

Armoured Cars

by B. T. White



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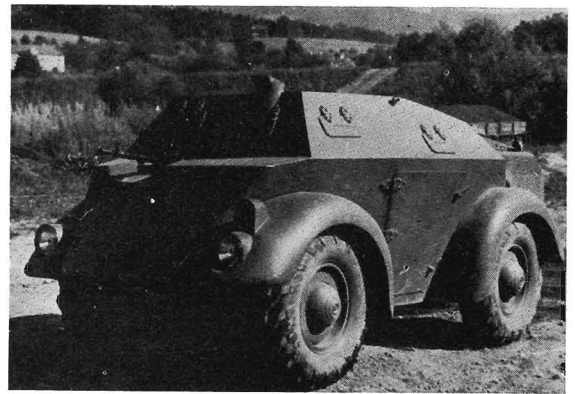
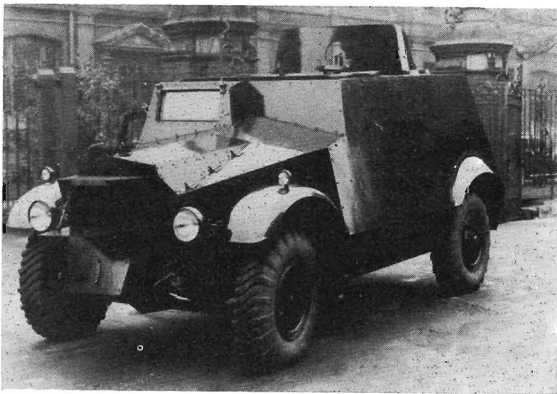
Contents of volume two are—Experiment in Armour; Mediums Marks I to III; A1E1 The Independent; Light Tanks Mark I to VI; Light Tanks Mark VII Tetrarch and Mark VIII Harry Hopkins; Amphibious Tanks; Vickers Six Ton; Matilda; Valentine; The Old Gang; Carden-Loyds; Carriers; Armoured Car Development in the Inter War Years; British Armoured Units and Formations (1919-1940).

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Left: *Morris Armoured Car, Reconnaissance (Model CS9/LAC)*. Produced in 1938 and the only recently built type of armoured car in service at the outbreak of war. The prototype is shown—this differed only in minor details from the production cars. (B.M.C.)
 Right: *Steyr-Daimler-Puch (Austro-Daimler) Model ADSK*. This was the original type supplied to Britain for experiment. (R. J. Icks)

Guy, Daimler, Humber, A.E.C.

by B. T. White

THE year 1938, during which it seemed increasingly apparent to the less sanguine students of European affairs that war with Germany was inevitable, found the British Army with only one modern type of armoured car in service. This was a four-wheeled Morris type, based on the 15-cwt. truck chassis. This design allowed for the quick and relatively cheap production of 100 armoured cars to re-equip the two cavalry armoured car regiments of the Army but, reverting as it did in many ways to features that were no improvement on armoured cars designed in 1914, could be regarded as no more than a stop-gap.

Rolls-Royce armoured cars of a design only improved in details over that of the original 1914 Admiralty turreted pattern were still in service, although some were rearmed with an anti-tank rifle and in this form were actually used in action in Libya in 1940.

Armoured cars of the 1938 Morris type and the Rolls-Royce 1920/1924 pattern with their conventional suspension and transmission on the rear wheels only were not good in performance off roads, although the development of an efficient design of sand tyre helped improve their going in the desert. This is not to say that various vehicles that showed a much better cross-country performance had not been built in the inter-war years in Britain as well as—more widely—on the Continent. In Britain in the 1920's and 1930's, efforts were concentrated on the development of the rigid (as opposed to articulated) 6×4 chassis both as a military load carrier and later as an armoured car. This six-wheeled type, with drive to all four of the rear wheels, showed a considerable improvement over 4×2 vehicles, although it had the disadvantage of "bellying"—the chassis between the front wheels and the front pair of rear wheels grounding—in certain conditions. However, 43 Lanchester Armoured Cars of this type were built in 1927-1931, followed by 6 Crossleys and

these shared with some 76 Rolls-Royces armoured car duties with the British Army all over the world during the inter-war years and some were still in service even after the outbreak of World War II.

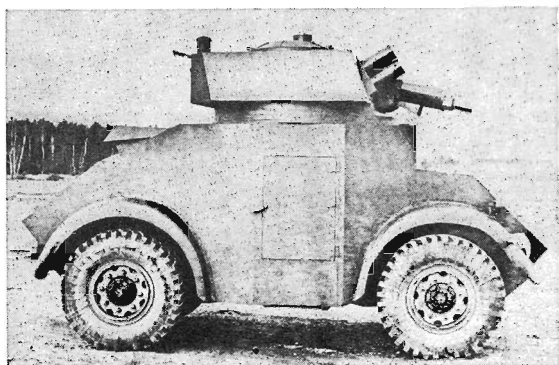
The Royal Air Force, which also used armoured cars—these were for internal security in Iraq and Palestine, in conjunction with aeroplane squadrons—mostly employed Rolls-Royces similar to those of the Army. Some 6×4 armoured cars of different pattern to the Army's were experimented with, however, as well as 4×4 types designed by Nicholas Straussler. Twelve of the latter were eventually ordered in 1937-1938. Perhaps the most advanced model of British 6×4 armoured car was the Armstrong-Siddeley, tested by the Air Ministry about 1938, which had a relatively short wheelbase, a well shaped hull and rear mounted engine, but the 6×4 layout was, as a whole, losing favour for A.F.V.s by this time.

On the Continent, several designs for armoured cars (besides those of Straussler, which originated in Hungary) were developed around the years 1933-1937 and which showed considerable advantages in cross-country going. Also, in Britain by 1937 there were several new designs of 4×4 chassis some of which were coming into use as gun tractors for the army.

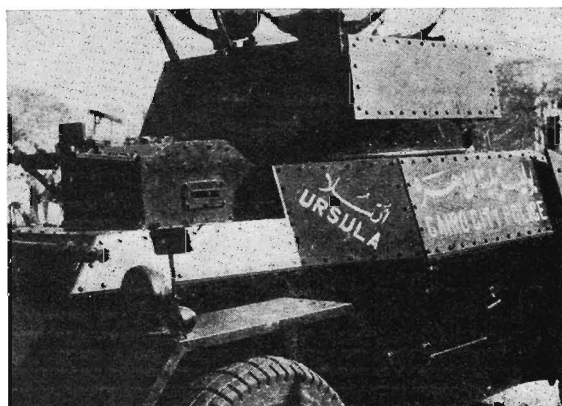
ARMOURD CAR TRIALS

In 1938 the War Office decided to institute tests to determine the best form of chassis to develop as an armoured car both to replace all existing types and to be suitable for further production in the event of war. As a start, early in February, six different chassis from five manufacturers were got together for comparative tests. All were four-wheeled types, with four-wheel drive, but three had conventional suspension with rigid axles and three had independent suspension.

The three chassis with conventional suspension were a Guy Ant (supplied by Guy Motors Ltd.,



Steyr-Daimler-Puch chassis with mock-up armored car hull and turret.
(British Official—Crown Copyright)

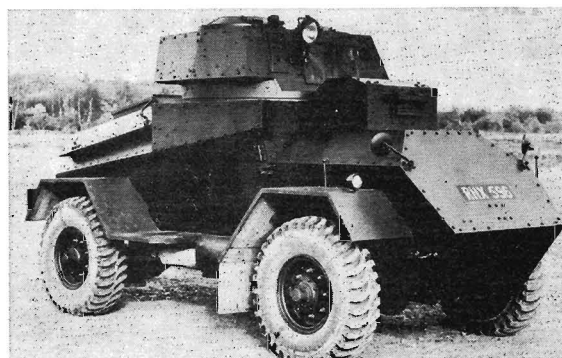
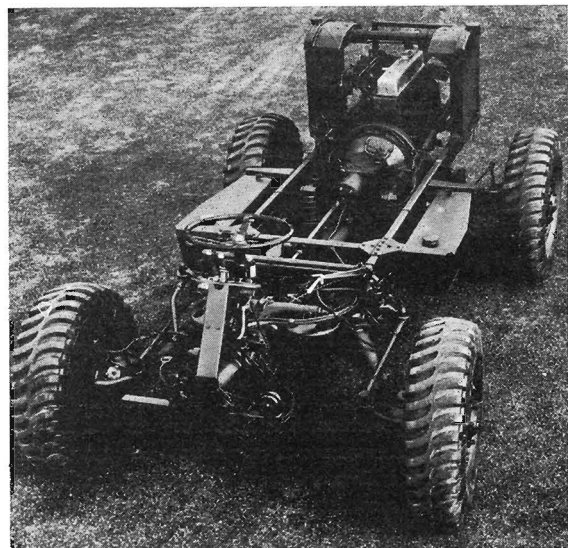


Morris Light Tank (Wheeled) in use by the Cairo City Police in 1941. The armament has been added locally.

(British Official)

Guy Light Tank (Wheeled)—the first prototype.

(Tank Museum)



Left: Morris Light Tank (Wheeled)—chassis. Note the rear-mounted Morris water-cooled engine with twin radiators; the tubular backbone with diagonally placed stub axles and volute springs.
(B.M.C.)

Wolverhampton), a Unipower, a forestry tractor type of vehicle, provided by Universal Power Drives Ltd. of Perivale, Middlesex, and an American G.M.C. chassis.

The three independently sprung chassis were a Morris Quad, supplied by Morris Commercial Cars Ltd., Birmingham, and two Steyr-Daimler-Puch vehicles imported from Austria. One of these Austrian vehicles (which were from the Austro-Daimler division of Steyr-Daimler-Puch A.G.) was a small turretless armored car with a rear mounted air-cooled engine and the other was a front engined unarmoured troop carrying vehicle, also adaptable to towing light artillery.

The preliminary tests eliminated the Unipower and the G.M.C. chassis and further trials were then concentrated on the British-built Guy and Morris chassis (of which six of each were ordered for extended trials) and on the Austrian Steyr-Daimler-Puch vehicles. By the end of February 1938 the fact was established that the Steyr-Daimler-Puch models were of high performance, being fast and economical in fuel. However, the driving position was cramped (this applied more to the armored car than the troop carrier), the air-cooled engine was noisy and the braking was poor.

The performance of the Guy was found to be about the same as that of the Austrian vehicles although

there were some problems with the suspension and the cooling of the water-cooled engine.

The Morris Quad proved to be the worst performer of the semi-finalists. The design of this vehicle was a completely new departure for the Morris Commercial firm. It consisted of a tubular chassis with a water-cooled engine mounted at the rear with the fan at the back and radiators at either side. The transmission was taken from a transfer box in front of the engine by means of diagonal shafts to bevel boxes at each wheel. Many faults arose in the tests carried out up to October 1938, including failure of the water pumps and stub axles. Also the Morris Quad was slower than the other types and the driver's position was uncomfortable. It was recommended, therefore, that further development should be limited to improvement of the steering position—modification of the steering column and of the driver's seat to make it adjustable—in order to make the six vehicles built suitable to be handed over to the Army for training purposes. To end their story at this point, the Morris Quads had armored hulls and turrets similar to those of the Guy Armoured Cars. No armament appears to have been fitted during their trials although one car tested in Egypt was eventually handed over to the Cairo City Police for riot control purposes. Rejoicing in the name of "Ursula" it was equipped locally with a light machine-

gun (possibly of Italian manufacture) plus crew weapons.

Tests continued through 1938 with the Guy armoured cars (three of which had been completed by September) and the Steyr-Daimler-Puch vehicles, five of which in all were obtained for experiment, four as armoured cars and the other as an armoured gun tractor.

The Steyr-Daimler-Puch armoured cars resolved themselves into three main types: the original model, turretless, with air-cooled engine; a modified version with a different hull with additional vision ports etc., in which the air-cooled engine was replaced by a Morris water-cooled type; and a chassis similar to that above with a Morris engine and fitted with a mock-up body with a rectangular turret (which was of identical pattern to the Guy and Morris turrets).

It had been felt desirable to try out the Steyr-Daimler-Puch design with a British-built engine since this would have obvious advantages if the Austrian vehicle were chosen for production. Also, the original air-cooled engine, although efficient, was noisy, which

was a liability in a reconnaissance vehicle. Therefore, Morris type CD water-cooled engines were fitted in some of the Steyr-Daimler-Puch armoured cars in order to compare their performance with that of the air-cooled engine. The water-cooled engine gave a markedly inferior performance in the Steyr-Daimler-Puch armoured car.

GUY ARMOURD CAR

In the meantime, trials of the Guy Armoured Car continued to show a good, if not spectacular, performance. Two out of the first three pilot vehicles were handed over in the autumn of 1938 to the Queen's Bays for troop trials. This was a newly-mechanized cavalry regiment which, it might be supposed, should be likely soon to reveal any mechanical weaknesses in the design. Such faults as showed up were not fundamental and were fairly easily rectified. They included some defects in the rear axle casing, the front anchorage of the rear springs, and the shock absorbers, while the cooling needed some improve-

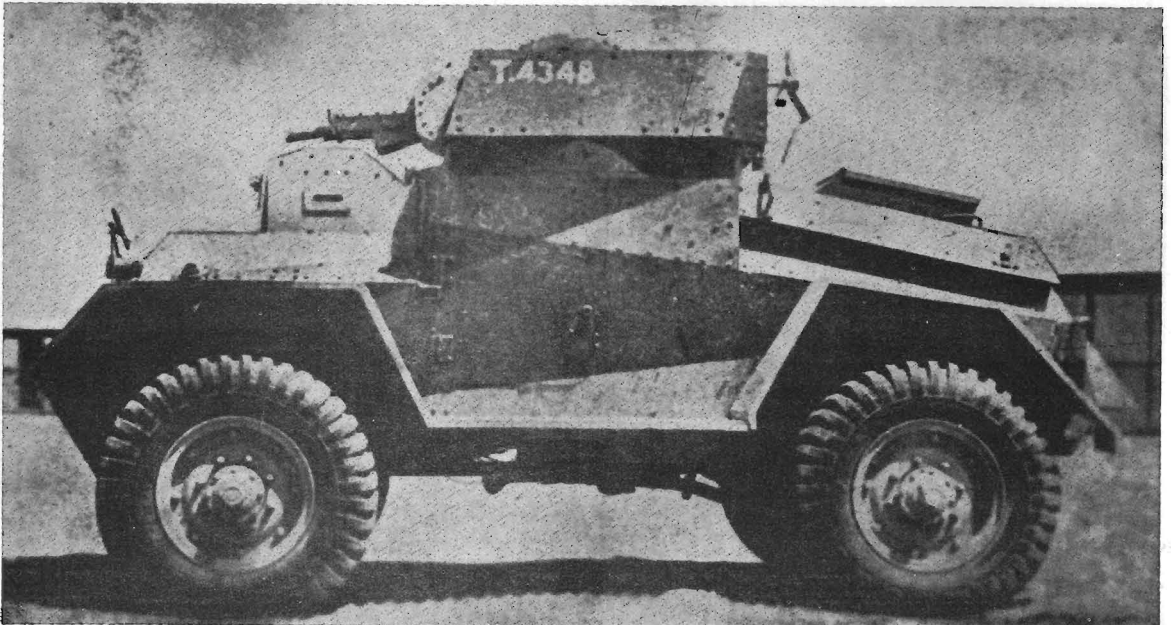


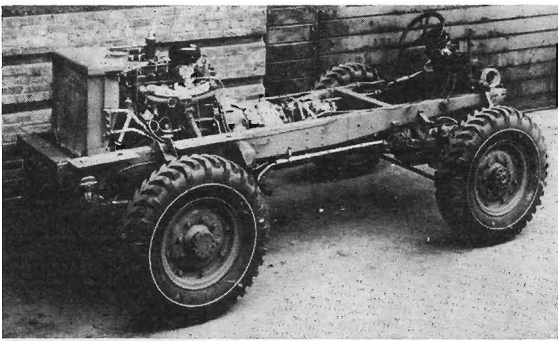
Armoured Cars, Guy, Marks I and IA—a line-up of vehicles belonging to the Royal Canadian Dragoons, training in the United Kingdom in 1942.
(Canadian Official)



A rear view of an Armoured Car, Guy Mark IA. This shows clearly the "solid" rear plate, with air intake underneath. This car is of the 2nd Derbyshire Yeomanry on an exercise in 1941.

Guy Light Tank (Wheeled)—sixth prototype vehicle. Apart from the riveted construction and minor details (including the positioning of the front shock absorbers), this car corresponds closely to the production vehicles which followed.
(British Official)

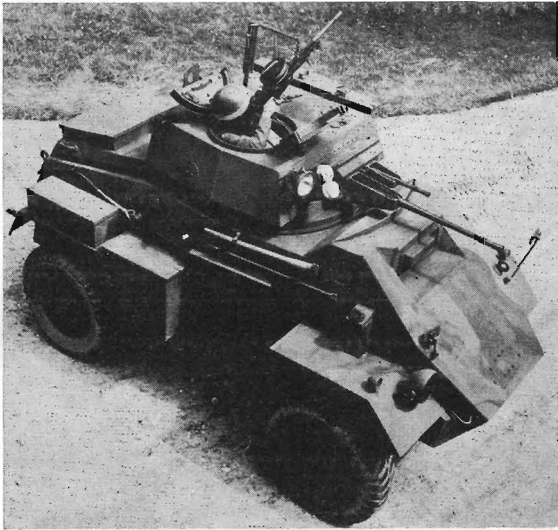




Humber Armoured Car chassis. Rear mounted engine, rectangular frame, semi-elliptic leaf spring suspension. (Rootes Ltd.)



Armoured Car, Humber Mark III. This side view (of a car with full Desert equipment on patrol near the Qattara Depression) shows the new form of turret with increased head room. (Imperial War Museum)



Left: A view from above of an Armoured Car, Humber Mark II, showing all the armament clearly, including the 15-mm. and 7.92-mm. Besa machine-guns, the twin smoke dischargers on the front plate of the turret and the 0.303-in. Bren machine-gun (with drum magazine) on a Lakeman A.A. mounting. The hull was basically the same as that of Humber Mark I but had a revised glacis plate incorporating the driver's vision hatch, and a different form of engine air intake at the rear. (Rootes Ltd.)

Below: Humber Mark II Armoured Cars of the 12th Royal Lancers on patrol in the desert in the region of the Qattara Depression, 1942. Much extra equipment had to be carried on these long range patrols and the cars have fittings, including a sun compass on the turret side and a spare wheel, which were not on Home service. (Imperial War Museum/Jaguar Cars Ltd.)





Armoured Car, Humber Mark IV. Apart from the 37-mm. gun, this model was similar in most respects, externally, to the Mark III. Note the un-ditching channel carried across the front glacis plate. (Rootes Ltd.)



Armoured Car, Humber Mark I. This particular vehicle was presented by the Maharajah of Bikaner in 1941 and was used by the 12th Royal Lancers. (Imperial War Museum/Jaguar Cars Ltd.)

ments. Some of the necessary modifications appear to have been included in at least one, and perhaps all the last three of the six pilot vehicles built. The last of these, WD No. T4348, which was sent to Egypt for desert trials, shows in its layout all the external characteristics of the production vehicles, including larger tyres (10.50 × 20, replacing the original 10.50 × 16s), re-designed mudguards, allowing more clearance, and re-positioned shock absorbers.

The Guy Armoured Car had all the advantages of being based largely on well tried components, many of which were already in production for the Quad-Ant Field Artillery Tractor. The four-wheel drive ensured a good cross-country performance, although limited to some extent by the use of "solid" axles. The independent suspensions and other features of both the Morris and the Steyr-Daimler-Puch vehicles might, if sufficient time could have been devoted to further development, have resulted in the end in a better vehicle than the Guy, but by this time it was desired to get some modern fighting vehicles into production and a contract was given to Guy Motors Ltd. for 101 armoured cars in January 1939. By this time the new nomenclature of Tank, Light (Wheeled) was applied to this class of fighting vehicle intended for long range fighting reconnaissance for the armoured division or higher formation headquarters. This designation, followed by the maker's name was applied to both the six Guy and six Morris pilot vehicles described above, whilst the Guy production model was known, initially at any rate, as Tank, Light (Wheeled), Mark I.

When Guy Motors were given the contract for production of Light Tanks (Wheeled) the specification called for riveted construction of hulls and turrets in accordance with the designs which originated from Woolwich Arsenal. The company suggested, however, that welding of the armour plate would be much more satisfactory from a production point of view. Doubts were expressed by the War Office technical branches but a successful system for welding the hulls and turrets was developed by Guy's together with a rotary jig for handling the bodies during the welding process. After the war Guy Motors received an award from the Royal Commission for Awards to Inventors for this invention, which reduced both the cost and time of production of hulls and turrets for armoured cars.

The system was adopted for the 101 Guy armoured cars of the production order as well as for all subsequent British armoured cars.

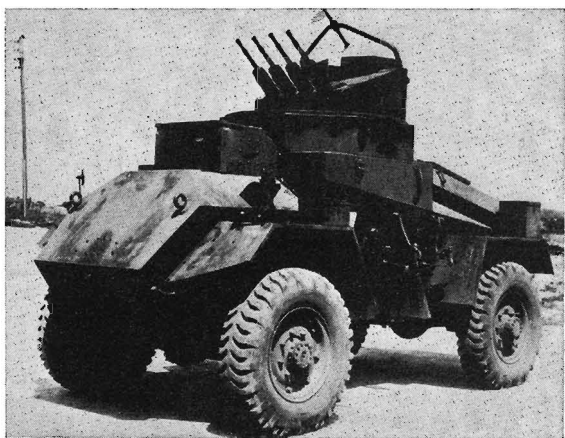
CLASSIFICATION OF BRITISH ARMOURD CARS

It is appropriate at this point to explain the three main classes of armoured car employed by the British Army in World War II.

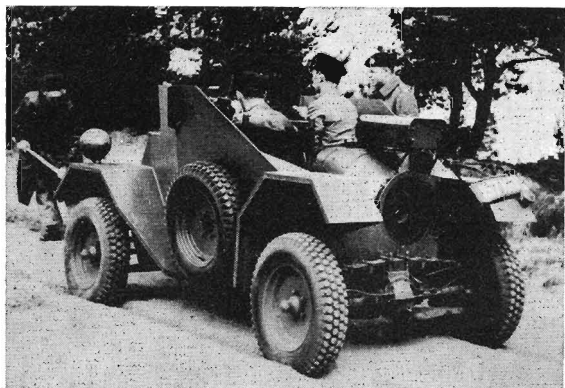
First was the Tank, Light (Wheeled), for which, by 1941, the simple designation of "Armoured Car" was again adopted.

Second was the "Car, Scout" a new class of armoured vehicle introduced in 1939. This type of vehicle was intended to be as small and inconspicuous as possible, but with a good on- and off-the-road performance, for employment with tank and armoured car regiments for liaison in the battle area and scouting only, although a light machine-gun was provided for protection. The evolution of this type of vehicle is dealt with below.

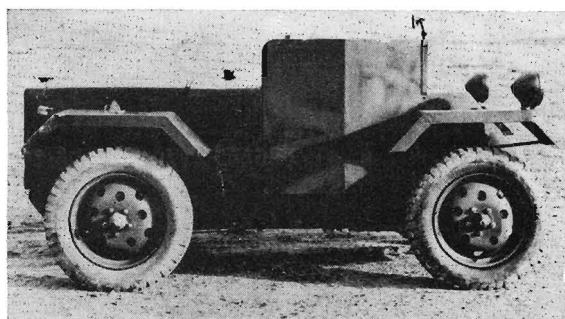
Finally there was the "Car, Light Reconnaissance" which was introduced as such in 1941 primarily for medium range reconnaissance duties with the Reconnaissance Regiments (the successors to divisional cavalry regiments) of infantry divisions. This class of vehicle was developed from the Light Armoured Cars built in the emergency of 1940, following the evacuation from Dunkirk of the British Expeditionary Force, which were at that time used in many instances as the principal and only equipment of many armoured units without tanks or proper armoured cars. The Morris 1938 armoured cars (the type based on 15 cwt truck chassis) were really in the Light Reconnaissance Car category, although before the introduction of more advanced vehicles they were used in the true Armoured Car rôle. The armament of this type of vehicle was most often a Bren light machine-gun and a Boys anti-tank rifle—both basically infantry weapons—and a smoke discharger. The Light Reconnaissance Car was developed both later and mainly on separate lines from the British Armoured Car and Scout Car of World War II although, mechanically, the specification came quite close to the latter by the end of the war and this was followed up after the war by the production of a



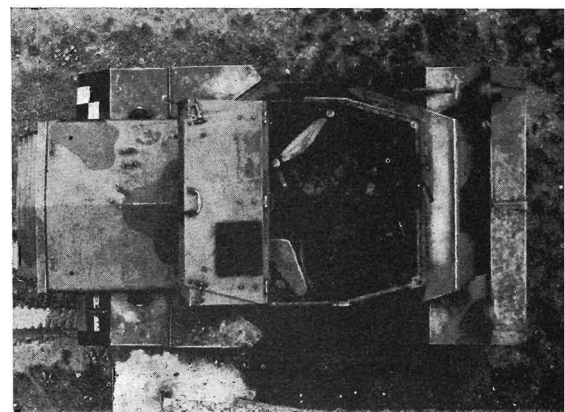
Armoured Car, Humber, A.A. Mark I.
(Imperial War Museum)



Alvis Scout Car. This rear view shows the car in its original form, before it was decided to increase the protection on scout cars to include rear armour and a roof. Note the semi-elliptic transverse rear suspension.
(Tank Museum)



B.S.A. Scout Car with original hull without roof or rear protection.
(Tank Museum)



Car, Scout, Mark IB. This view from directly overhead shows clearly the octagonal form of the crew compartment, the driver's seat and steering wheel set at an angle, and the close set inverted-V engine air louvres at the rear.
(Tank Museum)

vehicle—the Daimler Ferret—which, with slight variations, was suited to carry out both scouting/liaison and reconnaissance functions.

SCOUT CARS

During the early part of 1938 the War Office requirement for a new class of vehicle, the armoured scout car, was evolved and three British firms—Morris Commercial Cars Ltd., Alvis Ltd., of Coventry, and B.S.A. Cycles Ltd., Birmingham were invited to submit prototypes. The idea of introducing into the army a small turretless armoured vehicle for scouting and liaison was almost certainly inspired by the performance and layout of the Steyr-Daimler-Puch vehicle submitted for the armoured car trials held in February. The Steyr-Daimler-Puch concern were not, however, asked to provide further chassis for trials as a scout car because the complete take-over of Austria by Germany in March 1938 made it obviously undesirable to rely further on that country for war materials.

The three firms which submitted chassis for the scout car trials were each, in different ways, qualified by experience to provide a suitable vehicle for cross-country employment.

The Morris firm had already done work on four-wheel drive chassis and independent suspensions for their armoured car prototypes as well as having

constructed the 100, more conventional, armoured cars based on the 15 cwt truck chassis.

The Alvis company already had behind it for nearly 20 years a reputation for building high quality good performance cars (some with front-wheel drive) but, in addition, since 1935 had been associated with Nicholas Straussler in the design and production of armoured cars, 12 of which were, at the beginning of 1938, being built for use by the Royal Air Force Armoured Car Companies. An interesting link with earlier armoured cars lay in George Lanchester who from 1936 to 1939 was on the design staff of Alvis, latterly in charge of the military vehicles department.

The third firm, B.S.A. Cycles Ltd., was basically a builder of motor cycles. Although the company had never built armoured vehicles before, it had a long association with the armaments industry through its parent organization, Birmingham Small Arms, but perhaps more relevant was the fact that it had successfully overcome the problems of designing a front-wheel drive car. This was in production from 1933 onwards, and as the "Scout" (the name is purely coincidental in that the firm later produced a military scout car) achieved a fair degree of popularity in the years before the outbreak of war. (It is fair to say that the transmission and suspension eventually adopted for the scout car was not, in fact, based on that used for the civilian vehicle, but, nevertheless, much of the design

experience was almost certainly relevant.) A further point of interest is that the Lanchester Motor Company, which had constructed the six-wheeled armoured cars supplied to the army in 1927–1931, belonged to the B.S.A. group, having been absorbed in 1931.

The three different prototype Scout Cars were tested beginning in August 1938. All three weighed around two tons each and all had a similar layout of rear engine and four-wheel drive, with an armoured body, as first built, open at the rear.

The mechanical details of the three designs differed widely, however. The Morris Scout Car used a 15·9 h.p. 4-cylinder O.H.V. Morris-Commercial engine fitted at the off-side rear of a tubular chassis and linked to a four-speed gearbox. The suspension was an interesting adaptation from a Czechoslovakian design and consisted of four rear half-axes from a Tatra six-wheeled light car. The performance of this vehicle turned out to be inferior to that of the Alvis Scout Car with which it was compared at first, as the B.S.A. model was not ready until later than the other two. The road speed was poor and engine cooling inadequate and the car was returned to the manufacturers for modifications. When received back in March 1939, the Morris Scout Car was still found to be inferior to the Alvis as well as the B.S.A. vehicles and so it was recommended that no further trials of this model should take place.

The Alvis Scout Car was known as the “Dingo”,—a name which was, not strictly correctly, applied to the Scout Cars not made by Alvis subsequently supplied to the army in World War II. The Dingo appears not to have been designed by Nicholas Strausler although it undoubtedly used features which were used by him in his series of armoured cars, which had culminated in the model A.C. III, produced by Alvis for the R.A.F. as well as for the Netherlands East Indies Government in a slightly different form. One notable characteristic was the transverse leaf spring suspension

system which allowed a good degree of independent wheel movement. The Alvis Scout Car was quite a good vehicle, and fast—putting up an average speed of nearly 50 m.p.h. over a $\frac{1}{4}$ -mile cross-country course. However, compared with the B.S.A. Scout Car it had a relatively high centre of gravity—increased when, by a later War Office decision, the Scout Cars were made fully armoured, including a roof.

The third model of scout car, and the one which was eventually chosen for a production order, was that designed by the B.S.A. firm. The drawings for this vehicle were commenced in June 1938 and the prototype was completed in September, only four months later. It did very well in the scout car trials carried out in Wales shortly afterwards. By December 1938 the B.S.A. prototype had covered 10,000 miles both on and off roads and very few major mechanical defects showed up. War Office policy now decreed, however, that scout cars should have complete armour protection in place of the side and frontal armour originally deemed adequate in this type of vehicle. Accordingly the hull was redesigned and an armoured roof added and this extra weight made it necessary for the engine power to be increased and the suspension to be strengthened.

A preliminary order for 172 “Cars, Scout, Mark I”, as the vehicles were officially designated, was then placed by the War Office, in May 1939.

DAIMLER ARMoured CAR

The highly satisfactory performance on trials of the B.S.A. Scout Car led to the suggestion that a larger version should be built as a Light Tank (Wheeled) and accordingly design work on this project was commenced in April 1939. This was again carried out quickly so that the first of the two pilot vehicles ordered was actually running before the end of the

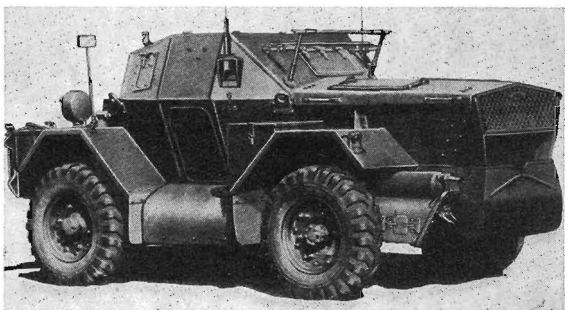
Right: A Car, Scout, Mark IB, belonging to 5th Royal Tank Regiment (4 Armoured Brigade, of 7th Armoured Division) in the Western Desert, 1942. A large stowage bin has been created by adding a plate between the front and rear mudguards on the right side. The support bracket for the folding roof is an identification point. Mark I had a sliding roof and hence no support bracket. (Imperial War Museum)



Below: Car, Scout, Humber Mark I. One of the pilot vehicles, but carrying full standard equipment. The remote-controlled mounting carries one 0·303-in. Bren with a drum magazine. (Rootes Ltd.)



Below: Car, Scout, Ford Mark I, Lynx I. This rear view shows how much larger the engine was compared with the Daimler Scout Cars, and also the greater height of the Canadian vehicle. (Canadian Official)





Daimler Light Tank (Wheeled)—second prototype. This car has the turret and armament as used on the production vehicles, but there are several differences in the hull details.
(Imperial War Museum)

Armoured Car, Daimler Mark I. A general view in which some of the family likeness to the B.S.A.-Daimler Scout Cars is apparent.
(Imperial War Museum)



year, when the Second World War had broken out. Although the design of the armoured car was based on that of the Scout Car, the increased weight (which was approximately double that of the smaller vehicle) and extra power resulted in transmission troubles which showed up in the early trials, together with other features needing revision.

The original vehicle had an armament consisting of two Besa machine-guns—15 mm. and 7.92 mm., the same as were fitted in the later Guy Light Tanks (Wheeled), but the second Daimler armoured car to be built had a turret mounting a 2-pdr. gun as well as a 7.92 mm. Besa machine-gun. This was the first time that a shell-firing weapon of this calibre (40 mm.) had been mounted in a British armoured car, giving it the hitting power of contemporary British infantry and cruiser tanks. The turret design was, in fact, that of a tank—the Tetrarch (Light Tank Mark VII) and the drawings for this turret were supplied by Vickers-Armstrong Ltd.

An interesting feature was carried over from the Scout Car to the armoured car—this was four-wheel steering which was, however, abandoned in the production vehicles as a complication of dubious value. A second steering wheel at the rear was retained in the final design, as were the Girling hydraulic disc



Daimler Mark I Armoured Car. A good close-up of Winston Churchill and also a clear view of turret details of his car, including the twin smoke dischargers, the gun mounting and the P.L.M. mounting on top for two 0.303-in. Vickers "K" machine-guns.



Daimler Armoured Cars of the King's Dragoon Guards in Sicily, 1943. Note the inverted-V radiator armour and the turrets traversed to the rear.
(Imperial War Museum)

brakes—a new feature in armoured car design which also foreshadowed by several years the general introduction of disc brakes into civilian high performance cars.

The various problems to be overcome meant that the first production vehicles did not come off the assembly lines until April 1941. Known in the development stage as Tank, Light (Wheeled), Mark II, by 1941 the new designation of Armoured Car, Daimler Mark I had been adopted.

HUMBER ARMoured CAR

The production facilities of Guy Motors were not great enough for them, once war had broken out, to manufacture the large number of Light Tanks (Wheeled) that were required in addition to gun tractors and trucks of various sorts. The Rootes Group of motor firms were asked, about October 1939, therefore, to undertake the design and production of an armoured car.

The design of this vehicle, which was closely modelled on that of the Guy Light Tank (Wheeled) was undertaken by Karrier Motors Ltd., of Luton, Bedfordshire. Taking as the basis the Karrier KT 4 field artillery tractor supplied for the Indian army just before the War, a very similar process to that used in

the evolution of the Guy armoured car was carried out. In brief, the engine was moved to the rear, the suspension was suitably modified and an armoured hull and turret mounted. The hull and turret were supplied by Guy Motors (who continued to provide them for Rootes) and were almost identical to those of the Mark IA Guy vehicles.

Since this vehicle was, in effect, an assembly of existing component parts rather than an untried design, trials of the two prototypes in 1940 showed up relatively few snags so that a first production contract for 500 vehicles was awarded in June 1940 and the first of these were running in early 1941. This type of armoured car was known in the development stage as Tank, Light (Wheeled) Mark III but although the design was undertaken by Karrier Motors (who were also chiefly responsible, in the Rootes Group, for subsequent production) the name Armoured Car, Humber Mark I was later adopted in official nomenclature. The reason for this was to avoid confusion with vehicles of Carrier (Bren, Universal, etc.) type.

A.E.C. ARMoured CAR

By 1941 British armoured car regiments had had considerable combat experience in the desert of North Africa, where, until about September when the first Humber Armoured Cars were received, their main equipment consisted of South African-built Marmon-Herringtons. These, like most contemporary British armoured cars, were armed only with light or heavy machine-guns and so the users adopted the expedient of mounting various captured Italian, and later German, guns of 20-mm. calibre upwards in order to have a weapon capable of knocking out enemy light armoured reconnaissance vehicles.

Although the Daimler Armoured Car with a 2-pdr. gun was under development in England during 1940-41 no official requirement existed at this time for an armoured car with armour as well as armament equivalent to that of a cruiser tank. This gap was filled by the Associated Equipment Company Ltd., of Southall (best known for building London omnibuses) who constructed a mock-up heavy armoured car with a 2-pdr. gun on a modified "Matador" medium gun tractor chassis. To draw attention to this project, the

vehicle was added, unofficially, to a demonstration of military vehicles held on Horse Guards Parade, London in early 1941. The A.E.C. armoured car aroused the interest of the Prime Minister and in due course a production contract—dated June 1941 for 120 vehicles—followed.

It is interesting to note, at this point, that another entirely different A.E.C. armoured mock-up was built also in 1941 but at No. 4 Base Ordnance Workshops of the British army in Egypt. This type (for which there was no real future, once details of the manufacturers' own design became known in the Middle East) also used the "Matador" chassis but retained the original front-engined layout, although reduced in overall height.

DEVELOPMENT OF THE HUMBER AND DAIMLER SERIES

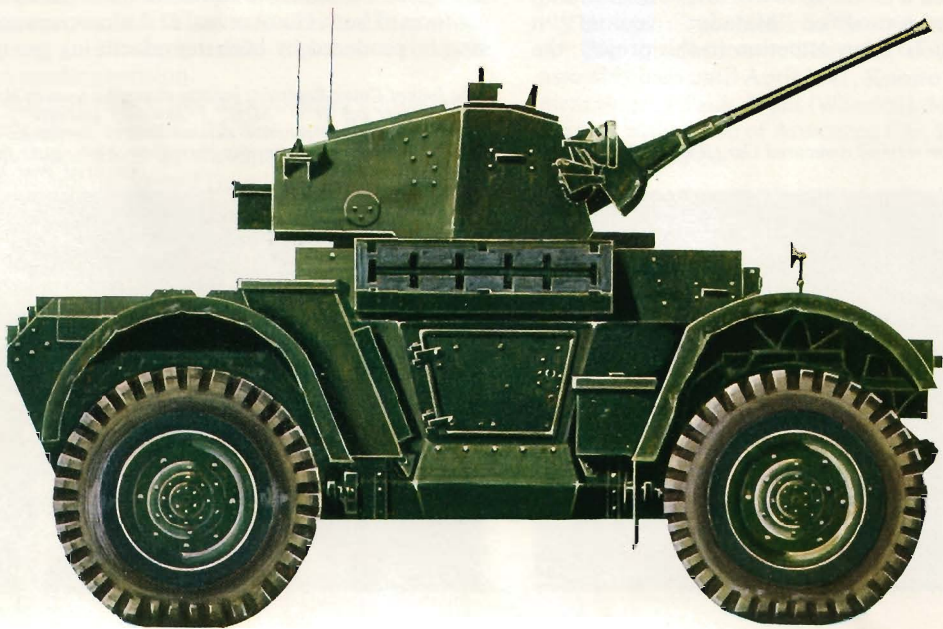
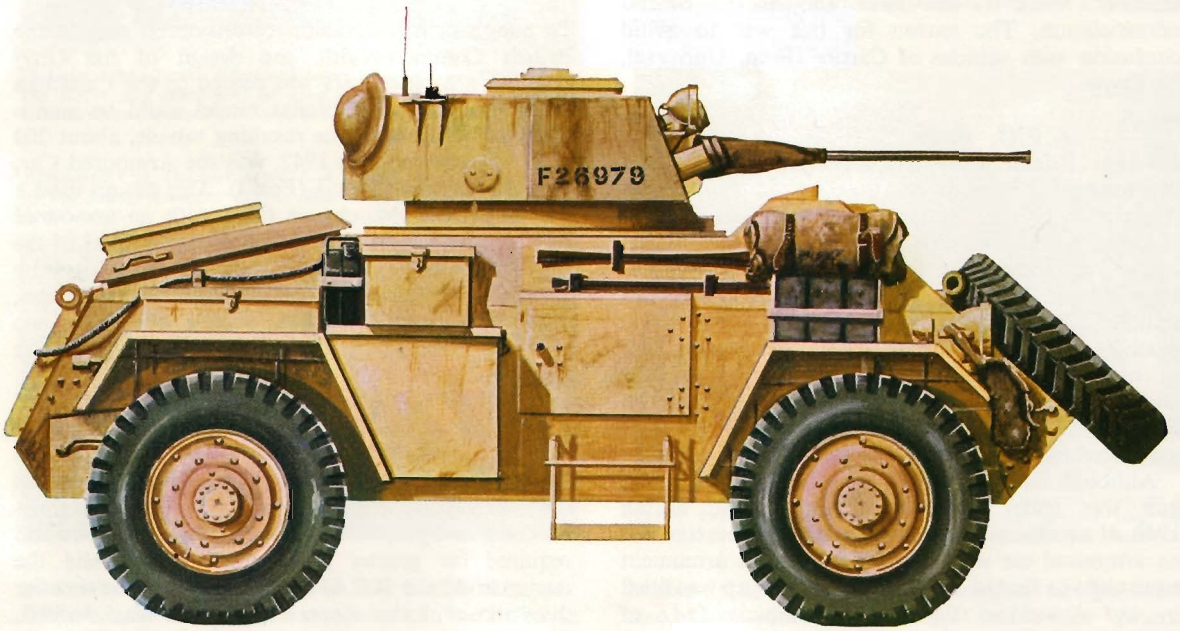
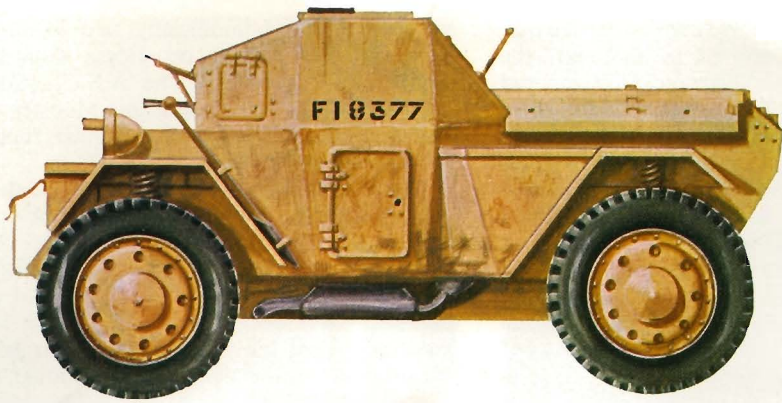
To supplement production of armoured cars in the British Commonwealth, the design of the Guy/Humber armoured cars was passed to the Canadian authorities so that a similar model could be manufactured in Canada. The resulting vehicle, about 200 of which were built in 1942, was the Armoured Car, General Motors Mark I (Fox I). This design used a rear engined G.M. chassis fitted with an armoured hull of a pattern modelled very closely on that of the British original. The output of armoured cars by Britain, supplemented by American production, ultimately proved adequate and so, beyond the one relatively small order, no further cars of this particular type were built.

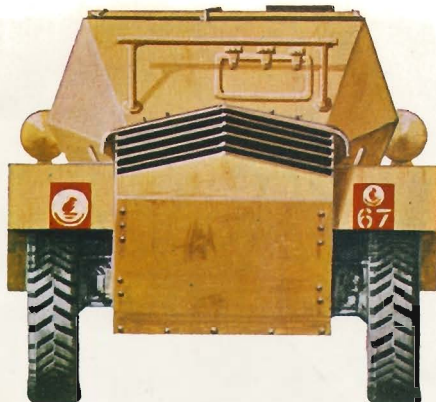
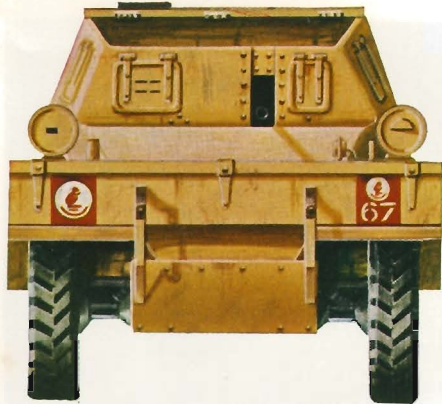
In the United Kingdom, the Humber Armoured Car was developed through four Marks (details of which are given in a later section) and there were two Marks of Daimler Armoured Car. The Daimler was the better design (although the Humber had advantages for command purposes) but was more complicated and required far greater production effort, while the resources of the B.S.A.-Daimler group were smaller than those of the Rootes Group. It was decided, therefore, to rationalize effort by designing a new armoured car which would combine some of the best features of both Humber and Daimler Armoured Cars and be produced by both manufacturing groups.

The Inns of Court Regiment passing through a town in Normandy. The nearest car is a "SOD" ("sawn-off Daimler") with the turret removed—a practice devised by this armoured car regiment. The two cars following have their 2-pdr. guns fitted with Littlejohn attachments. (Imperial War Museum)

Three-quarter rear view of Armoured Car, Humber Mark II. (Rootes Ltd.)





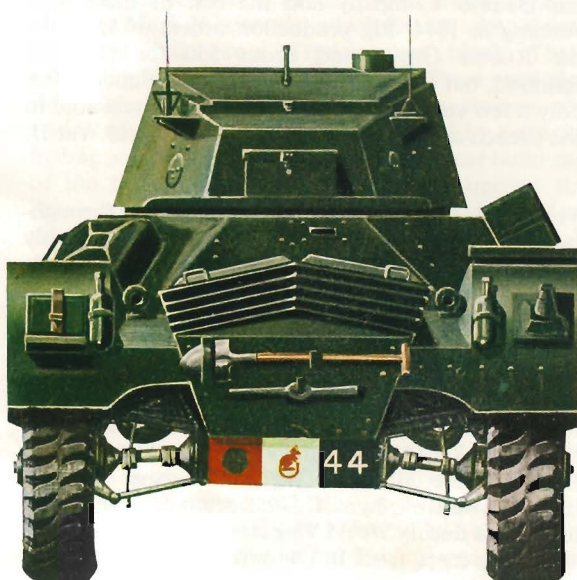
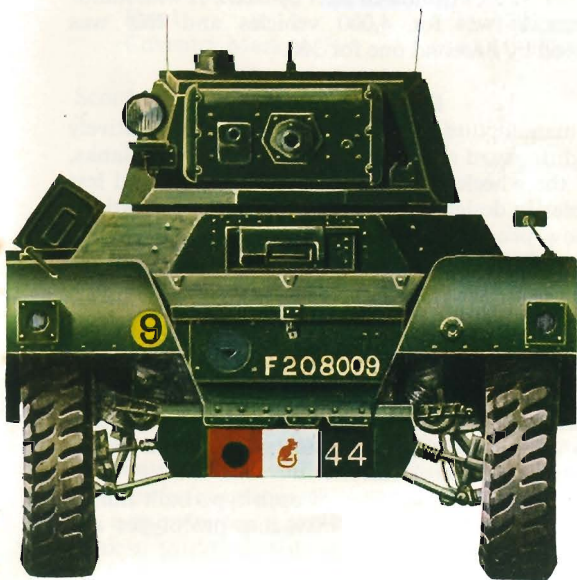
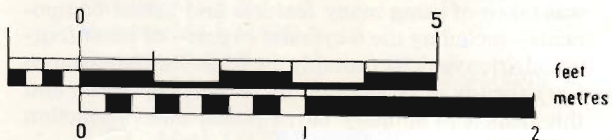
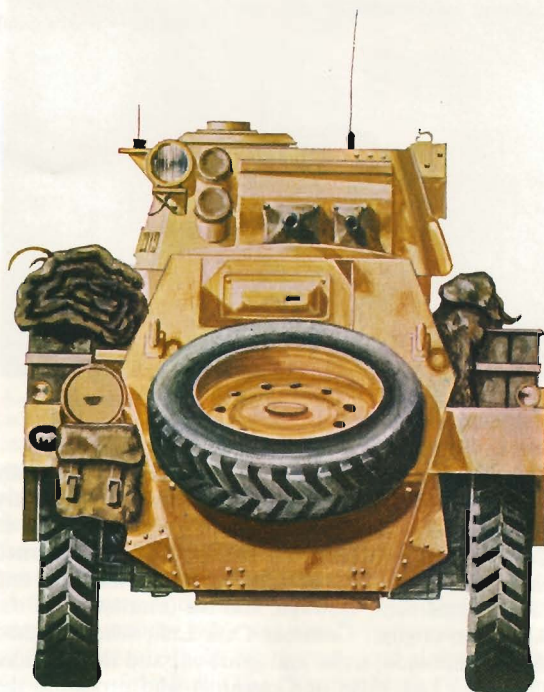


Top: A Car, Scout, Mark IB of 5th Royal Tank Regiment (4 Armoured Brigade, 7th Armoured Div.) as it appeared in the Western Desert 1942.

Middle: An Armoured Car, Humber Mark II of the 12th Royal Lancers (1st Armoured Division) in the Western Desert 1942.

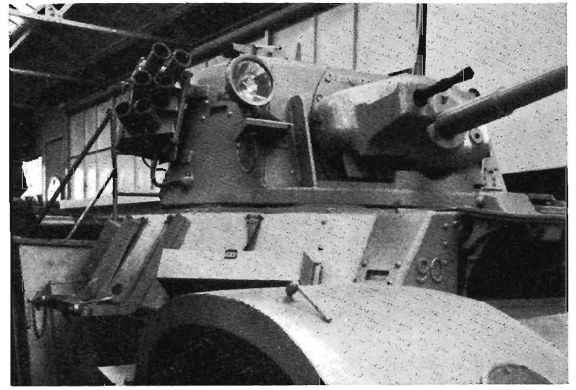
Bottom: An Armoured Car, Daimler Mark I belonging to the 11th Hussars (7th Armoured Division) in Berlin 1945.

Drawn by Martin Lee
 © Profile Publications Ltd.





A Daimler Armoured Car of the 2nd Household Cavalry Regiment waterproofed for deep wading trials in 1944. (Imperial War Museum)



The Daimler Mark II Armoured Car on exhibition in the Royal Armoured Corps Tank Museum, Bovington, Dorset is fitted with the post-war pattern of smoke grenade dischargers, mounted in banks of six. (B. T. White)



An Armoured Car, Daimler Mark I CS in which the 2-pdr. gun has been replaced by a 3-in. howitzer. (The Daimler Co.)



Car, Scout Humber Mark I. A view from above showing the fixed roof with two sliding hatches. (Tank Museum)

The design work for this project, known originally as A.F.V. W.19 and eventually as the Coventry Armoured Car, was undertaken by Humber Ltd., of Coventry, who coordinated the efforts of all concerned as well as doing the detailed work on the hull and turret, armament, stowage, and the installation of the American engine; Commer Cars Ltd., who designed the transmission, axles and gearbox; and the Daimler Company Ltd. (also of Coventry) who produced the drawings for the suspension and the steering gear. Two pilot vehicles each were built by the Rootes Group and the Daimler Company and the first of these were running in 1944. Big production orders of 1,150 for the Rootes Group and about 550 for Daimlers followed, but were cancelled when the war ended after only a few vehicles had been built. Some were sold to the French and used in Viet-Nam after World War II.

LATER SCOUT CARS

The B.S.A.-Daimler Scout Car was produced throughout the war and right from the start was highly successful, so that the demand for this type of vehicle continued to increase. In order that the resources of the Canadian motor industry could be brought in to help, the designs were sent to Canada where an equivalent vehicle was built on a Canadian Ford chassis. Because this had a more conventional form of transmission, however, the Ford Scout Cars (Cars, Scout, Mark III* in British nomenclature, later named Lynx I) were 11 inches higher. Together with an improved version, Lynx II, 3255 scout cars were built in Canada during World War II.

To help meet, from British production, the demand

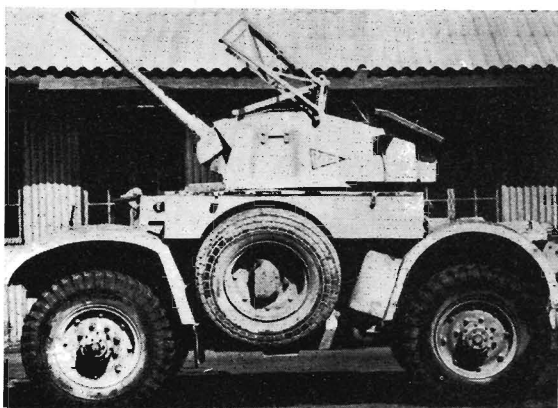
for scout cars by many arms of service in the British and Commonwealth armies and allied forces, Humber Ltd. were asked in 1942 to design a new scout car to be produced by the Rootes Group. The opportunity was taken of using many features and actual components—including the 6-cylinder engine—of other four-wheel drive vehicles (notably the Light Reconnaissance Car) already in production by the Rootes Group and this helped to simplify development and production problems.

The first contract in late 1942 for Cars, Scout, Humber Mark I (followed later by Mark II with minor differences) was for 4,000 vehicles and this was followed by a second one for 300.

PRODUCTION

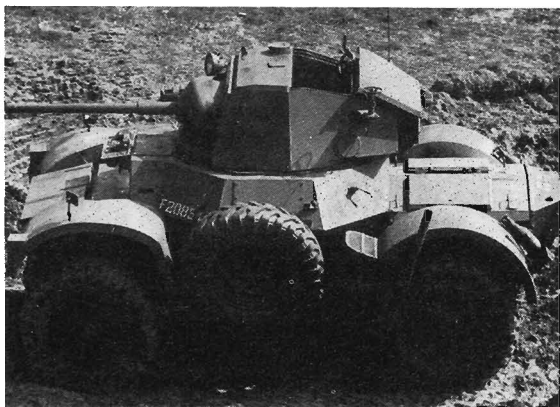
The manufacture of armoured cars was a relatively straightforward matter, compared with that of tanks, since the wheeled vehicles were both lighter and less complex in design, and they were built almost entirely on flow production lines in the factories of the big lorry and motor car manufacturers, together with the sub-contractors customary in the motor industry. There was in several cases co-operation between firms who were peacetime rivals, such as the supply of welded hulls and turrets by Guy Motors to Karrier Motors for building Humber Armoured Cars. All the turrets used on Armoured Cars, A.E.C. Mark I came from Valentine tank manufacturers because they were, in fact, ordinary tank turrets.

The numbers of vehicles of each type built during the War were as follows (excluding prototypes and purely experimental models):



Above: Armoured Car, Daimler Mark I H.A. An experimental modification carried out in the Middle East to produce extra high elevation of the main armament. A special sight, with linkage to the mounting, was mounted on top of the turret.

(Tank Museum)



Top right: Armoured Car, Daimler Mark II. The more bulbous gun mantlet and the escape hatch incorporated in the roof of the driver's compartment show up well in this view.

(Tank Museum)



Right: Armoured Car, Daimler Mark II. This view shows the new type of armoured radiator grille.

(Tank Museum)

Armoured Cars

Morris (CS9/LAC)	99
Guy Mark I	50
Guy Mark IA	51
Daimler Mark I	2,694
Daimler Mark II	
Humber Mark I (500)	5,400 approx.
Humber Mark II	
Humber Mark III	
Humber Mark IV	
A.E.C. Mark I (120)	629
A.E.C. Mark II	
A.E.C. Mark III	
Fox I	200 approx.
Coventry Marks I-II	a small number only

Scout Cars

B.S.A./Daimler Mark I	6,626
B.S.A./Daimler Marks IA, IB	
B.S.A./Daimler Mark II	
B.S.A./Daimler Mark III	
Lynx Marks I and II	3,255
Humber Marks I and II	4,300

TECHNICAL DESCRIPTIONS

Guy and Humber Armoured Cars

These two types had a similar line of development and had many features in common so they can conveniently be described together. They both had a rectangular chassis frame with a rear mounted engine with gearbox in front from which the drive was transmitted, via a transfer box approximately in the centre of the vehicle, to differentials on "solid" axles at front and

rear. The suspension consisted of longitudinal leaf springs at front and rear, controlled by hydraulic shock absorbers. The welded armoured hull was flexibly mounted on the chassis at four points at the front, rear and sides and, to prevent excessive body movement in rough going, "snubbers" were provided at the corners of the hull. The crew consisted of three men: commander (who was also the wireless operator) and gunner—both in the turret—and driver, in the front part of the hull. (The Humber Mark III had four men, including a wireless operator.) The driver's vision was through a flap in the front of his cab (the cab was incorporated in the front glacis plate in Humber Mark II onwards) which for use when closed carried a bullet-proof Triplex glass block. These blocks could be replaced if damaged. There were also side lookout shutters. For driving in reverse, the engine cover at the back could be raised by a special hydraulic jack so that when a flap in the rear bulkhead of the fighting compartment was also opened the driver could obtain a somewhat limited view out of the rear of the vehicle. The turret, mounted on a ball race, was rotated by means of a hand traversing gear.

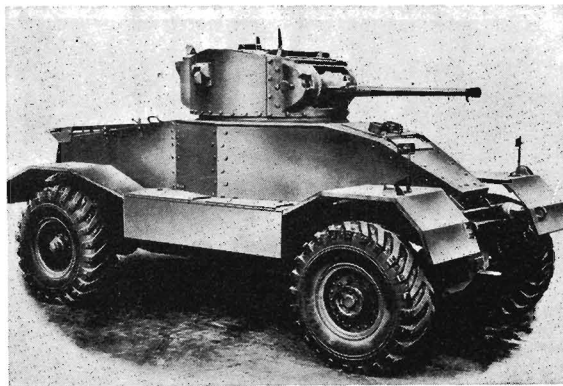
Daimler Scout Car and Daimler Armoured Car

The Daimler Armoured Car was developed out of the Scout Car and was in many of its mechanical features a scaled-up version of the smaller vehicle, so the basic points in common will be mentioned here first, followed by an outline of the main differences.

The Daimler armoured vehicles were powered by Daimler 6-cylinder engines mounted at the rear—a 55 b.h.p., 2,522 c.c. unit in the Scout Car and a larger



Experimental armoured car on modified front-engine A.E.C. Matador chassis. This work was carried out in Egypt in 1941. (British Official)



Armoured Car, A.E.C., Mark I. What appears to be a window below the twin periscopes for the driver is a folded down wind-screen, intended for use when the car is opened up and not in action. (Imperial War Museum)

95 b.h.p., 4,095 c.c. version in the Armoured Car. The Scout Car had a shallow tray-shaped chassis, armoured underneath, but there was no chassis, as such, in the Armoured Car. The engine, suspension, transmission etc. were all built into the lower part of the armoured hull, which formed a shallow dish to which the upper parts of the hull comprising the fighting and driver's compartments and engine cover were attached. The most interesting point about the Daimler armoured vehicles was their form of transmission, which was of a type successfully introduced in Britain for the first time. The drive from the engine was led forward, through a "Fluid Flywheel" and pre-selector gearbox, to a transfer box, situated almost exactly in the centre of the lower hull. This incorporated a single differential, from one half of which universally-jointed propellor shafts led forward to the front wheel on one side and back to the rear wheel on the same side. From the other half of the differential, similar shafts led to the wheels on that side. "Tracta" universal joints were employed at each wheel station. In the Armoured Car only, there were also reduction gears at each wheel hub. This transmission system, which avoided central drive shafts, enabled the crew and mechanical components to occupy a much lower position in the centre of the vehicle and helped to reduce overall height. This was of particular benefit in the Armoured Car; and the Scout Car, with a height of 4 ft. 11 in. was nearly a foot lower than the Canadian Lynx I, which had an almost identical hull but central transmission.

The suspension of the Daimlers was independent and consisted of vertical coil springs—one at each wheel station in the case of the Scout Car and a pair to each wheel for the Armoured Car. This system permitted, in the Armoured Car, a vertical upward movement of 16 in. of any one wheel independently of the others, which remained in contact with the ground. In the Scout Car the equivalent figure was about 8 in.

Four-wheel steering was provided in the earlier Marks of Scout Car built and this was also tried out in the Armoured Car. This system allowed a very close turning circle (23 ft., but 38 ft. with two-wheel steering) but was eventually abandoned in the Scout Car and not adopted for the Armoured Car, because inexperienced drivers, it was found, could get the car going

more or less indefinitely into a circle from which they could not get out!

The brakes on the Scout Car were Lockheed hydraulic drum type, but on the Armoured Car Girling disc brakes were used—new for employment in armoured cars and in wheeled vehicles generally.

The Daimler system of the Fluid Flywheel (taking the place of the normal engine clutch) linked with a pre-selector gearbox was introduced from pre-war motor cars built by the group to which the company belonged. In operation, the gear required was selected in advance and then brought in at the desired moment by depression of a pedal. This meant that, for example, reverse gear could be selected when the car was still travelling forwards—so ensuring a quick get-away from the awkward situations likely to be encountered by an armoured car unit on reconnaissance. It also had the advantage of instilling in the driver confidence that there was no likelihood of missing a gear in an emergency.

Amongst the differences between the Scout Car and the Armoured Car, apart from those of scale and the points already mentioned, was the incorporation in the Armoured Car of a duplicate steering wheel, plus hand throttle ignition cut-out switch and hand brake, for use by the commander when driving backwards in emergency. A special port was provided in the rear of the hull over the engine compartment for use in this contingency. However, this operation was avoided wherever possible since, as the historian of one armoured car regiment points out, the commander had to turn round in the confined space of the turret, then kneel and grab with one hand the second steering wheel whilst holding the intercom. microphone to direct the driver, who still controlled the gear-change. The consequent entanglement of wireless leads, the limited vision and the fact that the gunner was left without a loader meant that this system was used only in the "direst emergency". In the Daimler Scout Car, incidentally, although no separate steering wheel was provided the driver could, with practice, drive in reverse quite easily by looking over his left shoulder, since his seat in the octagonal-shaped crew compartment was set at an angle turned inwards slightly.

The turret of the Armoured Car (the Scout Car was, of course, without one) was mounted on ball bearings

on the roof of the fighting compartment and was fitted with hand operated traversing gear. The 2-pdr. gun, for which the car commander acted as loader, and 7.92-mm. Besa machine-gun were coaxially mounted.

A.E.C. Armoured Cars

These were the only British-built diesel-engined armoured cars in service in World War II and employed many components of the "Matador" Tractor, 4×4, Medium Artillery. Considerable rearrangement was necessary, however, and within a fairly conventional layout for a rear-engined four-wheel drive armoured car some ingenuity was shown in achieving a compact hull design. The engine, with the gearbox attached in front of it, was mounted inclined downwards—this not only helped reduce the angle of the shaft transmitting the drive through universal joints to a transfer box situated between the front and rear wheels, but also enabled the height of the rear hull deck over the engine to be reduced. The engine was also, in plan view, positioned at an angle which left sufficient room alongside it for the differential for the rear wheels, thus making for a lower mounting than would otherwise have been possible. The transfer box carried the drive forwards to an underslung differential mounted just right of centre on the front axle and rearwards to the rear differential. Drive for normal road conditions was on the front wheels only. The suspension of the armoured cars consisted of longitudinal semi-elliptic leaf springs.

The armoured hull of the A.E.C. Armoured Cars, mounted on a rectangular chassis, had vertical sides but was tapered from the centre, where it was at its

widest, to the front and also, to a lesser extent, to the rear. It was chiefly remarkable in that no direct vision port was provided for the driver, reliance being placed on twin periscopes when closed down. At other times the driver's seat could be raised to allow him to look over the top of the glacis plate.

The turret, mounted on a ball race, was traversed by electrical power with optional traverse by hand. On the Mark I, a Valentine tank two-man turret was used but for the Marks II-III a special three-man turret was designed, making a four-man crew for the armoured car.

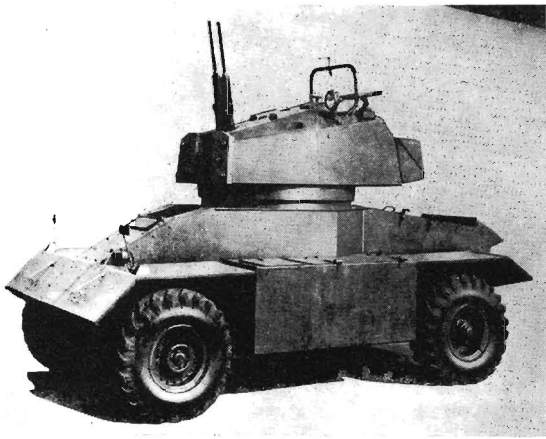
Coventry Armoured Car

Being developed from the Daimler and Humber Armoured Cars, the Coventry inherited many features of its predecessors but, basically, its layout was more closely akin to that of the Daimlers. The turret and hull were generally like the Daimler Armoured Car as also were some internal features like the rear steering wheel, for instance. The engine was unusual for a British armoured car in being of American manufacture—the Hercules model RXLD 6-cylinder petrol unit, which developed 175 b.h.p. at 2,600 r.p.m. More roomy than the Daimler, the Coventry had a four-man crew, although this had to be reduced to three in the Mark II version equipped with a 75-mm. gun in place of the 2-pdr. of Mark I.

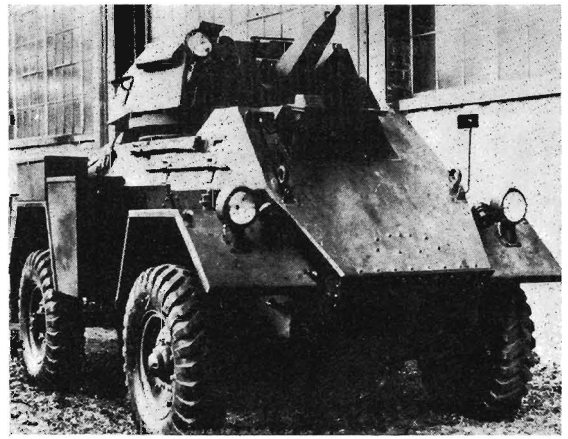
The transmission of the Coventry was different from that of its predecessors in having the drive taken forwards and rearwards from a central transfer box to differentials on front and rear axles which were of the swinging type, sprung on dual vertical coil springs at each wheel station.

Armoured Car, A.E.C., Mark II. The Besa machine-gun is not fitted in this car and the driver's hatch is open and the windscreen erected. (A.E.C. Ltd.)





Armoured Car, A.E.C., A.A. Hull like that of the Armoured Cars Mk. II-III with a turret as fitted on the Crusader A.A. II anti-aircraft tank. (A.E.C. Ltd.)



Armoured Car, General Motors Mark I, Fox I. Only the armament (two Browning machine-guns—0.5-in. and 0.3-in. calibre), the lighting equipment and the wheel hubs readily distinguish this Canadian-built armoured car from the Humber Mark III on which it was based. (Tank Museum)

Humber Scout Car

The Humber Scout Car had the same general layout as the Daimler Scout but was a larger vehicle capable of carrying three men. The rear-mounted engine (the same as that used on the Humber Armoured Cars and Light Reconnaissance Cars) transmitted power through a transfer box to differentials on the front and rear swing axles with "Tracta" universal joints. The front suspension was of the transverse leaf type (coil spring suspension was experimented with but not put into production) and the rear consisted of longitudinal semi-elliptic leaf springs.

Canadian Scout and Armoured Cars

The Ford Lynx and the General Motors Fox were counterparts of the Daimler Scout Car and the Humber Mark III Armoured Car respectively and used armoured hulls and turrets which closely resembled those of their United Kingdom cousins. The armament of the Fox followed North American practice, however, and was two Browning machine-guns of 0.5-in. and 0.300-in. calibre.

The transmission systems of both vehicles were based on components of Ford and General Motors four-wheel drive vehicles already in existence and used "solid" axles with a single differential on each, receiving the transmission from the engine via a transfer box.

ARMAMENT OF SCOUT AND ARMOURD CARS

The Daimler and Lynx Scout Cars were normally equipped with one 0.303-in. Bren light machine-gun, which was usually operated through a slot in the front plate of the hull. The 11th Hussars, however, modified their Scout Cars with a mounting for twin drum-fed Vickers "K" 0.303-in. machine-guns. This regiment, incidentally, experimentally fitted one of their Daimler Scout Cars with a captured 20-mm. Solothurn automatic gun.

In the Humber Scout Car, which had a fixed roof, provision was made for mounting single or twin 0.303-in. Bren machine-guns which could be operated by linkage from inside the vehicle.

The principal armament of the armoured cars is referred to in the main descriptions but special mention should be made here of the armament for anti-aircraft defence carried by all armoured cars. In 1940 this consisted of either a simple pintle mounting on the turret for a Bren gun or, later, the Lakeman mounting, a sprung counter-poised device from which the weapon was suspended. Armoured cars fitted with the latter included the Humber Marks I, II and III, A.E.C. Mark I and Daimler I. The Lakeman mounting was not very popular because, as one regimental historian put it, it was liable to turn inside out without warning and nearly throttle the car commander or cause him to fire the weapon in a totally unexpected direction!

Later in the war the P.L.M. mounting, used in the Coventry and the later Marks of Humber, Daimler and A.E.C. Armoured Cars (and also retrospectively) was introduced. This generally carried one or two Vickers "K" machine-guns and could be worked from the shelter of the turret.

During the North African campaign some regiments mounted captured German machine-guns (MG. 34) on their armoured car turrets.

For laying down a protective smoke screen, armoured cars carried twin 4-in. smoke dischargers—in the front plate of the turret in the Humbers, on the turret side in the Daimler and Coventry. The A.E.C. Armoured Cars had a 2-in. bomb thrower built into the turret.

MARKS, VARIANTS AND SPECIAL VERSIONS

Listed below are brief details of the different models and variants of the British Armoured Cars and Scout Cars dealt with in this Profile, together with some details of the versions (both experimental and production) that existed for special tasks.

Tank, Light (Wheeled) Mark I (Armoured Car, Guy Mark I).

Tank, Light (Wheeled) Mark IA (Armoured Car, Guy Mark IA)

15-mm. and 7.92-mm. Besa machine-guns instead of the Vickers 0.5-in. and 0.303-in. of Mark I.

Armoured Car, Daimler Mark I

Original production model. Some cars in Normandy had their turrets removed to make them less conspicuous.

Armoured Car, Daimler Mark ICS

Experimental close support version with 3-in. howitzer (able to fire effective high explosive and smoke ammunition) in place of 2-pdr. gun.

Armoured Car Daimler Mark II

Improved model with differences from Mark I including driver's escape hatch in driving compartment roof; new gun mounting (as on Harry Hopkins light tank); modified engine water pump with new type fan; and modified radiator and grille (the armoured louvres were now horizontal instead inverted V-shaped).

Armoured Car, Humber Mark I

Hull and armament as Guy Mark IA.

Armoured Car, Humber Mark II

Revised hull with driver's cab incorporated in front glacis plate; radiator armour grilles introduced at rear.

Armoured Car, Humber Mark III

Four-man crew and revised turret (front part of roof plate sloping forward, rear part sloping backwards). Humber Marks I-III all had two Besa machine-guns—15-mm. and 7·92-mm.

Armoured Car, Humber Mark IV

New armament of one 37-mm. gun (U.S. model) and one Besa 7·92-mm. machine-gun. Crew three men.

Armoured Car, General Motors Mark I, Fox I

Canadian-built: similar to Humber Mark III. One experimental vehicle was fitted with a 6-pdr. gun in the front of the hull.

Armoured Car, A.E.C. Mark I

Valentine tank turret with 2-pdr. gun and Besa machine-gun. Some later re-armed in the Middle East with a 6-pdr. gun. Spiked rollers were attached to some A.E.C. Armoured Cars for use as minefield locaters in North Africa.

Armoured Car, A.E.C. Mark II

New three-man turret with 6-pdr. gun and Besa machine-gun, bigger engine, revised hull front, etc.

Armoured Car, A.E.C. Mark III

75-mm. gun instead of 6-pdr. and minor turret improvements, etc.

Basilisk

Experimental flame-thrower armoured car with small flame projector turret mounted on right-hand side of hull. The new hull nose design, used later in the A.E.C. Mark II and III armoured cars, was introduced in this model.

Armoured Car, Humber, A.A., Mark I

Anti-aircraft armoured car introduced in 1943 to give protection to armoured car regiments against air attack. One troop of four cars per regiment, but these troops were disbanded early in the Normandy Campaign in 1944 because they were no longer needed. The armament consisted of quadruple 7·92-mm. Besa machine-guns in a turret designed by Stothert & Pitt Ltd. There was also a version with twin 15-mm. Besa machine-guns.

Armoured Car, A.E.C., A.A.

Chassis of A.E.C. Mark II armoured car fitted with turret (like that of the Crusader A.A. II tank) equipped with two 20-mm. Oerlikon cannons. A

prototype was built about the beginning of 1944, but production did not follow because the need for this type of vehicle ceased to exist soon afterwards.

Armoured Car, Coventry Mark I

Original version with 2-pdr. gun and Besa machine-gun.

Armoured Car, Coventry Mark II

Pilot models of type with 75-mm. gun and Besa.

Armoured Car, Daimler I (High Altitude)

An experimental modification carried out in the Middle East to permit very high elevation of the 2-pdr. gun.

Armoured Car, Humber Mark III R.L.

Armoured car modified as a Rear Link vehicle to act as a wireless link between Brigade and Divisional headquarters. Turret locked in forward position and guns replaced by dummies. No. 19 wireless converted to high power set by means of an amplifier.

Armoured Cars, Humber Mark II O.P., Humber Mark IV O.P., Fox O.P.

Conversions to artillery observation post officers' vehicles with radio equipment to maintain contact with field artillery batteries.

Carrier, Wheeled (Experimental), Guy

A pilot model of this type was built in 1940 to test its suitability for the function of tracked carriers but with greater speed and mobility in certain conditions. The layout was based on the Guy Light Tanks (Wheeled) but, despite modifications, the engine cooling remained unsatisfactory and as there were also other faults the type was abandoned. Over 4,000 Armoured Wheeled Carriers of the same general concept were, however, built later in India during the war.

Car, Scout, Mark I (Car, Scout, Daimler Mark I)

Original production model. Four-wheel steering and sliding roof.

Car, Scout, Mark IA (Car, Scout, Daimler Mark IA)

Folding roof, with supporting bracket on back of crew compartment.

Car, Scout, Mark IB (Car, Scout, Daimler Mark IB)

As Mark IA but engine fan draught reversed and revised (inverted-V) radiator armour grilles. Some converted to front-wheel steering only.

Car, Scout, Mark II (Car, Scout, Daimler Mark II)

As Mark IB but revised lighting equipment etc. and built without provision for steering of rear wheels.

Car, Scout, Daimler Mark III

No armoured roof fitted and waterproofed engine ignition included when built. After World War II Daimler Scout Cars were sometimes modified in various ways for use in such areas as Palestine and Malaya. These modifications included adaptations as rail vehicles or the addition of a fixed roof carrying a P.L.M. mounting for machine-guns.

Car, Scout, Mark III and Mark III* (Car, Scout, Ford Mark I, Lynx I)

Original Canadian-built Scout Car. Early vehicles had different radiator grilles and a heavier type of folding roof than later vehicles.

Car, Scout, Ford Mark II, Lynx II

Improved model of Lynx I—no armoured roof; sand channels mounted at rear instead of in front; extra stowage bins; revised air cooling grilles. One vehicle was experimentally fitted with a 2-pdr. gun in the front of the hull.

Car, Scout, Humber Mark I

First production model. Synchronesh on 3rd and top gears only.

Car, Scout, Humber Mark II

Identical externally to Mark I but synchronesh added to 2nd gear also.

Universal Scout Car

Prototype built in Canada, 1945, to broad specification supplied from U.K. as a vehicle intended to replace both Scout Cars and Light Reconnaissance Cars and foreshadowed the post-war Daimler Ferret series. (A Daimler Scout Car in England was fitted with a turret ring in early experiments on these lines.)

ARMoured CARS AND SCOUT CARS IN SERVICE

"The good name of an armoured car regiment rested far more upon the accuracy of its information than upon the casualties which it succeeded in inflicting upon the enemy . . ." as the historian of The Royal Dragoons put it. This being so, the emphasis in the armoured equipment of British armoured car regiments throughout World War II was on speed and mobility rather than on armour and armament.

The organization for a British armoured car regiment in 1938–1940 consisted of a regimental headquarters and three fighting squadrons—each squadron had three troops, each with three armoured cars. The total number of armoured vehicles—which, at this stage of the war, were generally all of the same type—was 38, including those at regimental and squadron headquarters.

The earliest employment of British armoured cars in action in the war was in France in 1939–1940, where the 12th Lancers had Morris type CS.9/LAC vehicles. The only cars of really modern design were the six Guy Light Tanks (Wheeled) used by Phantom—as it was known throughout the war, but whose official title started as the "Hopkinson Mission", became No. 1 G.H.Q. Reconnaissance Unit from June 1940 until January 30, 1941 and then changed to G.H.Q. Liaison Regiment.

Scout cars were tried out in France in the form of two platoons (total 21 cars) incorporated in 4th Bn. Royal Northumberland Fusiliers—a motorcycle infantry reconnaissance battalion. Scout cars were also used in formation, regimental and squadron headquarters in 1st Armoured Division, sent to France in 1940. They continued to be used in this way for scouting and liaison ("armoured despatch riders") with tank units with great success throughout the war. By 1944, the establishment for a tank regiment was nine scout cars in a headquarters intercommunications troop with three more at the headquarters of the squadrons.

The fighting in the Western Desert proved the pre-war organization for an armoured car regiment to be too weak in numbers, because the maintenance of reconnaissance patrols often meant that armoured car regiments were more continuously in action than most other types of unit. Consequently the establishment was increased by mid-1941 to five troops (each of three armoured cars) per squadron; three armoured cars at each squadron headquarters and four armoured cars at regimental headquarters—total 58 armoured cars.

In 1939–41 the armoured car units in the Western Desert—the only active British war front after the

evacuation from France—were equipped at first only with pre-war Rolls-Royce and Morris armoured cars, supplemented later by South African-built Marmon-Herringtons. These South African cars were produced in good numbers (5,746 by the end of the War) and were reliable and easy to handle, although not very modern in design. British-built Humber Armoured Cars were first issued to troops in the United Kingdom about June 1941, but did not begin to reach the Middle East Forces until September of the same year. The first Daimler Armoured Cars were not received in this theatre of war until about July 1942 and the first Humber Mark IIIs in October.

Both Humbers and Daimlers were welcomed in turn by the armoured car regiments as being progressive upward steps in the design of the fighting compartment, armour and armament, although there was a tendency to criticise both types as being underpowered. In desert conditions, to start with at any rate, the Humber's main disadvantage, according to the 11th Hussars, was a short engine life of only 3,000 miles. Another armoured car regiment's historian has reported the difficulty drivers had at first with the Daimler's fluid flywheel transmission, which did not seem able to stand up to the strain of the going in soft sand. However, both types soon proved themselves and generally speaking, were very effective in the open desert conditions. Steps were taken in 1941–1942 in the United States and South Africa to develop heavier vehicles, some with eight wheels to take advantage of these conditions, which placed no limits on size but where guns with longer range were an asset. The U.S. Staghound was the only car out of these experiments to go into quantity production for Britain, but too late for the desert fighting. However, the first British A.E.C. heavy armoured cars were received by the Eighth Army in 1942.

A new organization for armoured car regiments was adopted in 1943 prior to the invasion of the continent of Europe, which opened with the landing in Sicily in which a squadron of The Royal Dragoons, equipped with Daimler Armoured Cars and Daimler Scout Cars, took part. The new organization introduced a fourth "Sabre" fighting squadron to the armoured car regiment which then had as typical equipment:—

Regimental headquarters

- 1 Daimler Scout Car
- 12 Humber Scout Cars (when these became available)

- 1 Daimler Armoured Car
- 3 Staghound Armoured Cars
- 4 Humber A.A. Armoured Cars
- 1 Armoured Command Vehicle

Four Squadrons each consisting of:—

Squadron Headquarters—with

- 1 Daimler Scout Car
- 1 Daimler Armoured Car
- 3 Staghound Armoured Cars
- 5 *Reconnaissance Troops—each with*

- 2 Daimler Scout Cars
- 2 Daimler Armoured Cars

1 Support Troop—with

- 1 Daimler Scout Car
- 3 White Armoured Personnel Carriers
- 1 Section—with*
- 2 S.P. 75-mm. guns



Basilisk flamethrower armoured car. A small turret for a flame projector mounted on a hull adapted from that of the basic armoured cars. This vehicle was intended to accompany armoured car units in the field but did not get beyond the experimental stage because the requirement for this particular type of vehicle was cancelled.
(A.E.C. Ltd.)

This organization gave a total of nearly 150 armoured vehicles for the regiment.

The Daimler Armoured Car had by 1944 become deservedly favoured as the basic vehicle in the armoured car regiment, although Humbers were still used and were generally preferred for command purposes because of their greater roominess. Stag-hounds, designed for open desert warfare were far less suited for reconnaissance in the narrow lanes and fields of Europe and were used at regimental and squadron headquarters. The place of the S.P. 75-mm. guns (built on U.S. armoured half tracked chassis) was in some regiments taken by a troop of two A.E.C. Mark III heavy armoured cars with 75-mm. guns.

Besides armoured car regiments, which performed reconnaissance duties for armoured divisions or higher formations, units of the Reconnaissance Regiment carried out roughly the same function for infantry divisions.* The organization of a battalion of the Reconnaissance Regiment included much more equipment for dismounted action, but in each of the three reconnaissance squadrons were three scout troops, each including one section composed of two armoured cars (by 1944 usually Humber Mark IVs but sometimes Daimlers) and two Light Reconnaissance Cars. The establishment for a Reconnaissance Regiment in 1945 included a total of 28 armoured cars and 24 Light Reconnaissance Cars. Scout cars remained a popular and essential item in the equipment of British tank regiments throughout the war for scouting and liaison duties. The usual establishment was 12 scout cars, distributed between regimental and squadron headquarters.

The large number of scout cars included in the armoured car regiment is an indication of the high value for reconnaissance purposes that had come to be placed on this type of vehicle. Common tactics in Normandy were to have a scout car leading the troop. When an enemy position was located the troop

*The Reconnaissance Corps was formed in January 1941 to carry out the reconnaissance for infantry divisions which in France in 1939-40 had been undertaken by the Mechanised Divisional Cavalry Regiments. On January 1st, 1944, the Corps was absorbed into the Royal Armoured Corps and was re-designated the Reconnaissance Regiment—

Editor.



Armoured Car, Coventry Mark I. The Daimler influence in the parentage shows up clearly in this view. The weights bolted on to the nose plate are for trials purposes only.

(Imperial War Museum)

commander and his second in command, both in Daimler Armoured Cars, would, if necessary try and out-flank the position and knock it out, so that the advance could be continued, led again by one of the two Scout Cars. The support troop was brought in where dismounted tactics were required and the 75-mm. gun vehicles where the heavier weapons could help to knock out stiffer opposition.

It was in Normandy that some armoured car regiments removed the turrets of their Daimler Armoured Cars to lessen their height and, in effect, turn them into large Scout Cars. The 2-pdr. guns of the Daimlers were, in any event, only effective against light armoured vehicles, although the penetration was considerably improved by the Littlejohn attachment (a "squeeze-gun" device which tapered the bore) used on a proportion of the Daimler Armoured Cars in the regiment. The disadvantage of the Littlejohn adaptor was that it precluded the use of the 2-pdr. with high explosive ammunition. Armoured cars were not expected to be able to knock out tanks but they were occasionally able to do so by "stalking" the tank and obtaining a hit on the track or other vulnerable spot. An unusual success was achieved by the 2nd Household Cavalry Regiment when two Daimler Armoured Cars shot up and sank an enemy tugboat towing a string of barges on the River Waal. It was the unfortunate fate of armoured car regiments to suffer heavy casualties in men and vehicles—one regiment lost 25 scout cars in the first month of the Normandy invasion, for example. Often the first to meet opposition, their armoured or scout cars could not offer the protection afforded by a tank. However, the relatively quiet approach of the armoured cars or scout cars combined with their speed and manoeuvrability often enabled them to get out of trouble.

CONCLUSION

The British army (and, of course, the armies of the Commonwealth countries, which were organized on similar lines to it) made far wider use of wheeled armoured vehicles than any of the other combatants on both sides in World War II.

The advantages for reconnaissance purposes of armoured cars and armoured scout cars over the fully-tracked or semi-tracked vehicles more generally used by other countries outweighed many of the dis-

advantages where speed, range and silence were of high importance.

British designers tried, and generally succeeded, in developing these salient features which contributed more than a little to the success enjoyed by British and Commonwealth reconnaissance units during the War and also, incidentally, have led on to substantial world wide sales of British built wheeled armoured vehicles since 1945.

Armoured car units of Britain and the Commonwealth set a high standard of efficiency throughout the War and were in constant contact with the enemy, whether in advance or retreat. From Alamein to Tunis, in Italy and Burma, and Normandy to Berlin they provided a steady and invaluable stream of information to the commanders responsible for fighting the

main battle. The quality of the armoured cars and scout cars used by these units—the 11th Hussars, 12th Royal Lancers, The Royal Dragoons, King's Dragoon Guards, 1st and 2nd Household Cavalry Regiments, Derbyshire Yeomanry, Inns of Court, Royal Canadian Dragoons, 11th Cavalry (Prince Albert Victor's Own), 16th Light Cavalry and 4th and 6th South African Armoured Car Regiments, to name some of them—contributed greatly to their success in carrying out their duties and helped materially to final victory in World War II.

All photographs are from the author's collection but the original copyright holders are named wherever possible. The author would like to record his thanks to his friends and to the various bodies who have made photographs available.

Series Editor DUNCAN CROW

BRITISH ARMOURD CARS & SCOUT CARS—LEADING DATA

Armoured Cars	Weight (tons)	Dimensions (overall)			Engine/brake h.p. at r.p.m.	Transmission (Gears)	Crew	Armament	Armour (max. mm.)	Speed (m.p.h.)	Range (miles)	Remarks
Morris (CS9/LAC)	4.2	15'7½"	6'8½"	7'3"	Morris 6 cyl. 96.2 b.h.p. at 2,900	4 forward 1 reverse	4	1—0.55 in. Boys anti-tank rifle 1—0.303 in. Bren m.g.	7	45	240	
Guy Marks I & IA	5.2	13'6"	6'9"	7'6"	Meadows 4 cyl. 53 b.h.p.	4 forward 1 reverse	3	1—0.5 in. Vickers m.g. 1—0.303 in. Vickers m.g.	15	40	210	Mark IA 1—15 mm. Besa m.g. 1—7.92 mm. Besa m.g.
Humber Mark I	6.85	15'0"	7'2"	7'10"	Rootes 6 cyl. 90 b.h.p. at 3,200	4 forward 1 reverse	3	1—15 mm. Besa m.g. 1—7.92 mm. Besa m.g.	15	45	250	
Humber Marks II & III	7.1	15'0"	7'2"	7'10"	Rootes 6 cyl. 90 b.h.p. at 3,200	4 forward 1 reverse	3 (Mk II) 4 (Mk III)	1—15 mm. Besa m.g. 1—7.92 mm. Besa m.g.	15	45	250	
Humber Mark IV	7.1	15'0"	7'2"	7'10"	Rootes 6 cyl. 90 b.h.p. at 3,200	4 forward 1 reverse	3	1—37 mm. gun 1—7.92 mm. Besa m.g.	15	45	250	
Daimler Marks I & II	7.5	13'0"	8'0"	7'4"	Daimler 6 cyl. 95 b.h.p. at 3,600	5 forward 5 reverse	3	1—2 pdr. gun 1—7.92 mm. Besa m.g.	16	50	205	
A.E.C. Mark I	11.0	17'0"	9'0"	8'4½"	A.E.C. Diesel 6 cyl. 105 b.h.p. at 2,000	4 forward 1 reverse	3	1—2 pdr. gun 1—7.92 mm. Besa m.g.	30	36	250	
A.E.C. Marks II & III	12.7	17'10"	8'10½"	8'10"	A.E.C. Diesel 6 cyl. 158 b.h.p. at 2,000	4 forward 1 reverse	4	1—6 pdr. gun (Mk. II) 1—75 mm. gun (Mk. III) 1—7.92 mm. Besa m.g.	30	41	250	Mk. III—18 5" long, overall
G.M. Mark I, Fox I	7.37	14'8½"	7'5½"	8'1"	General Motors 6 cyl. 104 b.h.p. at 3,000	4 forward 1 reverse	4	1—0.5 in. Browning m.g. 1—0.30 in. Browning m.g.	15	44	210	
Coventry Mark I	11.5	15'6½"	8'9"	7'9"	Hercules 6 cyl. 175 b.h.p. at 2,600	5 forward 1 reverse	4	1—2 pdr. gun 1—7.92 mm. Besa m.g.	14	41	250	Mk. II had 75 mm. gun and crew 3
Scout Cars												
Daimler Marks I-III	2.8	10'5"	5'7½"	4'11"	Daimler 6 cyl. 55 b.h.p. at 4,200	5 forward 5 reverse	2	1—0.303 in. Bren m.g.	30	55	200	Weight of Mk. II—3 tons; Mk. III—3.15 tons. Armour 30 mm. is front plate only—sides and rear 12 mm.
Humber Marks I & II	3.39	12'7"	6'2½"	6'11½"	Rootes 6 cyl. 87 b.h.p. at 3,300	4 forward 1 reverse	2—3	1 or 2—0.303 in. Bren m.g.	14	60	200	
Ford Mark I, Lynx I	4.01	12'1½"	6'1"	5'10"	Ford 8 cyl. 95 b.h.p. at 3,600	4 forward 1 reverse	2	1—0.303 in. Bren m.g.	30	57	200	Armour 30 mm. is front plate only—sides and rear 12 mm.
Ford Mark II, Lynx II	4.2	12'8"	6'4"	5'8½"	Ford 8 cyl. 95 b.h.p. at 3,600	4 forward 1 reverse	2	1—0.303 in. Bren m.g.	30	57	200	Armour 30 mm. is front plate only—sides and rear 12 mm.

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