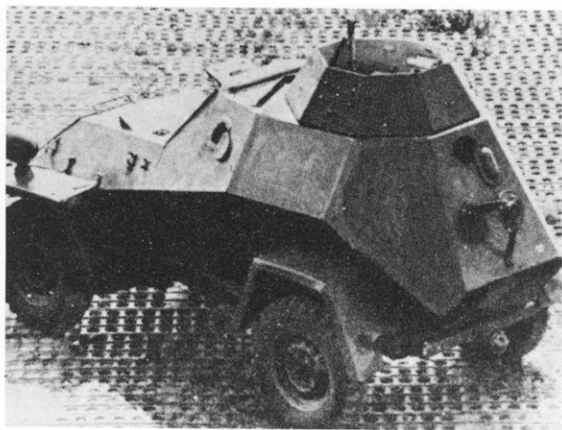
BA-10 in action with its turret, mounting a semi-automatic 45 mm tank gun and a 7.62 mm DTMG, pointing to the rear. Note the standard all-round periscope for the commander protruding from the turret top.

	BA-20	BA-20M
Weight:	3.2 tons	2.5 tons
Length, overall:	12.20 ft	14.11 ft
Width, overall:	5.49 ft	5.74 ft
Height, overall:	6.33 ft	7.0 ft
Ground clearance:	5.0 ins	9.5 ins
Crew:	2 men	2 men
Armament:	one 7.62 mm DTMG in turret, machine-pistols, smoke-generators and gas mines	
Ammunition:	7.62 mm: 1386 rounds; 12 gas mines	
Armour:	9-10 mm	9-10 mm
Engine:	GAZ-M1 4-cylinder water-cooled developing 50 hp at 2800 rpm	
Fuel capacity:	51 gallons	51 gallons
Drive:	rear axle	rear axle
Wheels:	4 solid-rubber tyred wheels	4 pneumatic tyred wheels
Maximum speed:	47 mph	55 mph
Range:	280 miles	280 miles

In 1934 the BA-10 armoured car appeared (also referred to as the BA-32). This vehicle had the same hull as the earlier 6-wheeled types but had a turret originally designed for the T-30 experimental light tank (round welded) which mounted a 45 mm semi-automatic tank gun. The vehicle was also provided with two 7.62 mm DTMGs and was often referred to as the BAF. It was based on the GAZ-AAA lorry chassis and was powered

BA-10M was a new model of the BA-10 that appeared in 1937.





Although primarily designed for liaison work the BA-64 was also used for other roles.



U.S. armoured half-tracks were among the many thousands of armoured, and other vehicles supplied to the Soviet Union by Britain, the United States, and Canada during World War II.

by a 4-cylinder 50 hp engine. With a weight of 5.2 tons the car had armour 10 mm thick on the front and sides. The hull MG was manned by the radio operator. The car had a maximum speed of 53 mph and a road range of 185 miles. All had radio equipment. Other characteristics of this vehicle were similar to those of the BA-6.

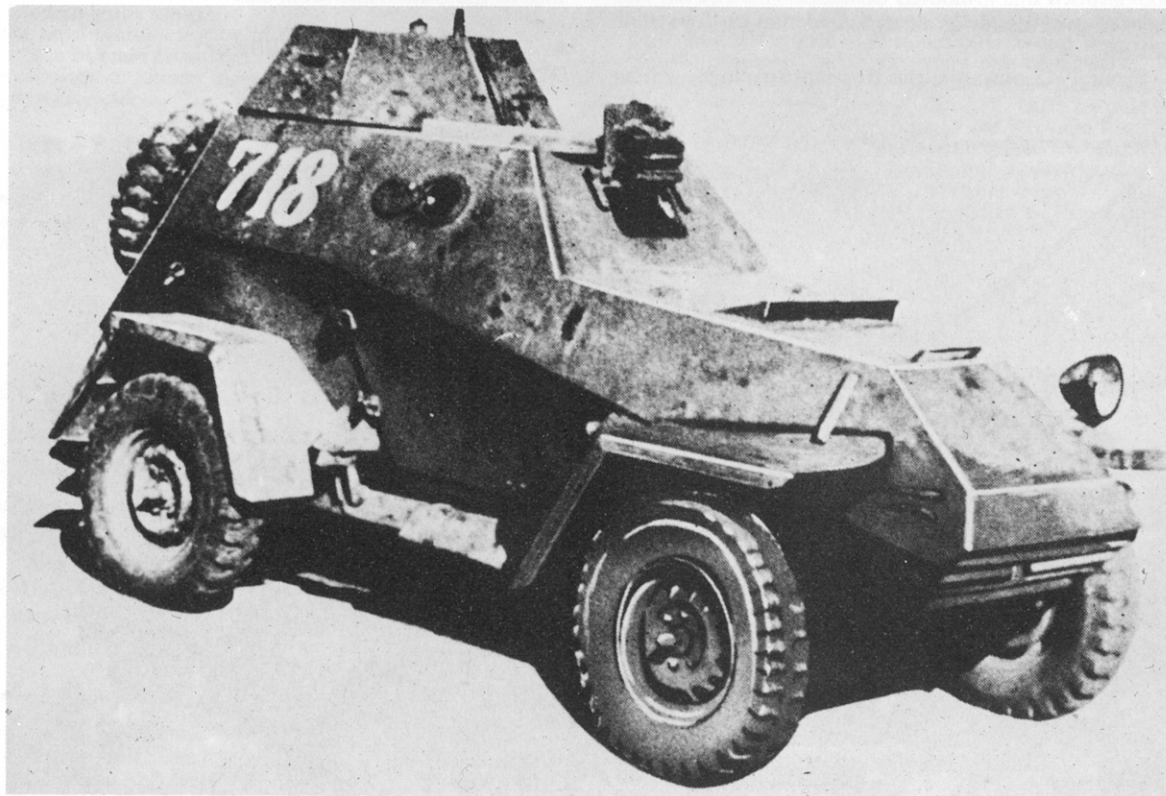
In 1937 a further model of the BA-10 appeared, the BA-10M (previously referred to as the BA-32-3), having a pressed and welded hull and the same turret as the preceding model with a 45 mm gun. All the BA 6-wheeled models could have tracks fitted around the rear wheels. The characteristics of the BA-10M were as follows:

Weight: 5.3 tons
 Length, overall: 15.40 ft
 Width, overall: 6.88 ft

Height, overall: 7.94 ft
 Ground clearance: 10 ins
 Crew: 4 men
 Armament: 45 mm L/46 tank gun and 2 MGs (one in turret, one next to driver)
 Ammunition: 40 × 45 mm and 2000 × 7.62 mm
 Armour: 11-14 mm
 Engine: GAZ-M-1 4-cylinder water-cooled developing 85 hp at 3000 rpm
 Fuel capacity: 51 gallons
 Drive: both rear axles (no reverse gear)
 Wheels: 6 pneumatic-tyred, bullet-proof
 Maximum speed: 54 mph
 Range: 200 miles

Just prior to the war, about 1937, the Russians introduced two new amphibious armoured cars designated PB-4 (or PBA = Plavaiushchiya Broni Avtomobil—Amphibious Armoured Car) and the BA-22 armoured

The BA-64 was produced towards the end of 1942. It was the only new armoured car model to be standardised by the Russians during World War II.





SU-57 57 mm anti-tank gun mounted on an American half-track.

ambulance. At the same time the half-track armoured car BA-30 was produced which had a significantly enhanced cross-country performance over the wheeled cars. Two other, heavy armoured cars entered production on the eve of the Second World War—the BA-11 and the BA-11D. These were based on the AMO 6-wheeled lorry chassis then in production. They weighed about 8 tons, had armour up to 13 mm thick and were armed with 45 mm guns and two machine-guns each. The maximum speed was 40 mph.

DEVELOPMENT DURING THE GREAT PATRIOTIC WAR (SECOND WORLD WAR 1941–45)

At the outbreak of war, there were 1200 armoured cars in service with the Soviet Army. In addition to these, it should be noted, some units classified the BT tank as an armoured car.

Due to the high priority given to other forms of weapons, such as tanks, artillery and aircraft, coupled with the continued use of tanks as reconnaissance vehicles, the development and production of armoured cars continued only on a very low priority. Indeed, throughout the entire period of the Second World War the Russians only standardised one armoured car model (the BA-64) and this was used mainly as an armoured staff car for senior officers.

From 1942 onwards, the Russians employed gutted

BA-10 and BA-6 armoured cars as armoured personnel carriers. An attempt was made to produce the old 6-wheeled model in more up-to-date form. The LB-23, as it was called, was an experimental model with 6-wheel drive and a reverse gear, but it never passed the experimental stage.

Towards the end of 1942 a new four-wheeled armoured car entered production at the GAZ facility, and was designated the BA-64. It was a 2-man car designed mainly for liaison, but under wartime conditions was used as a reconnaissance car and as an armoured personnel carrier. The armour arrangement of the car was influenced by the German 4-wheeled armoured cars, which it closely resembled. The vehicle utilised the chassis of the GAZ-67 light lorry. The characteristics were as follows:

Weight: 2.36 tons
 Length, overall: 12.0 ft
 Width, overall: 5.0 ft
 Height, overall: 6.24 ft
 Ground clearance: 8.25 ins
 Crew: 2 men
 Armament: one 7.62 mm DT or DTM MG, or one 14.5 mm anti-tank rifle
 Ammunition: 1070 rounds for the MG
 Armour: 6-10 mm
 Engine: GAZ-MM 4-cylinder water-cooled developing 50 hp at 2800 rpm
 Fuel capacity: 20 gallons
 Drive: both axles
 Wheels: 4 pneumatic-tyred, bullet proof
 Maximum speed: 50 mph
 Range: 280 miles

The polygonal turret was made up of 6 mm plates, and some later cars had up to 15 mm armour on the hull front. The turret was open-topped. Suspension was by semi-elliptic springs. The driver was provided with an episcopo covered by an armoured flap, whilst commanders' cars had send-receive radio equipment.

As far as is known the BA-64 was the last wartime-developed armoured car used by the Soviet Army, although a number of Lend-Lease vehicles were employed such as the U.S. White scout car.

**A.F.V. Weapons Series Editor:
DUNCAN CROW**

Soviet crew leaping from a U.S.-built White scout car to bring into action the 57 mm anti-tank gun that it is towing.



AFV/Weapons Profiles

Edited by **DUNCAN CROW**

FUTURE TITLES WILL INCLUDE:

Elefant and Maus (+ E-100)

by *Walter Spielberger and John Milsom*

Elefant was the conversion of the original Porsche Tiger tank design into a self-propelled tank destroyer. "It turned out to be a technically most complicated and unreliable vehicle. This is said despite the fact that your author was engaged as design engineer on this project and that he participated actively in the action in Russia described at the beginning of this *Profile*."

Maus the largest armoured fighting vehicle ever built, was the culmination of Porsche technical development in the Tiger field. E-100 was the Maus's rival.

Commando and Twister Armored Cars

by *Christopher F. Foss*

Although mainly devoted to the multi-mission Commando vehicle (which saw extensive service with the United States Army in Vietnam), and the Lockheed Twister (which consists of two bodies joined by a pivotal yoke), this *Profile* by a leading expert on modern AFVs also describes the Chrysler SWAT and the more interesting high mobility/off road vehicles developed by the US Army in the past few years: Gama Goat, Terra Star, PATA, XM-759 Marginal Terrain Vehicle, Air Roll, and the GOER series.

AMX-30 Battle Tank

by *R. M. Ogorkiewicz*

"At first sight the AMX-30 looks like most other battle tanks of the 1960s and 1970s. On closer inspection, however, it proves to differ from its contemporaries in several important respects. In fact, its design embodies a number of novel ideas which make it one of the most interesting of modern battle tanks . . ."

"The most unusual feature of the AMX-30 from the start has been its main armament. This consists of a 105mm gun which fires a unique type of armour-piercing shaped charge projectile . . ."

Vickers Battle Tank

by *R. M. Ogorkiewicz*

"Tank design has become a monopoly of government departments, even where free enterprise has survived in the field of tank production because the designs produced by

industry are government prescribed. There is, however, one very notable exception to this in the Vickers battle tank. This tank was designed by Vickers Limited on their own initiative and its development background is very different therefore from that of all other contemporary battle tanks. The enterprise which Vickers have displayed in developing their battle tank is, however, in keeping with their long and distinguished record in the tank field." The Mark I version of the tank has been adopted by the Indian Army as its main battle tank. Production is carried out near Madras – and these are the first tanks ever to be produced on the Indian sub-continent. The Indian Army has named the tank Vijayanta, which is Sanskrit for "Conqueror". Other Vickers battle tanks are manufactured in Newcastle-upon-Tyne and have been supplied to Kuwait. Development of the tank continues and the new Mark 3 version has a number of improvements including increased depression of the 105mm gun, increased ammunition stowage, and a glacis plate with improved ballistic shape. The tank, weighing 38 tonnes, or 37½ English tons, laden (hence its name the Vickers 37-ton Tank), is uncomplicated and robust, and offers "a combination of highly effective armament with a high degree of mobility at a cost which compares favourably with that of other contemporary battle tanks."

Armoured Personnel Carriers – A Survey

by *Major-General N. W. Duncan*

This *Profile* is concerned with battlefield mobility. It surveys the development of the armoured personnel carrier concept in the leading military nations from the first carriers of World War I to the sophisticated vehicles of today. It looks at the "battle taxi" designs of the United States, Great Britain, France, Germany, Japan, Sweden, Switzerland, and the U.S.S.R., and sees how they respond to the key questions that were raised after World War II experience: What was to be the future role of the APC? What was to be the size of the APC in terms of carrying capacity? What weapons should the APC carry? Could tanks be used as APCs on the lines of the war-time Kangaroo? What thickness of armour was required? Would it be possible to achieve any measure of standardisation with other tracked vehicles used by the same army? Major-General Duncan writes from close personal experience of commanding tanks and APCs as they worked together on the battlefield.

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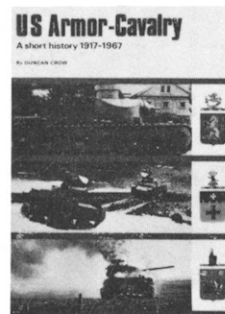
79th Armoured Division - Hobo's Funnies

by Nigel Duncan

The 79th Armoured Division was formed as a normal British armoured Division in 1942. In Spring 1943, however, its role was changed and it became a unique all-armoured formation. In this guise, it was responsible for the operation of the special purpose armoured equipment that cracked open Festung Europa on the beaches of Normandy in June 1944, and then smashed into the Channel ports, assaulted Walcheren, fought in Operation "Veritable" to clear the Reichswald, and took part in the crossing of the Rhine, the liberation of the Netherlands and the conquest of northern Germany. Excitingly told in this book by Nigel Duncan, who commanded the division's 30th Armoured Brigade.

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US Armor-Cavalry 1917-1967: A Short History

by Duncan Crow

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