

ARMORED CAR

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The French Citroën- Kégresse Half-tracked Armored Cars

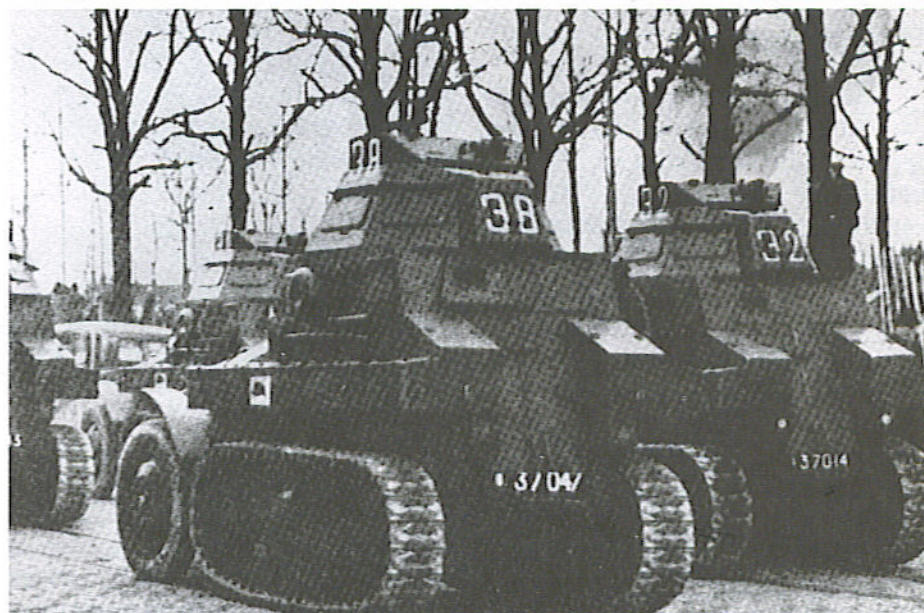
by Raymond Surlémont

drawings by Nicola Pignato
and Jacques De Corte

When French engineer Adolphe Kégresse (1879-1943) went to Russia in 1905, he was lucky enough to become Tsar Nicholas II's garage manager. At the Russian autocrat's request, he devised what he called a "traineau automobile" device which, when fitted on a touring car, could permit it to travel over the deep snows of the Russian winter. So equipped the car ran on two tracks made of leather at the rear and on two ski-like sledges attached to the steered wheels at the front.

The invention was developed and perfected over a period of time, Kégresse patenting all the improvements in France, from 1913 up to 1917. During World War One, the Russian War Ministry became interested and awarded an order to the Putilov Zavod concern of Saint Petersburg for 300 Kégresse tracked assemblies, sixty of these being destined for use on armored cars.

The latter were Austins of both the original British and the Russian modified Putilov-Austin types which thus were converted to half-tracked vehicles. When the so-called October Revolution broke out in Russia in



Above: *Auto-mitrailleuse de Cavalerie Schneider (P16) M.1929 of the 18th Dragons prior to 1940. Photo: R. Surlémont, Collection.*

1917, Kégresse was obliged to flee. First he went to Helsingfors, Finland, where he converted a Talbot car chassis into an "autochenille". Completely ruined financially, he came back to France where he continued to work on his track assembly device, which he then named either a "train porteur" or a "propulseur". Nobody seemed interested in his invention and he was in near despair when he met and persuaded an industrialist, Jacques Hinstin, manager of the La Fournaise factory, to fund his subsequent design and experimental works for improved propulsion units, subsequently named Kégresse-Hinstin.

By then Kégresse had devised a new endless track made of rubberized fabric, which General Estienne, the father of the French tanks in 1916-1917, brought to the attention of another industrialist, the motor car manufacturer Andre Citroën. Convinced by the trials carried out with three cars of his make in Saint Denis, Andre Citroën became associated with both Kégresse and Hinstin, and formed the "Département des Autochenilles" within his own Parisian

concern. In January 1921, several Kégresse-Hinstin suspension systems were adapted to Citroën B2 touring cars which were involved in a so-called "concours de chars de montagne" organized by the Automobile Club de France in the snow of Mount Revard, near Aix-les-Bains, in the Alps. The cars performed well and attracted the attention of the French Army's Artillery arm which tested two Citroën-Kégresse-Hinstin cars in Fontainebleau (June 1921) and in the sand dunes near Arcachon (September 1921). Tests were also conducted on a wider scale in the Sahara desert, Africa, during the winter of 1921-22.

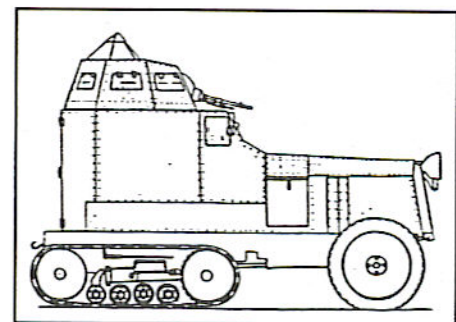
By this time, the Kégresse-Hinstin driving device had already been considerably improved. It included on each side a rear driving wheel, a front idler wheel, an endless rubberized fabric belt and two pairs of small bearing rollers. The tracks were driven purely by friction, the split driving wheel pinching a row of rubber teeth between its two cheeks.

The successful crossing of the Sahara desert in 1922-23, then the "Croisière Noire" (Black Cruise)

through tropical Africa in 1924-25, made by the explorers G.M. Haardt and L. Audouin-Dubreuil using Citroën Kégresse "autochenilles", gave considerable publicity to the Citroën company and convinced the French military authorities of the enhanced capabilities offered by these half-tracked cars in terms of mobility.

As a result, the Citroën-Kégresse "autochenilles" gave birth to three types of military vehicles:

- artillery tractors
- utility carriers and liaison vehicles
- armored cars.



The Auto-mitrailleuse de Cavalerie Citroën-Kégresse (P4), M.1923

In 1921, there was a proposal to mount a Kégresse-Hinstin track assembly on a Renault armored car dating from World War One. As this proved impractical, another attempt was made on a Peugeot armored car of the same vintage, but the trials conducted in 1923 proved unsuccessful.

In the same year, the French Cavalry's technical section invited the Citroën company to present their own armored car project. This was designed on the basis of a commercial Citroën B2 touring car chassis, powered by a 10hp, 4 cylinder, water-cooled unit of 1452cc, which drove the vehicle at a maximum speed of 35km/h. The armored car could average 20 km/h over a road distance of 1,000km, and its fuel consumption was gauged at 22 liters for 100km on normal going. The Kégresse-Hinstin driving unit was of the P4 type, on which the track treads featured chevron-shaped ribs for better adherence on soft ground. Steering was effected by the front wheels which bore pneumatic tires.

Supplied by the Schneider & Cie armament company, the armored

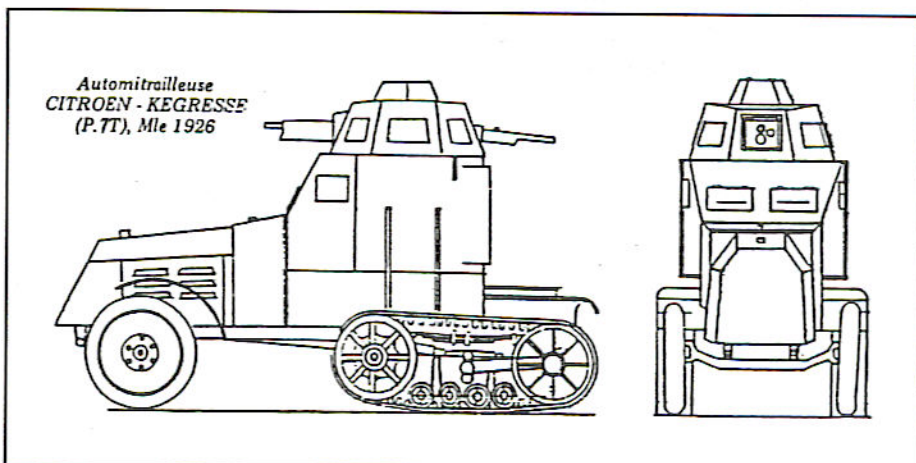
bodywork weighed about 900 kg. The sheet armor varied from 3mm minimum to 7mm maximum. This thin armor plating was considered proof against an ordinary rifle bullet in vital places.

The vehicle could accommodate a three-man crew, including a driver and gun crew of two. The latter two sat on a fold away seat, arranged over an ammunition stowage bin. The armament, housed in a fully rotating turret installed at the extreme rear of the armored hull, could be either a semi-automatic 37mm gun or a machine gun. The pyramidal cupola surmounting the turret was split in two parts that could be folded down. Access to the inside of the car was by a rear door.

Fitted on the front of the hood, a protected searchlight could be oriented at will by the driver. Outside the car, there was a large stowage bin on each side of the hull while a horizontal plate formed a mudguard over the track assembly.

Although it was recognized that its motor was underpowered for a cross-country vehicle, this type of half-tracked armored car was accepted as the Auto-mitrailleuse de Cavalerie Citroën-Kégresse (P4), M.1923. The French Cavalry command requested and got permission to place an order with Citroën for sixteen vehicles. These were destined to equip an armored car squadron for service in Morocco, North Africa. The cars were delivered in January 1925.

The Auto-mitrailleuse Citroën-Kégresse (P7T), H.1926.



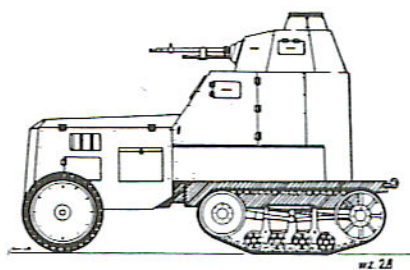
By 1926, Citroën was involved in the design of another half-tracked armored car known as the M.1926.

In this design, both the driver's plate and hood front armor were sloped, and the armored hull was shortened, leaving a free space over the second half of the Kégresse driving device. This was of the P7T type, in which the front wheel was not in contact with the ground. The tracks were ribbed with rubber chevrons on the outside to provide better traction.

The revolving, multi-sided pyramid-shaped turret was fitted with a machine gun to fire in one direction and a 37mm gun to fire in the opposite direction.

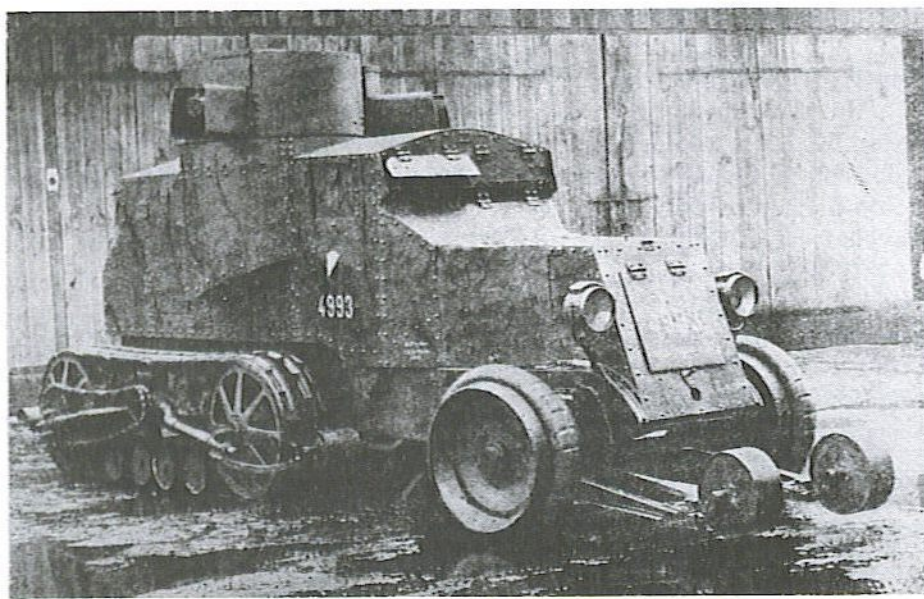
Nothing more is known about this car which seems to have not gone beyond the mock-up stage.

Samochod pancerny, wz.28 - first type



The Samochod Pancerny Wz.28.

The Citroën-Kégresse "autochenilles" also attracted the attention of the Polish military authorities. In fact the Kégresse driving devices were not unknown to the Poles, as they used a few half-tracked Putilov-Austin armored cars captured during the Polish-Soviet War of 1919-20.



Above: Putilov-Austin-Kégresse in Polish service, circa 1919-1920. Photo: D. Haugh, Collection.

In 1923, a Polish military mission led by General S. Wroblewski went to France and this visit resulted in a consistent order for Citroën-Kégresse half-tracked B2 chassis, of which ninety would be destined to become armored cars. The design work of such a vehicle was entrusted to engineers R. Gabaud of the BK-WIBI and J. Chacinsky of the CHS. Two prototypes were involved and tested in the military maneuvers in Wolyn, in August 1925. In 1927, there were as many as twenty machines engaged in large-scale cavalry exercises to compare their performance with those of wheeled vehicles.

The Polish half-tracked armored car was adopted under the designation of "Samochoł Pancerny Wz.28". It weighed 2.2 tons and was driven by a Citroën 4 cylinder motor which, with a capacity of 1,452cc, moved the vehicle along at maximum speed of 28km/h on roads. Like the French M.1923 armored car, the Kégresse drive was of the P4T type.

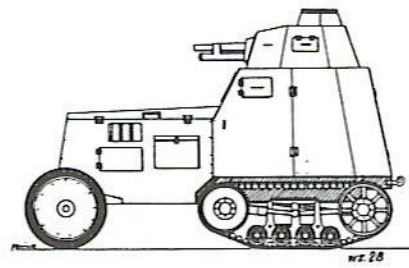
The Polish armored car was protected by a 3-8mm thick sheet armor. Built by the Baildon steel works of Katowice, the armored bodywork was not unlike the one designed by the French Schneider company, although existing in two different patterns; one had a vertical rear plate, while the other had a slightly sloping rear plate. The turret was armed with either a 37mm gun or a 7.92mm Hotchkiss machine

gun, and was topped by a pyramidal-shaped cupola.

Early in 1931, eighteen Wz.28 armored cars were used in support of the Polish State Police which was quelling communist troubles in the Malopolska region.

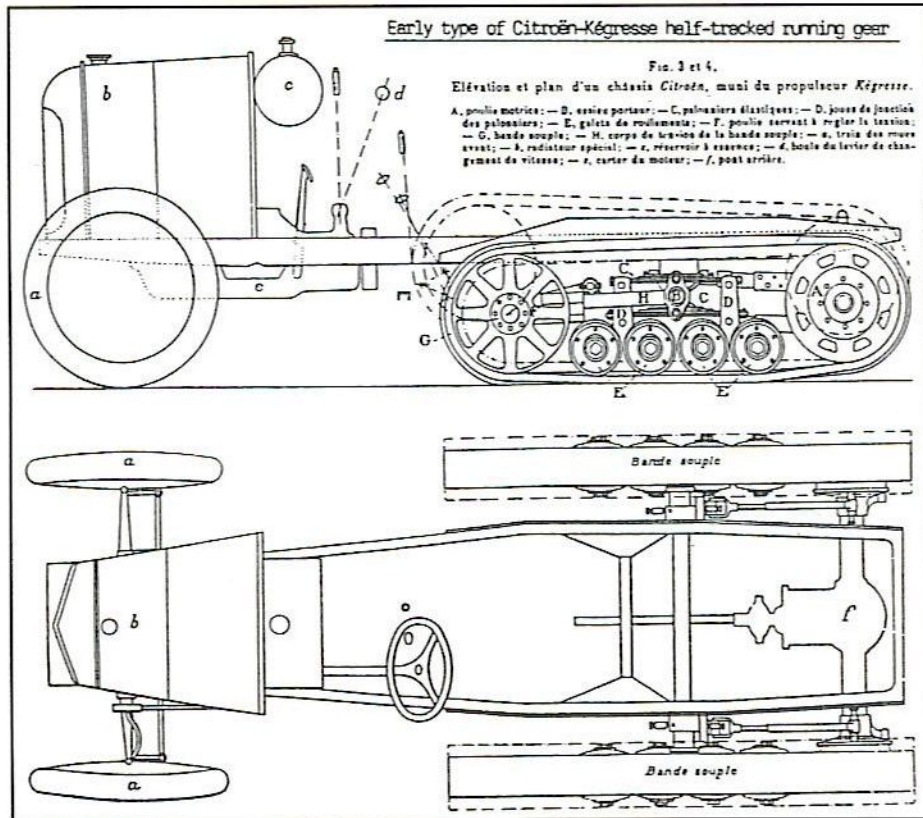
All in all the Wz.28 Citroën-Kégresse armored cars were a disappointment to the Polish Army, as they did not come up to expectations. Like the French M.1923, the motor was not powerful enough and the

Samochoł pancerny, Wz.28 - second type



tracks were too flimsy and wore out quickly. Thus a decision was taken to turn all these half-tracked machines into wheeled Wz.34 armored cars, some fitted with a more potent (Polski-Fiat) engine.

The conversion was carried out quickly and, on 1 November 1935, there were only 59 Wz.28 armored cars still in service with the Polish Army. This figure had dropped to 36 on 1 April 1936. By 1938-39, only three Wz.28 armored cars survived in the Armored Forces Training Center in Modlin. In September 1939, these three cars, belonging to Lt. F. Uscinski's platoon, took part in the short war against Germany. The very last car was destroyed near Nadwórna, while trying to reach the Hungarian border.



War in the Rif mountains.

Well aware of the shortcomings of their first half-tracked armored cars, the Citroën design bureau had already begun work, in 1924, on an improved model equipped with a more powerful engine. Once more, Schneider & Cie were in charge of the armored body.

On 30 June 1925, Citroën was granted an order for four half-tracked armored cars fitted with a Panhard power plant, for experimental purposes.

By this time, the political and military situation of France and Spain in north-western Africa was becoming acute. In the Moroccan Rif mountains, the rebelling Emir Abdel-Krim had stormed several military forts and imposed his rule over large stretches of both French and Spanish Morocco. The emergency was such that the French Minister of War prescribed, in notes dated 29 September and 4 October 1925, that the Citroën order should be extended to one hundred armored cars.

However, Citroën did not consider themselves capable of fulfilling such a large contract and declined it on 12 January 1926. On 4-February, Schneider & Cie accepted the contract instead, under the conditions that the four machines ordered in 1925 would be the only ones built as experimental prototypes, and that Citroën and Panhard would remain

in the deal as sub-contractors.

New track and drive.

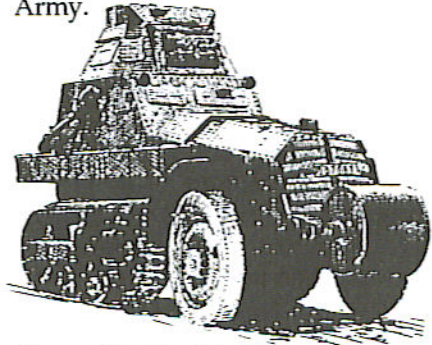
In 1925-26, eight Citroën-Kégresse B2 "autochenilles", on the so-called "Black Cruise", departed from Colon Bechar, in the Sahara desert, traveled on to Cape Town (South Africa), then went up to Tananarive (Madagascar). This widely publicized automobile odyssey provided many technical lessons, from which Kégresse profited in the design of several types of improved running gear, namely the P7bis, P14, P16, P17, P26A, P28, P28A and P104, and a more resistant track pattern, called "metallo-caoutchouc". The latter appeared in 1927 and was patented on 20 April 1928 (n° 667701).

The "metallo-caoutchouc" (metal-rubber) track was radically improved and consisted of an endless rubber belt as before, but fitted with extra teeth on its interior side, riveted or screwed on the belt with exterior steel track shoes on the outside. The latter not only protected the rubber belt, but also gave, by their sharp edges, sufficient adherence on soft soil. In order to protect the road surface and have the vehicle still run silently, there were small rubber pads in the center of the steel shoes, held together with them and to the interior teeth by screws. The arrangement was such that on roads, only the soft rubber pads were touching the

ground. On soft soil, these small rubber pads were pressed deeply into the ground, so as to bring the steel track shoes into contact with the soil. The whole rubber pad and steel plates could be easily changed when damaged.

Another radical change was that the new half-metallic track was no longer driven by friction, but by a sprocket drive (now in the front) in which cross bars engaged two rows of guiding teeth disposed near the edges of the tracks. The larger rubber teeth in the middle of the interior side of the rubber belt were now intended to guide the track over the bearing rollers and were no longer needed for propulsion.

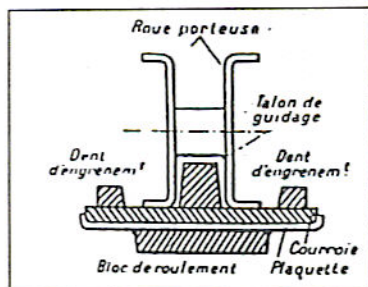
The new Kégresse-Hinstin running gear used front driving sprockets, rear idlers and four pairs of bearing rollers to support the weight of the car. It was adopted for the next model of half-tracked armored car (H.1928) ordered for the French Army.



Above: AMC Schneider P16

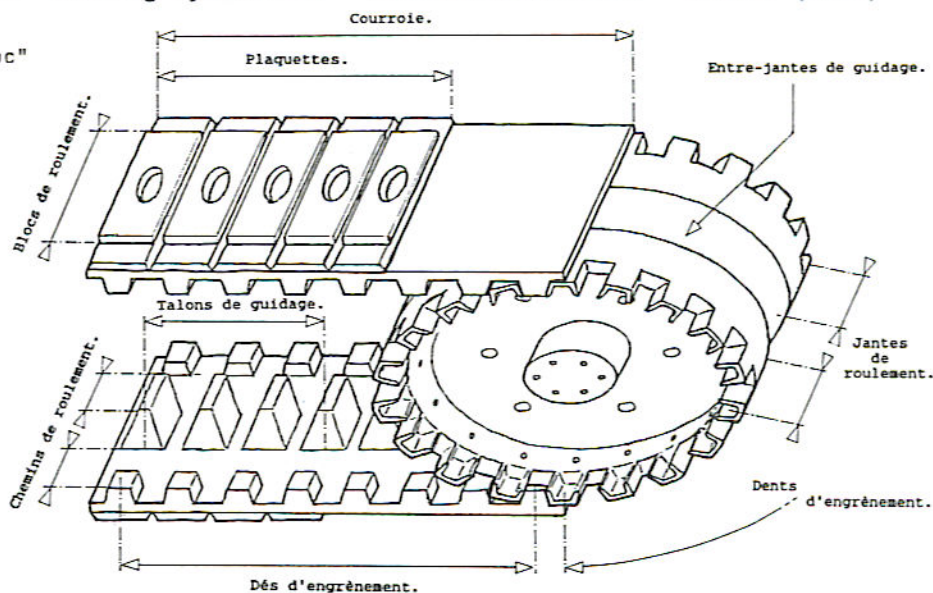
New Citroën-Kégresse driving system and "métallo-caoutchouc" track. (1927)

New Kégresse "métallo-caoutchouc" track

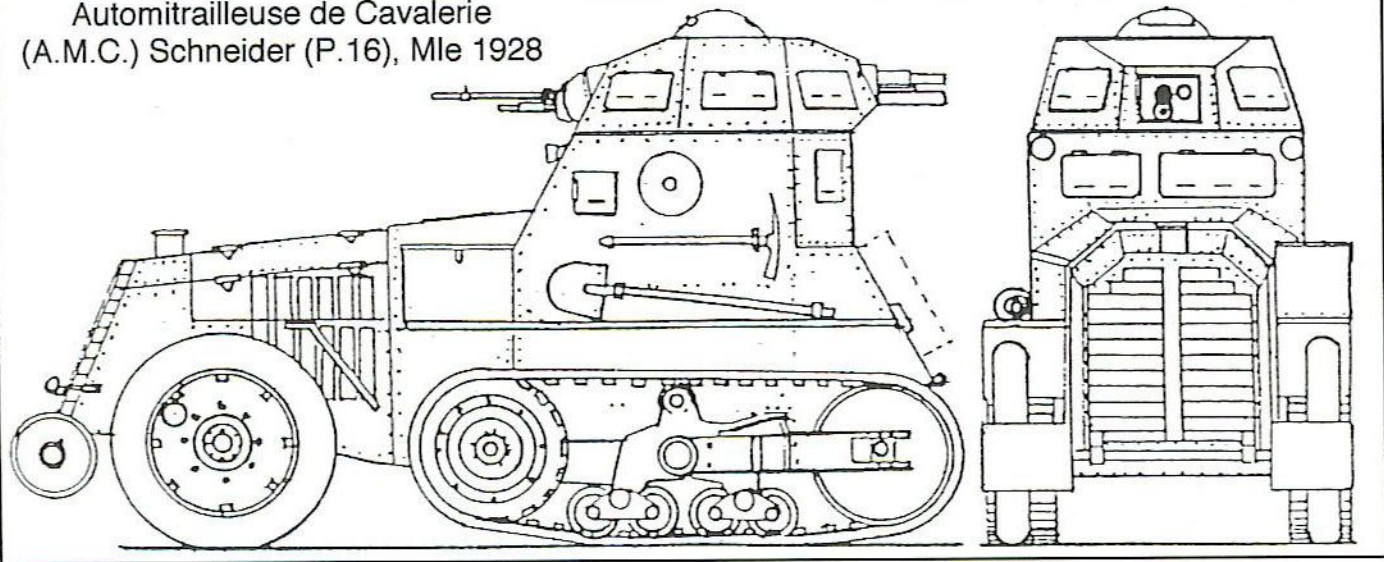


Coupe schématique de la nouvelle chenille Citroën-Kégresse

- Roue porteuse = bearing roller
- Talon de guidage = guiding tooth
- Courroie = rubberised fabric belt
- Plaquette = steel track shoe
- Bloc de roulement = rubber pad
- Dent d'engrènement = track driving tooth.



Automitrailleuse de Cavalerie
(A.M.C.) Schneider (P.16), Mle 1928



The Auto-mitrailleuse de Cavalerie
Schneider (P16), M.1928.

Schneider & Cie delivered the four experimental armored cars ordered in 1925 three years later.

The new half-tracked armored car was powered by a valveless 16hp Panhard, four cylinder (85 x 140) engine which had appeared in 1927. With a cubic capacity of 3,176cc, it delivered a motive power of 60hp at 2,700rpm. A special clutch and reverse system provided six forward and reverse speeds, the latter with a 1.2 reduction on the forward speeds. In combat order, the car attained a maximum speed of 55km/h on roads.

Substantial improvements had been introduced in the form of a duplicated control for steering backwards, and a new pattern (P16) of the Kégresse-Hinstin drive. Unusual two-flanged sprocket wheels were fitted with cross bars over their circumference, so arranged that they drove laterally the tracks by gearing the rubber teeth protruding in two rows on their internal surface, near their inner and outer edges. The front steered wheels (955 x 155) were fitted with Michelin tires and bullet-proof Veil-Picard inner tubes and suspended by leaf springs. In the front of the car, a free axle carried two loose rollers for the purpose of assisting obstacle crossing.

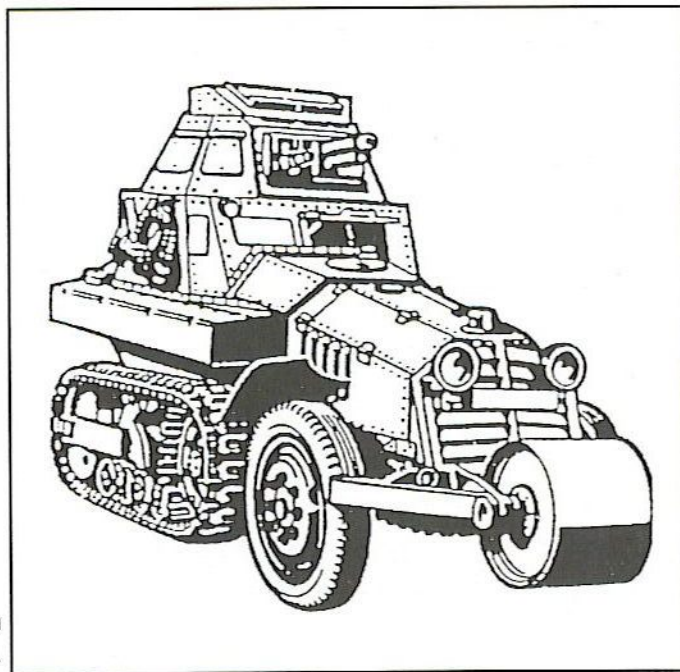
Both the armored body and turret were 11.5mm thick at their maximum; thus the amount of armor pro-

tecting the car weighed some 1,750 kg. The multi-sided (polygonal) turret was topped by a small dome shaped cupola and liberally provided with observation ports which could be closed by drop-down armored flaps. Both its weapons, a 37mm gun and a machine gun were housed opposite to each other, pointing front and rear.

The crew consisted of three men, i.e. a driver, a car commander who also acted as gunner, and an auxiliary driver, named "inverseur", in charge of the rear driving controls. Entering the car was through a two-flap door opening in the armored body's rear plate. The interior of the car was ventilated by a small extractor blower located on the left side of the hull, under the protection of a round armored casing.

The four vehicles were entrusted for trials to the Centre d'instruction des auto-mitrailleuses and to the 3rd Escadron d'autos-mitrailleuses et autos-cansons, in Lunéville. Although considered as a noticeable improvement over the all-wheel White armored car, the French Cavalry's mainstay of that time, the M.1928 car was recognized as being underpowered. Its armored body was also too small; it could only accommodate three men, instead of four as specified in the requirement. The armament aimed in opposite directions proved difficult to serve.

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Right: P16 with
37mm gun.

Mercedes-Benz 240GD in Greek Service

Below: Standard 240GD with full canvass, of the Greek Air Force.



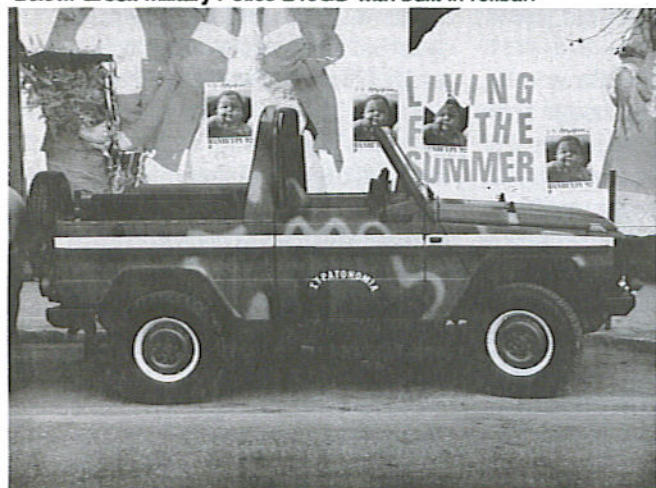
Below: 240GD with 106mm RR, frame over the hood is a blast shield.



Below: 240GD with 106mm RR, barrel extends thru armored windshield.



Below: Greek Military Police 240GD with built in rollbar.



Below: TOW armed 240GD with extra missiles and ground mount.



Below: Medical versions have a platform at the left rear that hinges up to support a stretcher.



Below: Crew seats fold-up and face toward the center of the vehicle.



The Mercedes-Benz 240GD in Greek Service

Photos Tasos Tsiplakos

In service with over twenty countries, and UN Forces world wide, the Mercedes-Benz 240 series of light 4x4 vehicles is one of the most successful and wide spread European light vehicle designs in the last twenty years. Besides its co-production in Austria (Mercedes-Benz and Steyr-Daimler-Puch), the 240 is built in France as the Peugeot P4, and in Greece, originally by Steyr Hellas, and now by Hellenic Vehicle Industry S.A. as the 240GD.

Over 5,000 240GDs have been built for the Greek military in several different variants from straight liaison and reconnaissance cars to TOW, MILAN and 106mm RR armed weapons' carriers.

Specifications:

Length: 4.145m
Width: 1.7m
Height: 1.995m
Clearance: 0.24m
Weight: 1670kg
(empty)
Max load: 750kg
Max speed: 117km/h
(road)
Fuel: 70 Liters
Gears: 4 fwd 1
reverse
(manual)



Hellenic Vehicle Industry S.A.

Top: Standard 240GD with bench seats at the rear facing center. Vehicle is painted green, light brown, black and light gray. *Center:* The 106mm RR is matched with the M79 mount. The mount's front wheel rolls down the guide in the middle of the rear bed. *Bottom:* MILAN antitank mount with storage for four extra missiles.



The Auto-mitrailleuse de Combat Schneider (P16), M.1929.

The military situation in Morocco had settled down long before Schneider began to deliver the 96 armored cars foreseen in the extended order of 1925. The production model, the M.1929, emerged as a major redesign of the M.1928 pilot models. Its armored body had a different outline and the opposed arrangement for the weapons in the turret was abandoned in favor of a classic co-axial one in a combined mount. The two small front rollers had been replaced by a single, but larger idler drum, intended to help climbing over sharp banks or to prevent trench ditching.

The production model was given the designation of Auto-mitrailleuse de Combat (AMC) Schneider (P16), M.1929, although the Kégresse-Hinstin rear running gear was then of the P17 type. The latter drove 30cm wide metal-rubber tracks. The engine was still the valveless Panhard 16hp that was provided with an unusual auxiliary starting device. One could have access to it through an opening in the floor of the car: a toothed wheel fitted with a handle could be set in motion, via a bicycle chain, a pinion acting on the primary shaft of the gearbox. This allowed one to start the engine when the normal starter had failed, for instance in low winter temperatures. The electric power was supplied by a dry nickel-cadmium battery.

The engine functioned with the so-called "carburant national" (national fuel), a mixture of petrol and alcohol pink in color. This fuel was carried in two tanks with a total capacity of 105 (75+30) liters which was sufficient for 250km without refueling. In cross-country work, it was necessary to engage the reduction gear; the fuel consumption was then as high as one liter per kilometer.

Like the M.1928, the M.1929 accommodated a three-man crew. The armor plating varied from 3mm minimum up to 11.4mm maximum, better than on most armored cars in service in the early thirties. A long stowage box was placed on each side of the vehicle over the tracks, forming a sort of mudguard.

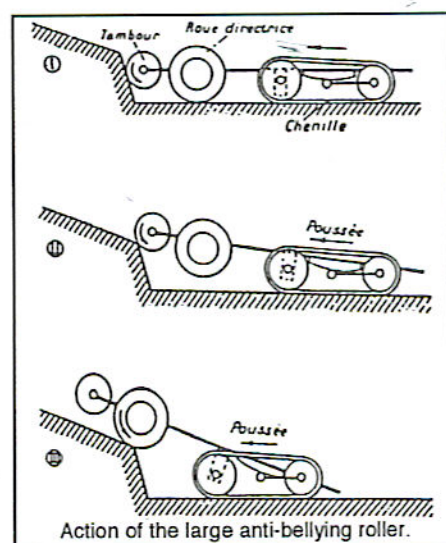
As the Panhard engine was not yet considered powerful enough for the near seven tons of the Schneider (P16) M.1929 armored car, the Commission d'Experience du Materiel Automobile, in Vincennes, was entrusted with the task of experimenting with a production car fitted with an alternative power plant. They selected the Hotchkiss 80 SAM, 20 (fiscal) hp, which generated an actual motive power of 72hp at 2,700 rpm, against 60hp for the Panhard. Comparative trials were carried out from 1933 to March 1935 which showed a maximum speed of 42km/h, and an average of 34 km/h, for the Panhard powered car, against 55km/h and 40.5km/h for the Hotchkiss powered

one; the fuel consumption also being in favor of the latter (51.2 liters /100km against 66 liters /100km). However, petrol feed defects appeared with the Hotchkiss engine when the vehicle was climbing steep gradients and nothing resulted from this experiment.

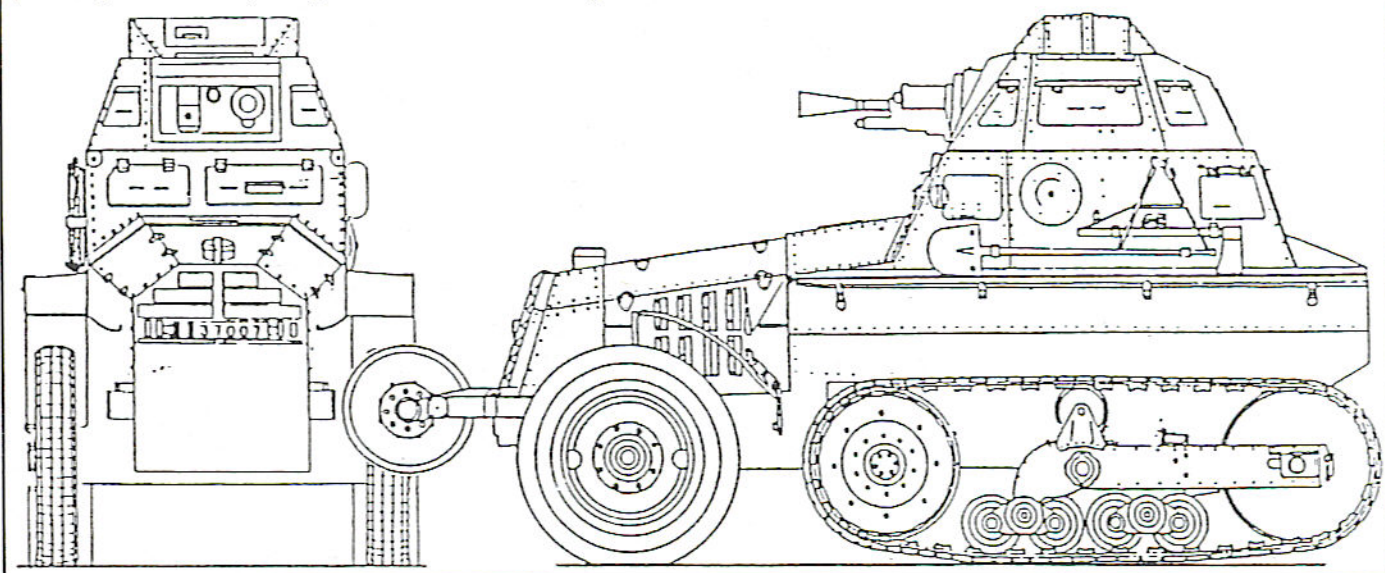
Comfort and crew performance of the M.1929

The AMC Schneider (P16) M.1929 was not at all comfortable. Its hull was very cramped, even with the crew reduced to three men.

Access was by a very narrow rear door. The driver entered first. His position was comfortable enough, even for a large and tall man. The second to enter was the commander. He had a fold away seat, on which he



(A.M.C.) Schneider (P.16), Mle 1929 with 25mm gun circa 1940



could stand when observing with his chest out of the turret. The cannon, machine gun and ammunition left very little room in the turret. Last to enter was the reverse driver, seated on a very primitive fold away seat; if needed he could pass ammunition for the cannon, as the ammunition locker was within reach.

On the AMC. Schneider (P16) M.1929 no thought was given to the need for heating or ventilation, apart from a ventilator on the left side of the hull, level with the driver's side vision flap. It was protected by an armored domed cover, and it helped extract the fumes when the guns were fired. In the heat of the summer, the crew was uncomfortably hot, while in winter the only enviable position was that of the driver, as he had the engine next to him.

Some vehicles were equipped with an ER.27 radio set, which encroached even more on the limited space available. These cars were recognizable by the two aerials they carried.

The Panhard engine was a good power plant, but was too low-powered for a half-track car weighing six-and-a-half tons. The inertia was such that engaging the clutch brought the vehicle to a halt. The maximum speed (50km/h) claimed by the manufacturer could only be reached going downhill. However, it could get up to 35km/h in reverse with a well trained driver. Apart from the steering wheel, the reverse driver only had an accelerator, brake and clutch, the normal driver having to change

the gears. In reverse, steering was difficult, needing very good coordination and signaling between the two drivers, as the front wheels acted like the rudder of a ship. The play on the control rods was such that driving in reverse needed constant correction by the driver. It was a practice that was only used in extremes, to get out of trouble.

As in all armored vehicles of this period, no provision was made for defense against aircraft. The crews tried to correct this by fixing a spare machine gun to a lug on the turret. As no proper sight was provided, fire from this was ineffective.

The Auto-mitrailleuse de Reconnaissance, Citroën P28 (M.1932)

In October 1930 the French Army set up a program for what was called a "vehicule type N", in fact a thinly armored supply vehicle for the infantry. Citroën proposed a small tractor fitted with a Kégresse P28 drive unit. As this machine was not accepted, Citroën took it back and redesigned it as a two-man, half-tracked armored car, armed with a single machine-gun housed in a Schneider turret. Further development work led to a much modified model and, for some obscure reason, fifty were ordered on 15 October 1931, although not yet officially recognized.

Two machines were delivered for trials during the summer of 1932 the first one (5604 W1) was powered by a Citroën K, six cylinder engine which generated 67hp; the second one (5609 W1) had a 55hp Citroën

C.6, six-cylinder engine. The transmission provided four forward speeds and one reverse.

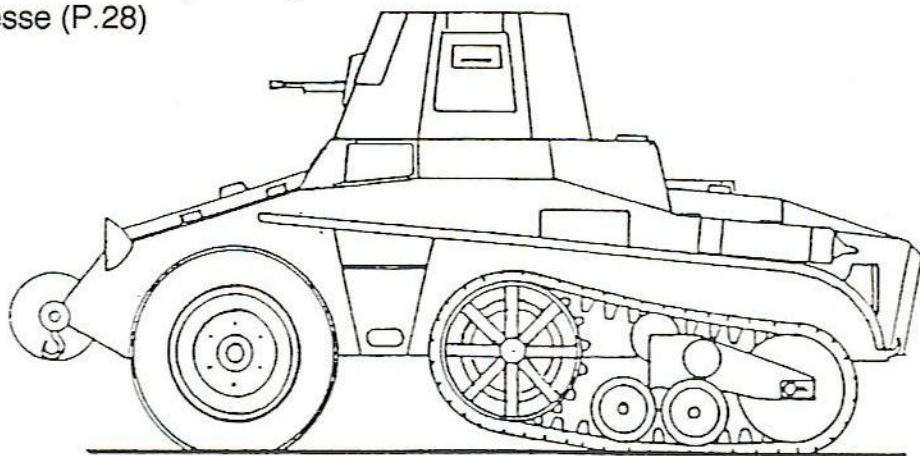
Both vehicles were tested during July and August 1932 by the "Commission d'Experience du Materiel Automobile" in Vincennes and revealed numerous defects. The cars were overloaded on their front springs, their tracks were too narrow, the fuel capacity was insufficient and the C.6 engine proved under-powered.

Another car (79728) was tested in December 1932, and again in March 1933, with a new Citroën K engine. Its maximum speed was clocked at 50km/h and the range of operation attained was 230km. Further improvements were needed, including a regulator for the engine, strengthening of the idler wheel and several other changes. At least the vehicle was accepted for service with the French Cavalry but no further order was placed for this model, which went into service as the Auto-mitrailleuse de Reconnaissance (AMR), Citroën P28 (M.1932). It was the swansong of half-tracked armored cars in the French Army.

Half-tracked armored cars in French service

When they were delivered in 1925, the sixteen half-tracked Citroën Kégresse (P4) M.1923 armored cars did not go to Morocco, as originally intended. The French had experimented there with some of their Renault FT.17 tanks equipped with the Kégresse-Hinstin running gear and rub-

Automitrailleuse de Reconnaissance (A.M.R.)
Citroën-Kégresse (P.28)



ber tracks, but had found that these tracks were rapidly torn to pieces by the rocky ground which prevailed in North-Africa. While two cars remained in France, fourteen went to Syria. Their main defects were recognized as being underpowered and their range of operation was not sufficient. As time passed, the number of cars available dropped to only four; at the time of the Syrian campaign of 1941, they were operated by a "Peloton Special d'Autos-mitrailleuses" located in Homs.

During the thirties, the AMC Schneider (P16) M.1929 probably served in six of the French Cavalry's seven "Groupes Autonomes d'Autos-mitrailleuses" (GAAM) then in existence, namely:

- the 1st GAAM in Orléans
- the 2nd GAAM in Strassbourg
- the 3rd GAAM in Paris
- the 4th GAAM in Reims
- the 5th GAAM in Compiègne
- the 7th GAAM in Saint Omer.

They were assigned to the (paper) mobilization establishment of the "Divisions Legeres de Cavalerie" (DLC), type 1932, and the "Divisions Legeres Mecaniques" (DLM), type 1935. However they were discarded from these units as soon as the Panhard 178 (AMD-35) armored cars and the Hotchkiss H-35/H-38 tanks were available in sufficient numbers.

Some cars were in North-Africa, serving with the 4th Regiment de Chasseurs d'Afrique, in Tunis (1938).

When France mobilized her Army in August 1939, 74 Schneider (P16), M.1929 were reclassified as Autos-mitrailleuses de Reconnaissance (AMR) and incorporated in five armored car squadrons, as components of five motorized "Groupes de Reconnaissance Divisionnaire d'Infanterie" (GRDI).

Another squadron with fourteen cars was serving with the 5th Regiment de Chasseurs d'Afrique, in Algiers (Algeria). Eight other cars were in the depots and workshops.

Also during the thirties, the AMR Citroën-Kégresse (P28) armored cars were present in at least two squadrons, one as a component of the 9th Regiment de Dragons in Epernay, the other of the 11th Regiment de Chasseurs à Cheval, in Vesoul. These cars were soon withdrawn from service and their ultimate fate is unknown to the author.

Aftermath

In 1934, Andre Citroën was in bankruptcy and his company was taken over by Michelin, the French tire manufacturer. Andre Citroën himself died in the following year while Kégresse, who had left him in

1934, retired to Croissy-sur-Seine. There he undertook design work on an automatic gearbox with a hydraulic clutch (patented on 2 September 1935). Later on, in 1940, he worked on a miniature radio-controlled, tracked vehicle intended to carry explosive charges against obstacles and hostile vehicles. He passed away in 1943 because of a heart attack.

The Kégresse running gear story ended with World War Two, but its endless rubber band track became the inspiration for the continuous band steel-cable-reinforced rubber track designed by Goodrich for the American half-tracks. Another far-off descendant was the light, linkless and polyester-reinforced rubber pad track specially designed during the seventies by the Belgian ACEC company for their COBRA family of full-tracked armored vehicles.

Acknowledgements

The author is most grateful to Mike Kelsey, Mike Roseberg and Tomasz Ostrowski for the help they provided when he was writing this article.

Characteristics and Performance of the Citroën-Kégresse half-tracked armored cars

	A.M. de Cavalerie M.1923	A.M.C. (P16) M.1928	A.M.C. (P16) M.1929	A.M.R. (P.28) M.1932	Samochód Pancerny Wz.28
Combat weight	2,100kg	5,800kg	6,800kg	4,540 kg	2,300 kg
Crew	3	3	3	2	3
Length, overall	3.40m	4.30m	4.83m	4.00m	3.43m - 3.50m
Width	1.40m	1.70m	1.75m	1.63m	1.35m - 1.40m
Height	2.20m	2.45m	2.60m	1.96m	2.10m - 2.20m
Ground clearance	0.25m	0.25m	0.25m	0.23m	0.28m
Track width	0.24m	0.275m	0.30m	0.275m	0.275m
Armament	(1) 37mm cannon or (1) 8mm MG	(1) 37mm cannon or (1) 8mm MG	(1) 37mm cannon or (1) 7.5mm MG	(1) 7.5mm MG	(1) 37mm cannon or (1) 7.92mm
Ammunition	Cannon: ? MG: ?	Cannon: ? MG: ?	Cannon: 100rds MG: 3,000rds	MG: ?	Cannon: 96rds MG: 4,200rds
Engine:					
Make and type	Citroën 10CV	Panhard 15CV	Panhard 15CV	Citroën K	Citroën
No. of cylinders	4 cylinder	4 cylinder	4 cylinder	6 cylinder	4 cylinder
Bore and Stroke	(68x100) ?	(68x140)	(68x140)	(80x100)	(68x100)
Displacement	1,452cc ?	3,176cc	3,176cc	-----	1,452cc
Motive Power	-----	60hp/2,700rpm	60hp/2,700rpm	67hp/3,000rpm	20hp/2,100rpm
Transmission	?	6F/6R	6F/6R	4F/1R	6F/2R
Fuel capacity	60 liters	105 liters	105 liters	80 liters	59 liters
Cruising range	?	250km	250km	230km	200km (?)
Maximum speed	35km/h	45km/h	42km/h	50km/h	25km/h (?)
Maximum grade	?	?	60.00%	50.00%	35.00%
Vertical obstacle	?	?	0.50m	0.50m	?
Trench crossing	?	1m	1.40m	?	?
Fording depth	?	?	0.40m	0.60m	0.50m

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World Fighting Vehicle Notes

More Up-Armored HMMWV. O'Gara-Hess and Eisenhardt Armoring has been awarded a contract for 72 up-armor High Mobility Multipurpose Wheeled Vehicles XM1114 to be delivered by September of this year. This order is in addition to the 81 vehicles ordered in February and reported in *ARMORED CAR* last issue. DoD April 1996.

Heavy HMMWVs for the US Air Force. The USAF has announced a requirement for 167 Up-armored Heavy High Mobility HMMWVs to replace its aging fleet of Textron Marine & Land Systems (formerly Cadillac-Gage) Ranger 4x4 patrol vehicles. While the present Ranger is armed with a single 7.62mm M60 light machinegun, the new vehicles will be able to carry wither the M60 machinegun or the Mk19 40mm automatic grenade launcher on an armored crew compartment. The new vehicles will join some 90 standard HMMWVs already in the US Air Force inventory.

US Marine Corps provides "Quick-fix" for vehicle identification. Advancing from the painted-on, inverted "V" used to identify vehicles and equipment in the past, the USMC has recently supplied forward deployed units with "Quick-Fix" Combat Identification Systems. Known as Combat Identification panels (CID), these non-reflective thermal panels are designed to accommodate the Light Armored Vehicles (LAVs) and Amphibious Assault vehicles unique to the Marine Corps. Once mounted, the panels works by creating a "cold mark" against the vehicle's heat signature. MCNEWS 04-96.

US Army Reserve Equipment. USAR units received 600 new M998 HMMWVs in FY95. This still leaves reserve units at only 72% of requirements. *Army Reserve* Winter 96.

Qatar. Besides 50 new main battle tanks, the government of Qatar is

considering buying HMMWVs (probably the heavy Hummer chassis) armed with GIAT 20mm or 30mm cannon for reconnaissance and special operations.

Palestinian armored vehicles. The Palestinian Police in Gaza are reported to have received 15 of a scheduled 45 APCs from Russia. The type of vehicles involved isn't yet known as of publication.

GKN Piranha 8x8 for Oman. Oman has taken delivery of 80 GKN Piranha 8x8 APCs. The British GKN vehicles have been modified, but basically are licensed versions of the Swiss MOWAG Piranha design.

Notes

International Directory of Military Publications (IDMP). I have at hand Sidney Allinson's 10th edition of IDMP (1996) of his listing of some 600 English language military publications from around the world. Separated into twelve sections: Defence & Military Affairs, Military History, US Civil War, Vietnam War, Regiments/Corps, Soldiers, Naval & Warships, Air Force, Security & Intelligence, Firearms/Weaponry, Military Collectors and Reserves, Veterans & Old Comrades. Each entry lists the publication name, mailing address, publication schedule, and sometimes a very brief one line note on contents/subject matter. Even with 600 entries, I still came up with six more that weren't listed which I've sent in, if everyone came up with

only one or two new publications there would be a substantial increase for the 11th edition. There's something for everyone in this publication and I'm sure some new titles most reader's haven't come across before. Mr. Allinson has done an excellent job and any serious researcher will want a copy. You can email Sidney at: ub076@freenet.victoria.bc.ca or send \$15 to: **Sidney Allinson, 3444 Karger Tr., Victoria, BC, V9C 3K5, CANADA.**

New name for "Museum Ordnance". Effective with the July issue, *Museum Ordnance* will be renamed *Journal of Military Ordnance*. The magazine will still retain its relationship with the US Army Ordnance Museum, but the publisher felt that the new name would better reflect the contents of the magazine. If you haven't seen a copy, \$3 will bring you a sample: **Museum Ordnance, PO Box 5884, Darlington MD 21034.**

No more English language "Raids" and "Militaria" magazines? Rumor has it that Militaria #25 and Raids #52 were the last English language editions. Historie & Collections will continue to publish both publications in French.

Hard to find military vehicle models. For those that don't know about them I suggest writing to R&J Enterprises for a copy of their latest newsletter and price list. They have some kits that will be really hard to resist (both tracked and wheeled vehicles). Write: **R&J Enterprises 47000 Warm Springs Blvd #1 Suite 365, Fremont CA 94539.**



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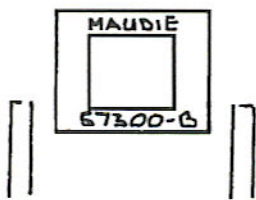
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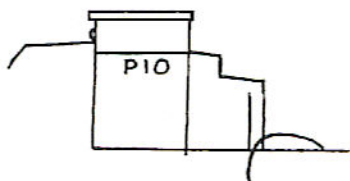
Assistance requested in researching UN Armor. In order to complete a comprehensive study of UN armored vehicles since the sixties, I am looking for photographs of UN AFVs in all field missions. Mainly: armored Land-Rovers (4x4 and minibus versions) in Bosnia, mine protected Land-Rovers in Namibia (1989), Italian 6614 in Lebanon, Indian armored vehicles in Somalia and any unarmored versions of softskinned vehicles, from sedans to heavy trucks. Original returned after copy. Please write: P. Malmassari, 122 rue Maréchal Foch, F-51400 Mourmelon-le-Grand, FRANCE.

AFV vehicle numbers in Ireland. On trying to find out more about AFVs used in Ireland since the end of WWI, I have two photos of the same Peerless armored car from the collection at Bovington. Mr. Fletcher, the Librarian has told me that these are the only photos of a Peerless in Ireland in their collection. Date, actual location and unit are unknown. What was interesting were the markings, plain white letters approximately 7-8 inches tall. (Fig 1)

FRONT VIEW

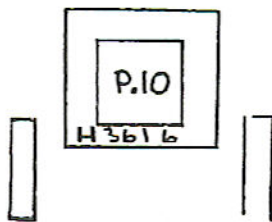


Mr. Fletcher said that 'P' was a bit far down the alphabet to be a squadron number, but other units aside from the R.T.C. used AFVs so it could be a system peculiar to Ireland. Which brings me to the problem.



SIDE VIEW

In Mr. Fletcher's book "Mechanised Force" on page 26, there is another photo of a Peerless in Yeomanry service marked as shown in figure 2. (Fig 2)



Mr. Fletcher said that he hadn't noticed the similarity before, but didn't think there was any connection, as Yeomanry units did not serve in Ireland. Peter Brown confirmed this, noting that the book, "Registration Plates of the World" states that "H" was used from 1920 by the British Army for vehicles registered in Middlesex.

What I would like to know is mainly, what the significance of "P. 10", and is "57300-B" actually a civil registration number, or some sort of hybrid Army census number? **Mark Salisbury, Middleton Hall Farm, Goosnargh Lane, Goosnargh, Preston, Lancs PR3 2JU, GREAT BRITAIN.** (Anyone have any ideas? I'm stumped on this one. -ed)

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1914-1918. Their shattering fire once changed the course of modern history, but now they stand only as rusted memorials with breechblocks welded shut and muzzles filled with empty beer cans and bird nests. They are the great guns of the Great War, forgotten survivors of the war to end all war.

In an effort to locate and document these historic relics before they disappear into the junkyard, I am asking for your help. If you are aware of any of these veterans of the 1914-18 war in your area, I would certainly appreciate hearing about them. Any information from inscriptions on muzzle, breech and carriage would assist in properly identifying the piece. Photos would be extremely helpful in showing present condition. All survey results made available to contributors. **The Great WWI Memorial Survey, Dick Pope, 1705 Greenwyche Rd SE, Huntsville AL 35801.**

Contributors to this issue include:

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