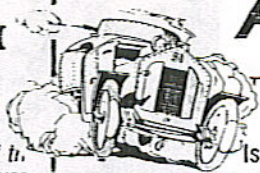


Experience with Heavy Vehicles during World War I

by W.F. Bradley



ARMORED CAR

THE WHEELED FIGHTING VEHICLE NEWSLETTER

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The following is an extract of the observations of W.F. Bradley (Special European Correspondent of "The Automobile") during late 1915 and early 1916, regarding the development and use of armored cars and trucks in Northern France. By the time of Mr. Bradley's article, open movement on the Western Front had all but ceased, and trench warfare had become established. There also had been time for the armored car to develop from the first hurried touring cars with applique armor, to purpose built machines designed in both Great Britain and France. - editor.

Here in Europe there are few types of automobiles which have not been made to carry a gun or guns. The range varies from motorcycles with sidecars and a light machinegun to 5-ton trucks with naval cannon. They all look good on maneuvers, and appear convincing on specially selected ground, but when submitted to combat, there are deceptions.

Early Developments

The motorcycle with a third wheel attached so as to make it possible to carry a gun and extra passenger, has the advantage of speed movement and reduced visibility over unmounted machinegun sections. They are of necessity limited to two men and their ability to operate away from paved roads is not much better than that of a car, and under the present conditions of trench warfare there is no great scope for them. Probably owing to this, and to the fact that they cannot give the men the advantage of armor plating, motorcycle mounted machineguns are not used to any great extent by any of the armies in the field.

Every type of touring car, up to 60 hp semi-racers, have been made to carry a gun. In the early stages of the war numbers of ordinary touring cars were taken out of

private service, equipped with a machinegun and sent to the front without any armor being added. It is hardly necessary to explain that such machines could not go into an exposed position with any reasonable hope of returning in safety.

As soon as it was possible to do so, these cars were armor plated, although not very effectively at first. One of the earliest cars to be put in to service by the British was a standard Rolls-Royce, which had been used for touring purposed by the officer in charge of it. A louvered guard was built in front of the radiator; a steel windscreen replaced the usual glass, and a machinegun was mounted behind the driver in such a position that it could be raised above the pointed steel rear of the vehicle. By crouching low, the driver and gunner could get a certain amount of protection, but there was always the danger of the driver being hit by an incoming round. On this first design, no attempt was made to protect the tires or the motor. Although this type of car did good service in the hands of a daring crew, it would not be considered a safe or up-to-date vehicle at the present (1916).

A further development was also based on a Rolls-Royce chassis, being completely armor plated, with side panels flush with the outside of the wheels and the upper portion of the vehicle shaped like a pyramid. The top of the fighting compartment is hinged to allow a machinegun to be raised above the top of the body. There are also hinged doors provided in the side of the vehicle for entrance. With this amount of armor it became necessary to fit twin pneumatic tires on the rear wheels. This type of car trails a special gun carriage with a naval cannon, the carriage having automobile type wheels and twin tires.

Four Cylinders Adequate

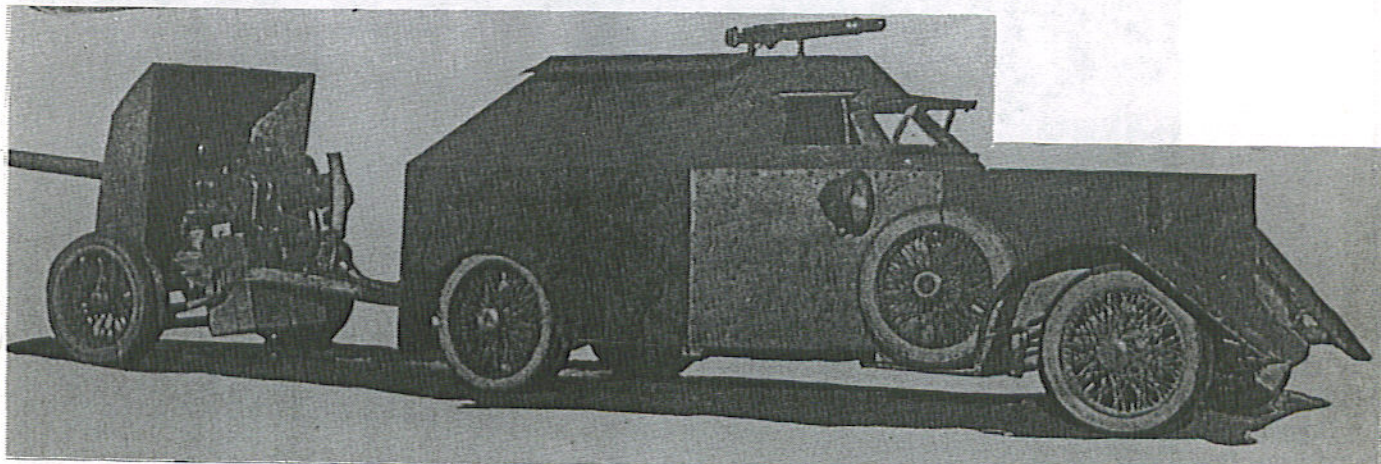
Most high-grade automobiles with four-cylinder motors have proved satisfactory for armored car work. With an adequate front radiator and good capacity water pump, overheating troubles are minimized, despite the armor. Many cars have gone into service without other mechanical modifications than the reducing of the gear ratio (double steering is a refinement, though not always adopted). Armament generally consists of a machinegun or sometimes a small cannon. Best results have been obtained when these cars have worked together in squadrons.

It was to be expected that attempts would be made to use comparatively heavy guns on automobile chassis. In the early stage of the war, the London motorbus B-type chassis was made to carry a naval cannon, the car being without any armor plating. This experiment was a failure, the springs being unable to withstand the recoil of the gun. It is doubtful if any other but or truck chassis available at the time would have proved any better.

Probably the only really successful use of an automobile for carrying a field gun (as of 1916) is the special De Dion Bouton chassis with a French 75mm gun. The chassis approximated the firm's 3-ton truck model, but the feature is the system of jacks allowing the entire load to taken off the springs, and giving the vehicle the same amount of rigidity as the ordinary gun chassis. This is a type of automobiles developed before the war and used very extensively and successfully at the present time. These cars carry sufficient armor plating to protect the crew against rifle bullets and each gun car is served by 3-ton trucks carrying ammunition. These ammunition

...continued on page 4

Early Royal Naval Air Service Rolls-Royce armored car, this vehicle tows a naval cannon on a dual wheel carriage. Another photo shows at least four of these cars in front of what appears to be a factory.



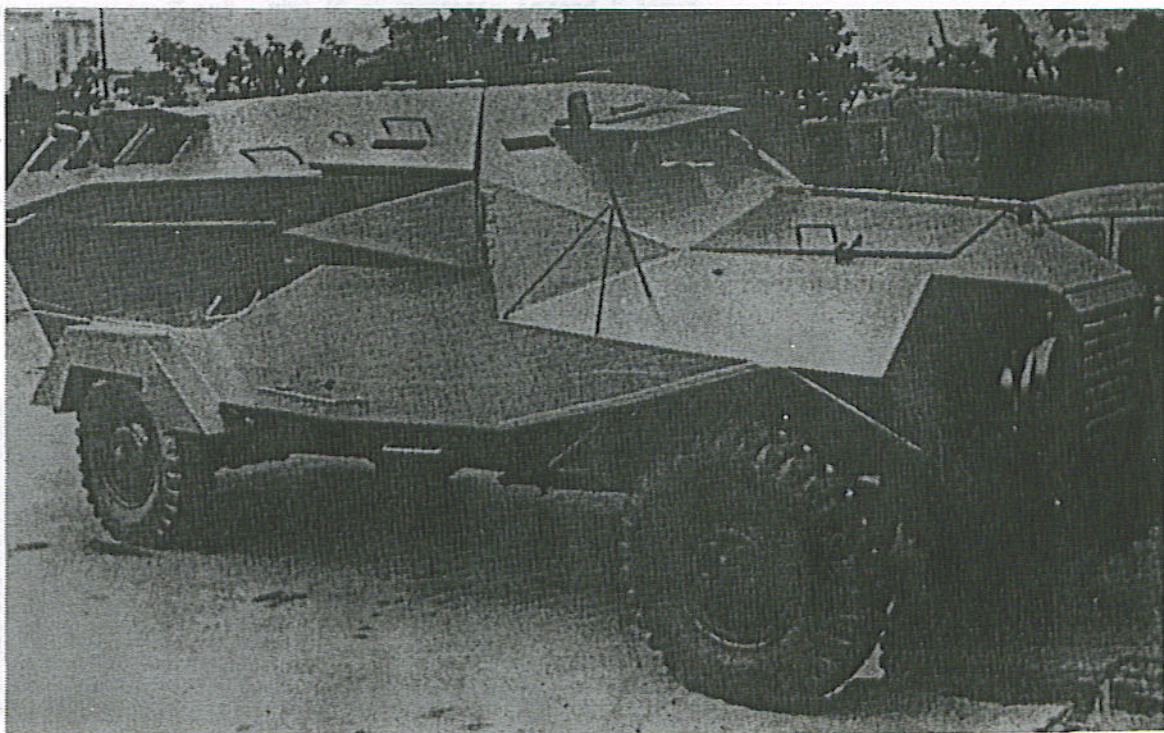
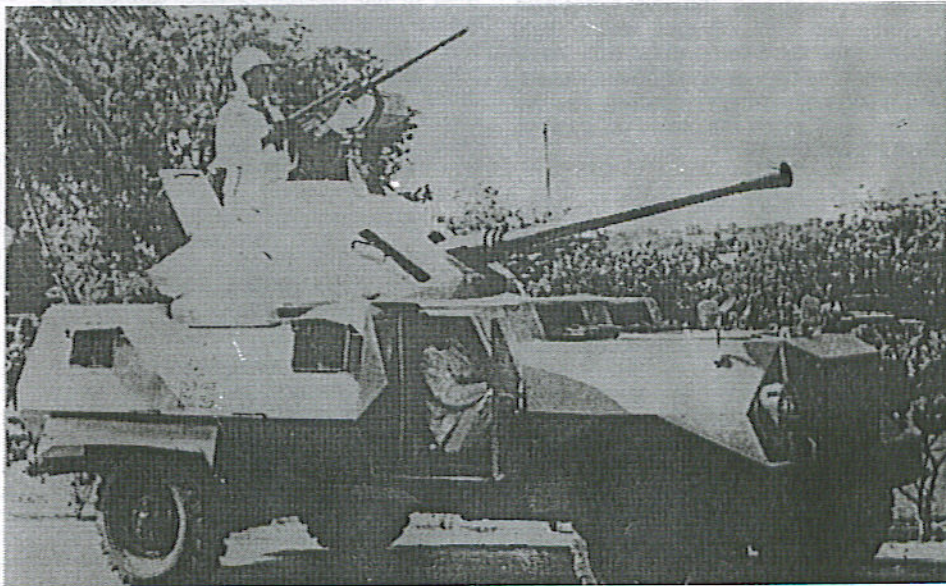
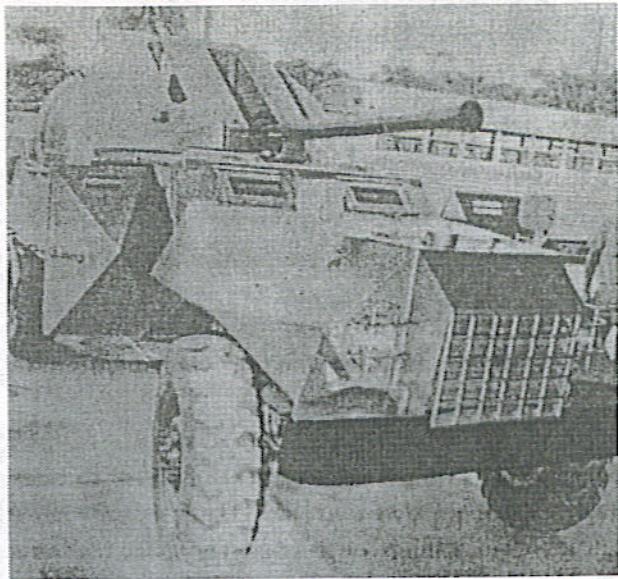
Dominican Republic Naval Armored Cars

Information - John Loop
Drawings - Dave Haugh

In August of 1981 the Dominican Navy received two, RM-79 armored cars, ordered by General Ramiro Matos González, E.N. One car was an armored personnel carrier, and the other mounted a rotating turret with a 40mm Bofors cannon. Both cars were commissioned on December 2 of 1981. Started at the beginning of 1981, the cars were built in Naval workshops, under the supervision of Ship's Captain Rafael Santiago Diaz Jiménez, Supervisor of the Dominican Department of Naval Armament. The cars themselves had originally been designed by General González.

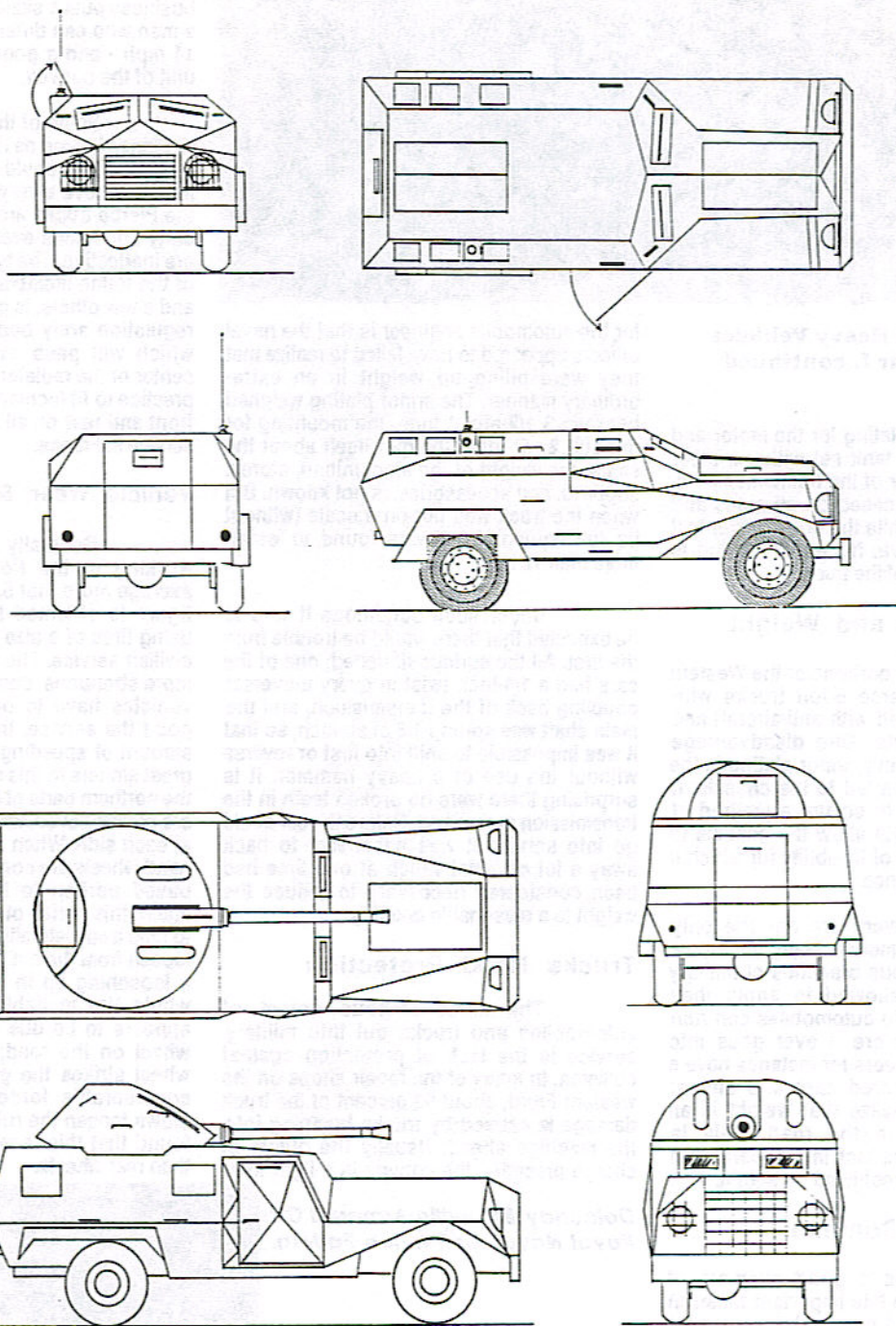
It appears that the cars were built using a lengthened M37B 3/4-ton truck chassis, or even possibly a commercial chassis from a Dodge Power wagon .

It is doubtful that either vehicle remained in service long. The chassis of the cannon armed version undoubtedly being overloaded.

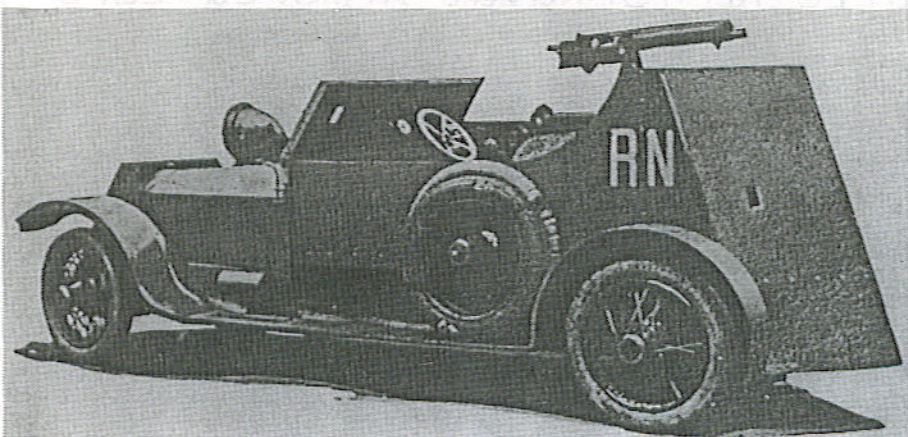


All photos:
Dominican
Navy.

Dominican Republic RM-79 Naval Armored Cars



The drawings above are in 1/76th scale and based on the dimensions of Chassis, Truck: 3/4-Ton, 4x4, M56 and M56B1, with and without winch (also used for the M43 Ambulance), and the space required to fit a Bofors 40mm cannon and mount. It is also possible that the standard M37 3/4-ton truck with a suitably lengthened chassis may have been used. All sizes and details of the vehicles should be considered provisional. Drawings copyright © David R. Haugh, February 1995.



Experience with Heavy Vehicles during World War I, continued from page 1

trucks have armor plating for the motor and have their gasoline tank set within a steel box between the rear of the frame members. Thus the tank is encased on all sides and along the bottom, while the body prevents it being hit from above. No armor plating is used for other parts of the truck.

Rigid Chassis and Weight

On certain portions of the Western front numerous Pierce 5-ton trucks with heavy armor are fitted with anti-aircraft and other types of guns. One disadvantage experienced with heavy armor plating is the extreme rigidity imparted to the chassis. It appears necessary to secure a method of attachment which will allow the chassis to maintain the degree of flexibility for which it was originally designed.

Green drivers are not the only enemies of the automobile. Many engineers and experts in various branches of military operations when allowed to apply their special knowledge to automobiles can ruin an armored car before it ever goes into service. Naval engineers for instance have a lot to do with armored cars and almost invariably fail to realize that weight is an important factor on the road. This is doubtless due to the fact that aboard ship they are not usually restricted by weight.

Overloading Common

There was a good example of failure to appreciate this important factor in two special armored cars which were sent from England to France for experiments at the front. The standard Pierce-Arrow 5-ton chassis had been transformed into an armored car to carry a 6-pounder gun. Each chassis was fitted with a big bed plate, about 4 feet 6 inches in length, the full width of the frame, and 1 inch thick. Under this was a very heavy structure of I-beams, placed about one foot apart, and below this another heavy bed plate, similar to the upper one. It was intended that when the gun car had taken up a suitable position, big wooden metal-faced wedges would be driven between the lower bed plate and the ground, thus providing an absolutely rigid mounting for the gun. In this car the interesting feature

for the automobile engineer is that the naval officers appeared to have failed to realize that they were piling up weight in an extraordinary manner. The armor plating weighed between 3 1/2 and 4 tons, the mounting for the gun 2 1/2 tons, the gun itself about the same; the weight of the ammunition, stores, supplies, and accessories, is not known. But when the truck was put on a scale (without its full equipment) it was found to weigh more than 12 tons.

Under such conditions it was to be expected that there would be trouble from the first. All the springs flattened; one of the cars had a 1/4-inch twist in every universal coupling back of the transmission, and the main shaft was sprung 1/8 of an inch, so that it was impossible to shift into first or reverse without the use of a heavy hammer. It is surprising there were no broken teeth in the transmission or rear end. Before the car could go into service it was necessary to hack away a lot of metal which at one time had been considered necessary to reduce the weight to a reasonable quantity.

Trucks Need Protection

The most obvious defect of automobiles and trucks put into military service is the lack of protection against collision. In many of the repair shops on the western front, about 50 percent of the truck damage is caused by trucks bumping into the machine ahead. Usually the officer in charge precedes the convoy in a light tour-

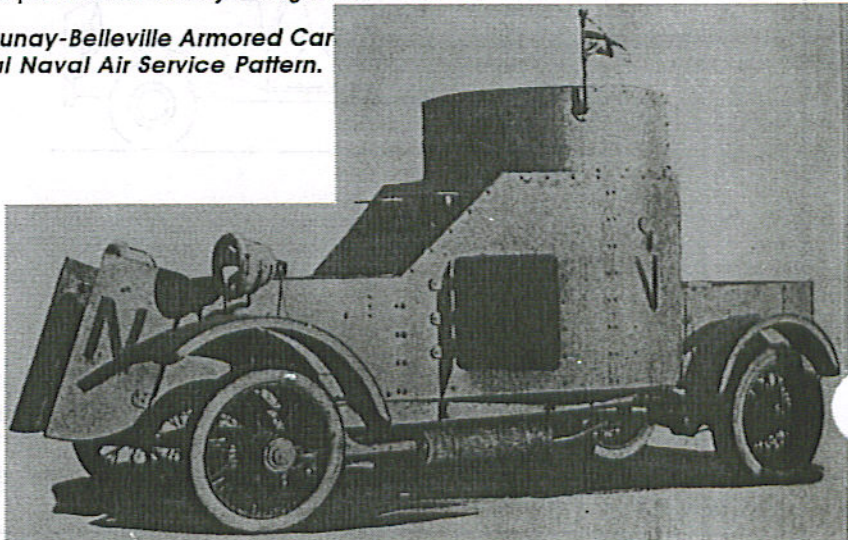
ing car, and unless he is really experienced, will set too fast a pace. Each driver tries to keep as close as possible to the man ahead, with the result that when a sudden stop has to be made, radiators are smashed in and sometimes damage is done as far back as the third cylinder. The officer who knows his business puts a skilled driver on No. 1 truck - a man who can differentiate between 12 and 14 mph - and a good mechanic on the last unit of the convoy.

Some of the American trucks sent to France looked as if they had all the radiator protection that could be desired. Packards for instance have a very substantial buffer, and the Pierce trucks are well protected. But for army conditions even these good examples are ineffective. The type of guard on the level of the frame members, as fitted to Packards and a few others, is generally useless, for the regulation army body has a rear overhang which will pass over the guard into the center of the radiator. It has now become the practice to fit locomotive-type spring buffers front and rear on all trucks going into active service in France.

Vehicle Wear & Road Conditions

Generally solid tires on vehicles working in the North of France do not average more than 5,000 miles of wear. This figure is obtained from records of trucks using tires of a size considered adequate in civilian service. The shorter life is due to the more strenuous conditions under which the vehicles have to operate. No matter how good the service, there is always a certain amount of speeding; English drivers are as great sinners in this respect as the French. In the northern parts of France most of the roads are granite paved, with a macadam or dirt strip at each side. When traffic is heavy the right-hand wheels are constantly slipping from the paved portion to the dirt strip and back again, this series of jumps causing the tires to chip away laterally. Sections of the tire also loosen from the rim and when there has been a loosening up in two or three places the whole tire is liable to come away. This appears to be due to the bouncing of the wheel on the road; when driving fast the wheel strikes the ground at intervals with considerable force, and these repeated blows loosen the rubber from the base. It is found that this is more common with front than rear wheels.

*Delaney-Belleville Armored Car
Royal Naval Air Service Pattern.*



Another source of tie trouble, which was known to users before the war, is due to arched roads. It is obvious that with a vehicle running on one side of a highly crowned road the full width of the tread cannot be in contact with the road surface, and the wider the tire the smaller the proportion in contact. This throws an excessive load on one portion of the tire, or on the inner tire when duals are used, and causes rapid wear. The effect is lessened on those vehicles having chain drive with slightly toed-in wheels, as is common with the front wheels of automobiles.

The problem with arched roads has been recognized for some time and attempts have been made to construct a type of transmission allowing the wheels to accommodate themselves to the arch of the road.

Finally there have been many cases of parts failure in heavy vehicles. One problem has been axle housings failing, but these have been traced to a heavy load shifts to one side of a truck. Loads of shells are particularly liable to slip in this way. Also manufacturers all over the world who had old models or units in stock have been tempted to get rid of them in the various armies. Cases are now coming to light, such as one firm who used a certain number of touring car crankcases in order to finish a series. These were too weak for truck service, with the result that all the front hangers snapped and the French repair shops have had to fit these vehicles with a steel member forming a brace under the front end of the crankcase. Only time will expose what flaws in design or manufacture are present in other vehicles.

Australia, Mobility and Project Bushranger

by David R. Haugh

Faced with increasing need to secure their northern coastal areas (and the immediate interior south of the coast); Australia's military has come to the conclusion that to project an adequate presence in the north, changes in equipment and missions within the Australian Armed Forces will have to be brought about. The 1987 Australian White Paper, "The Defence of Australia" identified systemic problems with the Australian Army's ability to respond rapidly to a threat not only along the north coast of Australia, but inland as well.

Structured for a conventional war in support of Europe, or in support of UN operations, the Australian Army doesn't have the mobility assets available for rapid deployment across the country, or rapid tactical movement once the theater of operations has been reached.

Operating under the project name (APIN) Army Presence in the North, an initial step has been to move more of the Australian Army's assets to the less populated north. Both cavalry and armored units have been transferred, along with logistic and support units; but the real emphasis has been on

equipping a reserve force with enough mobility to cover long distances in a relatively short time. The goal is to accomplish the movement with reliable vehicles, organic to the units. This project has been named *Bushranger*.

Bushranger has been envisioned as following three phases:

1st Phase - full motorization of the 6th Infantry brigade (Ready Reserve). Rover Australia has received a contract for 293 4x4 and 6x6 Perentie vehicles. Modifications (to be accomplished by British Aerospace Australia) to the Rovers include increased roll-over protection, increased seating for up to ten soldiers, a weapon ringmount, and space for extra water, tires and fuel. As newer more mission specific vehicles are purchased, the 1st phase vehicles will be transferred to lower priority units. First deliveries of the modified Rovers is scheduled for 1995 with completion during 1996.

2nd Phase - the evaluation of mission specific vehicles to meet the mobility/protection requirements to become the new Infantry Mobility Vehicle (IMV). As of 1994, some thirteen companies were offering seventeen vehicles for consideration. The Australian Army's goal is to cut the field to two or three main contenders by 1996, with requests for trials vehicles (to undergo twelve months of testing) to be supplied in 1997.

3rd Phase - the purchase of 500 IMVs, with the first to be delivered by the end of 1999. The goal of the project is to equip seven infantry battalions (four with IMVs, and three with the original Rovers).

Australian IMV specifications include:

- *able to carry a fully equipped nine man infantry section with navigational aids, and enough provisions for three days' operations. This load must include 270 liters (71.33 US gallons) of water, considered a critical requirement during operations in Australia's open spaces. Total payload for the proposed vehicle comes to approximately two tons.

- *a range of 600km (372.6 miles) without resupply, with 1000km (621 miles) preferred on hard surface roads.

- *able to maintain a highway speed of 90km/h (55.89mph).

- *able to withstand 5.56mm and 7.62mm ball ammunition, with a desired ability to withstand armor piercing rounds of the same caliber and ability to protect vehicle occupants from injury due to mines or 81mm mortar shell splinters.

- *able to mount a machinegun.

- *able to be airlifted in a C-130 Hercules series aircraft.

Manufacturers from the US, Canada, France, United Kingdom, South Africa, Israel and Germany have so far offered designs. Besides initial cost, one of the considerations of vehicle choice will be the ability of Australian industry to support the new vehicle over its projected 20 year operational life.

Among the possible contenders for the Project *Bushranger* series are:

- * Ani Reumech "Mamba MkII" from South Africa

- * GKN Defence "Glover Tactica" series of 4x4 armored vehicles from Great Britain

- * GKN Defence "Saxon" 4x4 from Great Britain

- * General Motors of Canada, with their LAV/Bison series of 8x8 vehicles from Canada

- * IAV/RAMTA (Israel Aircraft Industries) along with A. Gonian & Co (Australia) with the RAM-V3, a 4x4 vehicle with overhead cover, from Israel.

Reviews

Osprey New Vanguard No. 11, M3 INFANTRY HALF-TRACK 1940-1973, by Steve Zaloga, illustrated by Peter Sarson. ISBN 185532-467-9, Osprey Publishing Ltd., Michelin House, 81 Fulham Rd, London, SW3 6RB, Great Britain. Soft covers, price £7.50 in the UK.

Reviewed by Peter Brown.

When the US Army decided to mechanize its infantry, it selected a simple design which could be produced in large numbers and adapted to a variety of roles. The resulting half-track series was produced in large numbers (out numbering even the Sherman) which alone would provide it with a place in the history of armored warfare. It deserves even more exposure as it helped to bring about the armored infantryman, some may even use, albeit in modernized form, these vehicles.

How this came about, standard types and many variants which were derived from them, is told by Steve Zaloga in this new book in the excellent New Vanguard series. And it is a 'new' book, not the old 1983 title from the original series. Apart from some organization diagrams and the odd photo, the two works have only their subject in common. Even if you have Vanguard 31 you would be well advised to add this new one.

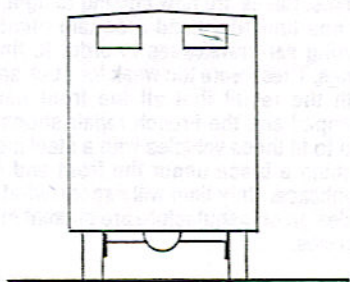
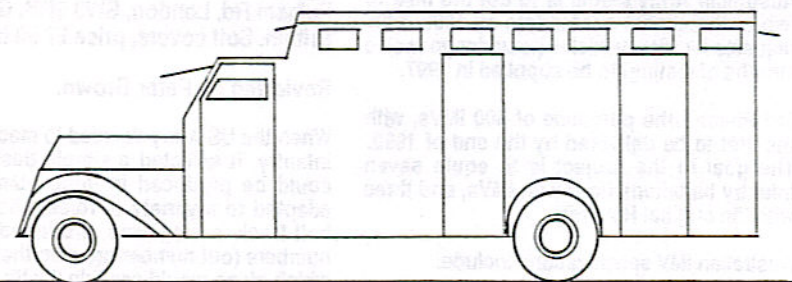
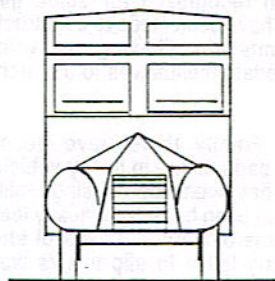
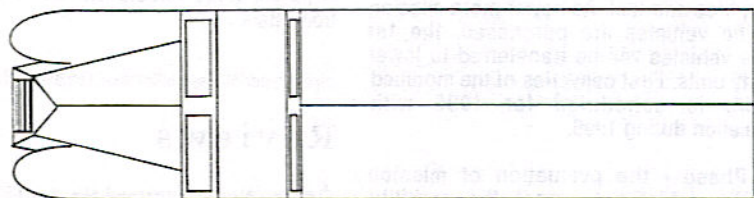
As well as the technical side of the vehicle, their use in action is also covered, from debut in the Pacific and North Africa, through to playing a major part in the liberation of Europe. A quick guide to spotting the 'Blitz Doughs' who rode them is also included! Criticism is also covered, coming from both conservatism and limitations in the vehicles and the methods of using them. Typical unit organizations, shown using using vehicle silhouettes help illustrate this area, a useful list of production changes and improvements as well as production figures for each type add facts and details.

What will fascinate and even surprise is the wide range of modifications, official and unofficial, applied to the half-track series. These ranged from those made necessary by production from different manufacturers -

Another Wilton-Fijenoord Armored Car

by Hans Heesakkers

Somewhere in the 1930's the Sao Paulo, Brazil Police Department ordered two armored trucks from the Dutch shipbuilding company Wilton-Fijenoord. The armored superstructure was placed on a Ford truck chassis and was powered by a Ford 8-cylinder engine. Able to carry 20-22 men (14 seated and 6 to 8 standing) the body itself was made from 4mm thick armor plate which could resist normal, small caliber bullets. How effective they were in police work, and their final disposition is unknown.



1/76th scale provisional drawing Wilton-Fijenoord Armored Car © David R. Haugh, February 1995

incidentally, 'basic' vehicles may well have been the M5 or M9 and not only the M3 - to conversion, such as self propelled artillery and anti-aircraft guns. Mention is also made of their use in Allied and Russian service, and comparisons are made with German half-tracks and British carriers.

Once the war was over, half-tracks continued to use around the world, with many going to Israel. Indeed, the vehicle became almost an IDF trademark. The many variants are brought to life using some dozen or so side view plans, good black and white photos (both detail views and in-action shots), and the color paintings which show them in many guises in both plan, side view and three quarter angles with a variety of schemes shown. This will be a standard work for many years, and comes highly recommended, as does this whole series of books.

Fighting Vehicles and Weapons of Rhodesia 1965-80, by Peter G. Locke and Peter D.F. Cooke, illustrated, 152 pg. ISBN 0-473-02413-6. P&P Publishing, Box 9724, Wellington, NEW ZEALAND. Soft covers, price £18, \$25 (US), postage extra.

Reviewed by Dave Haugh.

I have been looking forward to this book for years, and I haven't been disappointed. If you like armored cars, **buy this book!** The text is informative, the photos are excellent, and the information is a gold mine. The modelers out there will be scratch building Rhinos and Kudus and Pumas like crazy. I liked this book so much I have printed Peter Cooke's flyer on page 8 to make it easier to order. (PS. Peter Cooke's newsletter *Tank TV* is also recommended -drh)

Letters

Dear Friends:

I am a hobbyist interested in expanding my collection and yours too, no money, no checks, no IRCs... only trade!

I collect 1/76th and 1/72d scale kits and soldiers of WWII only, tanks, AFVs, armored cars, artillery and soft skins. My offer is simple, militia of the Brazilian Army, Navy, Marines and Air Force in exchange for kits. This offer includes caps, badges and uniforms. I also have available a booklet I have put together on "Armored Vehicles and Weapons of Brazil" (*I have a copy of this booklet and it's a real gold mine of information - ed.*)
Fernando Costa de Sousa, Rua Major

Gondim 259A, Venda Da Cruz - Sao Goncalo -RJ, CEP 24411-110, BRAZIL.

Gentlemen:

Being a volunteer member of the Belgian Tank Museum, I was put in charge of the restoration of our AEC MK II armored car, armed with a 6 pdr anti-tank gun. The restoration lasted two years, but our vehicle is fully operational and took part in several events in Antwerp, Brussels and Nymegen.

To finish the job I am conducting some historical research, for some reason it is very difficult to find information about this particular vehicle.

I am very much interested in the history of the Mk II version; it seems that only one British unit (or better stated former colonial Indian unit, the 10th Indian Division) used this particular vehicle. This was in Italy, and later on the 10th gave up their AECs to equip part of a Yugoslavian Brigade. After the war, the Mk II version along with the MK III (75mm gun) were used by the Belgian Army.

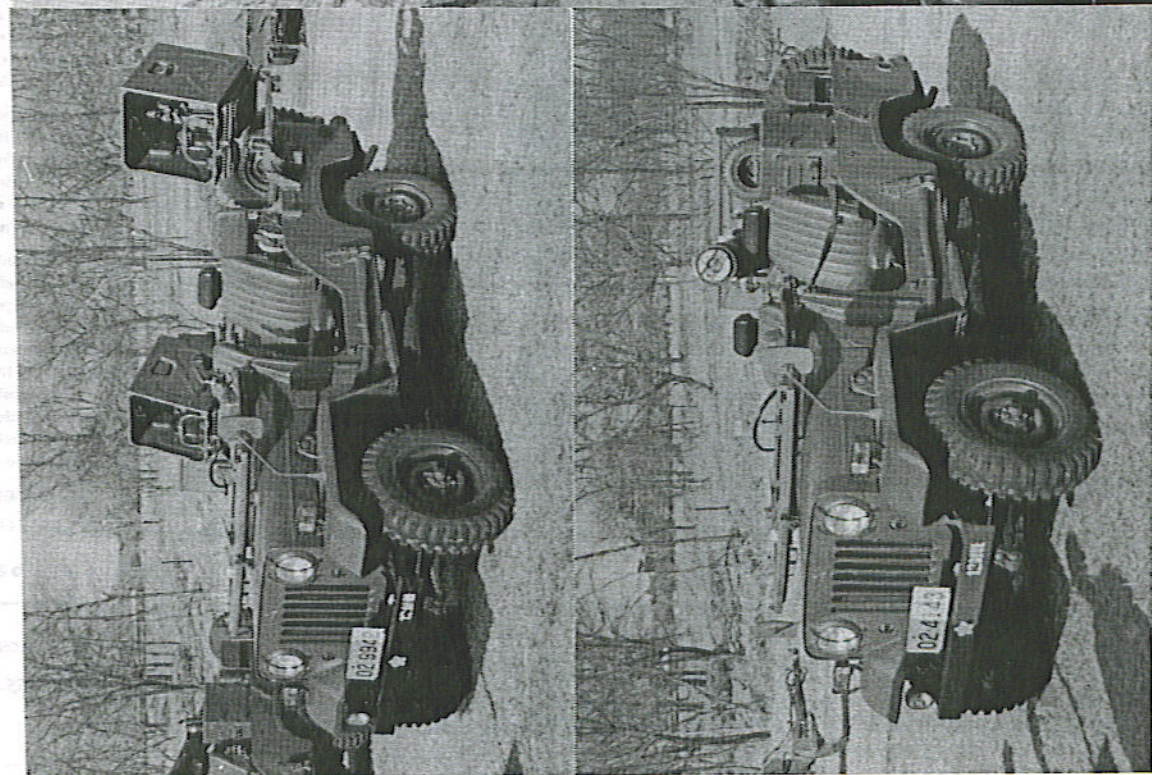
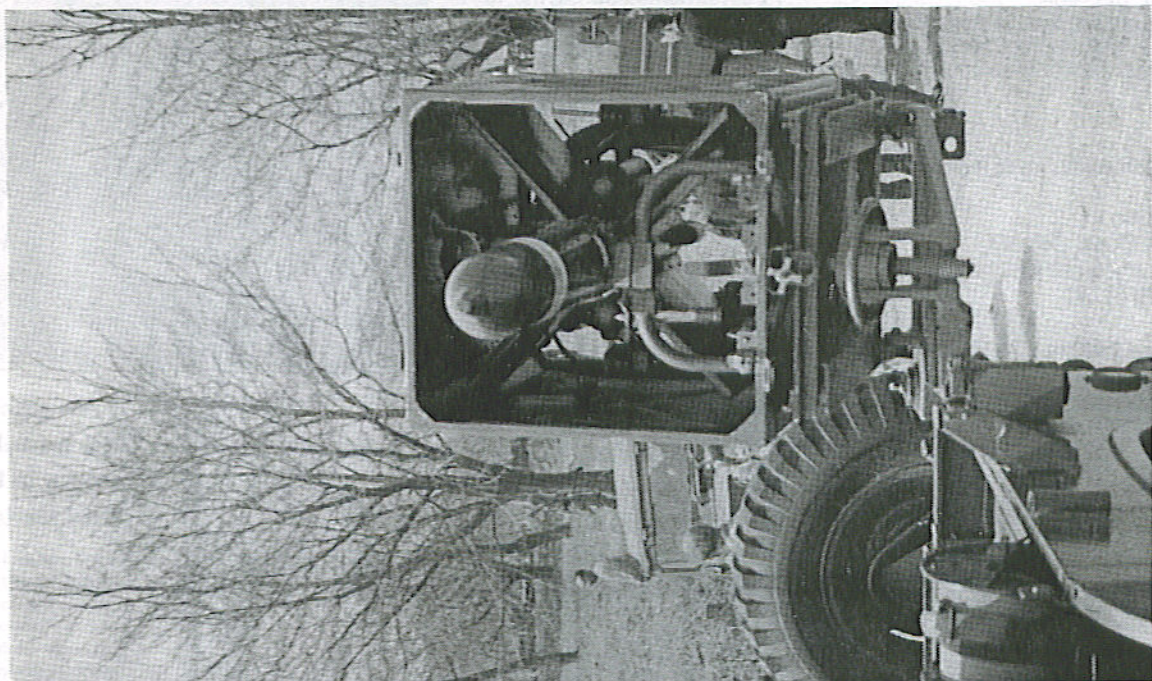
Of the Belgian usage, I have lots of information, the only thing is that one AEC Mk II came from BAOR and 67 others came direct from the UK. Since the British army in the UK doesn't seem to have used these vehicles, where did they actually come from,

...continued on page 6

Letters, continued from page 6

The Reference Page: A Japanese Ground Self-Defence Force (JGSDF)-Truck, 0.5-ton, 4x4 Mitsubishi J24-P (Type 73 small truck) with KAM-3D (Type 64) wire guided anti-tank missile.

Below KAM-3D Missile System



Above: KAM-9 Missile System

Although it looks much like the (Willys) "Jeep" CJ3B series of vehicles, the Mitsubishi version is longer and has a diesel engine. Dimensions are: length 3750mm, width 1655mm and height (to top of canvas) 1950mm. The KAM-3D was adopted as standard equipment for the JGSDF in 1964 and is still in service. The missiles can be launched either one at a time or in multiples. Skilled operators can score as high as 19 hits out of 20 firings. A three man team is used in support of the KAM-3D, the operator using an optical sight and control box. Using a two stage solid-propellant motor, the KAM measures 1000mm in length, with a span of 600 mm. and has a cruising speed of 85m/per second. Minimum engagement range is 350 meters, with a maximum range of 1800 meters. A second generation KAM-9 (Type 79 heavy anti-tank missile) is also in service mounted on the same type of Mitsubishi 4x4. Minimum engagement range for the KAM-9 is 300 meters, with a maximum range of 4000 meters. Photos © Masahiko Saito.

and who had them? Why only one Mk II from BAOR since not one unit seems to have had them on their Table of Organization? Testaert William, Dapperen Square 48, 1630 Linkebeck, BELGIUM.
(If there is anyone that can help please contact Mr. William direct, but I'd appreciate a copy of your answer to share with everyone else. -ed)

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AEC Mk II Armored Car of the Brussels Tank Museum painted as a vehicle of the 1st Belgian Reconnaissance Regiment (Circa 1945) photographed during the 1994 St Georges Day parade. A total of 629 AECs (of all marks) were built.

Photo via, Testaert William.



Fighting Vehicles and Weapons of Rhodesia 1965-80

Peter G Locke
Peter DF Cooke

**Five poor photos
348 excellent ones
3 years in the making
One helluva book**

At last *Fighting Vehicles & Weapons of Rhodesia 1965-80* is available. The book was started in 1991 when the two authors pooled their resources on the unique mine-protected vehicles and the industry that made them during Rhodesia's 'dirty' bush war. In 1993, it was expanded to cover all weapons and ground-based technology developed.

The only book dedicated to the topic this work details the inventive approach taken by a desperate society under attack from all quarters and forced under sanctions to use the resources and materials at hand.

Separate illustrated sections cover the indigenous vehicles, firearms, anti-ambush weapons, munitions and miscellaneous technology. The book also covers aspects of the country's history — from 1890s pre-armor to post-war Zimbabwe — that help explain the turbulent 15-year conflict. This major research is calm, thorough and, above all, accurate.

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