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LIGHT TANKS MARKS I-VI

50p

ILLINGS





The heyday of the light tank—a Light Mk. V (right) followed by four Mk. VIBs leads the light and medium tanks of the Tank Brigade on summer manoeuvres, Salisbury Plain, August 23, 1938.
(Chamberlain Collection)

Light Tanks Marks I-VI

By Major-General
N. W. Duncan

THE ORIGIN OF THE LIGHT TANK

THE ancestors of the British light tanks Marks I to VI are the medium tanks of World War I although the reasons which called them into being are not those that brought the later versions to light. British medium tanks A, B and C were intended to take advantage of the opportunities created by the heavy tanks for the dislocation and exploitation of a defeated or partially defeated enemy. Only one of these tanks, the Medium A, was ever in action and, despite many brilliant actions on their own, they failed to live up to expectations since their speed of 8 mph was insufficient on good going to keep up with the cavalry on the few occasions when they were able to advance mounted; equally 8 mph was too fast in face of enemy opposition for horses to take advantage of the opportunities which armour could create. Only the prototype Medium D was intended to carry out the duties which light tanks were later called on to perform. It was fast enough to pursue a retreating enemy, to carry out independent actions in the form of raids, and to undertake reconnaissance duties for the main mass of heavy tanks which it was intended to use in independent operations in 1919.

After the Armistice in 1918 tank development was in a state of flux: tanks were built under various designations to fill differing roles and as the military mind changed its thinking on the subject—which was pretty often in those days—so tank nomenclature changed too: tanks which started life as mediums found themselves successively light and heavy before reverting again to the medium category.

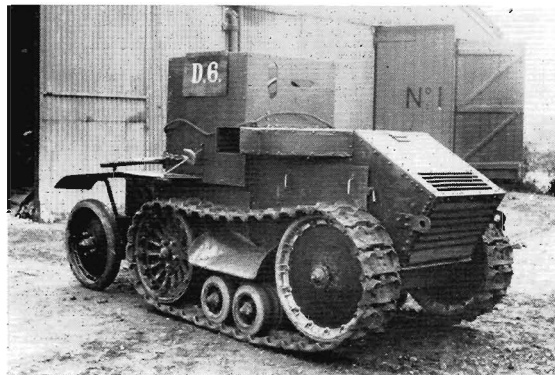
In 1925, Major G. le Q. Martel, an engineer officer who had been on the staff of Tank HQ in France, electrified the military world by building in his garden a one-man tank, which worked. Demonstrating it he suggested that a mass of these machines could materially help the infantry in an advance. On further reflection it was considered that one man would have his hands too full to carry out his duties effectively and

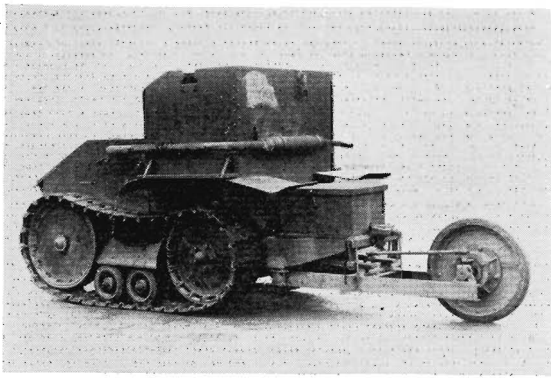
in 1926 a two-man version appeared. Eight of this model were built by Morris Motors for the Experimental Mechanised Force in 1927 while eight of another version of the two-man machine built by Carden and Loyd were also ordered at the same time.

No clear General Staff requirement for a light tank was ever issued but after the 1927 trials it was decided that two types of light armoured vehicle were needed; an open one for use with the infantry as a machine-gun carrier, and one with a turret for use by the battalions of the Royal Tank Corps. As an infantry weapon the Carden Loyd Machine-gun Carrier was produced, weighing a ton and a half, capable of a speed of 25 mph and able to convey two men and a machine-gun in extreme discomfort. It was used as a light tank pending the arrival of the proper vehicles and from it was descended the Bren gun carrier of World War II.

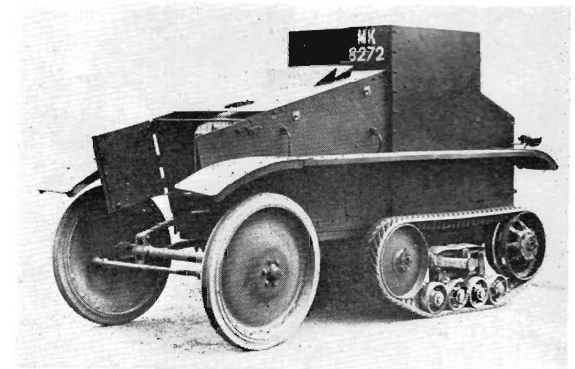
To meet the RTC requirement, Carden Loyd produced a series of experimental light tanks with turrets and their Mark VIII became the prototype Light Tank Mark I. These experimental vehicles were produced by Sir John Carden, one of the most talented tank design-

Morris-Martel one-man tank. The steering-wheel is visible through the loop-holes. This picture emphasises the height of the engine compartment and turret compared to the narrow track.
(RAC Tank Museum)





Left: *The Morris-Martel two-man tank, shown from the rear to reveal the mode of steering via the back wheel.* (Imp. War Museum.)
 Right: *Martel-Crossley two-man tank with Kegresse pattern track.* (RAC Tank Museum)



ers the U.K. has ever had, as a private venture. It could almost be said that light tank design evolved itself. No military specification had been drawn up but the product of evolution appealed to the General Staff: it was a tank, it was cheap, it was easily produced and did little damage. However as no clear conception of light tank duties existed outside the Royal Tank Corps British light tanks were under-gunned by comparison with those of other countries whose equivalent machines were better armed and more thickly armoured than British contemporary medium tanks. The likelihood of tank having to fight tank was outside the official view: at worst light tank would only ever have to fight light tank and powerful anti-tank weapons were not needed because the destruction of hostile tanks was primarily the task of the anti-tank gun. The melee and confusion of an armoured battle was not appreciated except in armoured circles: in consequence many casualties were later sustained by British light tanks against a more heavily armed and better protected enemy.

On the credit side it must be said that in overseas operations against a lightly armed enemy they more than proved their worth in India and Palestine before World War II, and that they were excellent training machines. It was only when they came up against the mass of German tanks in France in 1940 that they finally disposed of the idea that it was not the task of a tank to fight another tank and disproved the fallacious idea that numbers of under-gunned vehicles could successfully oppose fewer enemy tanks of superior gun power—an idea that was to cost us very dear in all our tanks until the 17-pdr. Sherman could face its enemies on virtually equal gun terms in 1944.

THE EVOLUTION OF THE LIGHT TANK

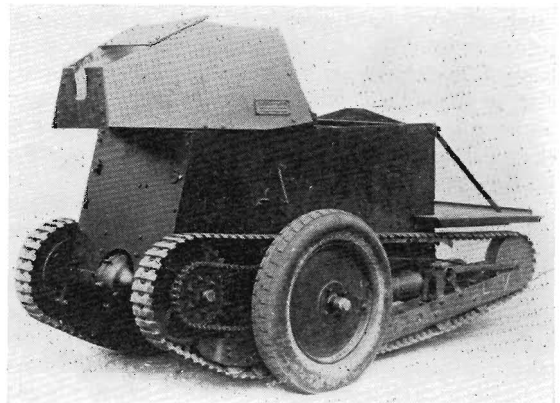
The Morris Martel two-man light tank was dropped after the disbandment of the Armoured Force in 1929. While these vehicles had proved their tactical value, continual trouble was experienced with their light construction and particularly with the rear wheel steering mechanism which was often damaged in rough going. The centre of gravity was too high and the cross-country performance was indifferent.

Carden Loyd developed their machine-gun carriers and a range of light tanks from their version of a one-man tracked vehicle which was produced about the same time as the Martel machine. This turned into a

two-man version which first appeared in 1926/27: it was small and light, giving only cramped accommodation for its crew but it did provide quick and speedy transport across reasonable going for a machine-gun and ammunition. A later version had overhead cover, two non-rotating turrets for the crew, and although this was discarded in favour of an open version for infantry use it probably played some part in the tank development. It is interesting to note that some of the Carden Loyd carriers made provision for travel on either wheels or tracks in an endeavour to reduce track wear which was always such a bugbear and led in World War II to the extensive use of tank transporters.

By 1929 Carden Loyd, who early in 1928 were taken over by Vickers-Armstrong, had produced their Mark VII light tank: this was a two-man machine armed with a .303 ins. Vickers machine-gun mounted in a low bevel-sided rotating turret which was cramped and difficult to operate from. A 59 hp Meadows engine gave it a top speed of 35 mph. Four suspension wheels either side, grouped in two leaf-sprung bogies, were used with an external girder connecting the outside bogie pivots. The outside girder has been used by almost all tank designers in all countries in early versions of comparatively speedy tanks. It has always been rapidly discarded probably due to the additional drag imposed by unfavourable going, bogie pivots and hull supports being increased in strength to take the additional load caused by the absence of external support.

The Carden Loyd Mk. I one-man tank, or "tankette", earliest stage of Vickers light tank development.* (Imperial War Museum)





Four Morris-Martels followed by a Carden Loyd marching past, Salisbury Plain, 1929. The Carden Loyd is an original two-man vehicle, very low in build and thus inconspicuous, and armed with a light machine rifle. (RAC Tank Museum)

The Carden Loyd Mark VIII light tank which followed was accepted as the prototype vehicle for the Mark I light tank. Very few Mark I's were built and they never became a general issue to troops. However they and the Mark IA's provided valuable data for the design of subsequent light tanks.

THE LIGHT TANKS DESCRIBED LIGHT TANK MARK I AND MARK IA

This was a two-man vehicle with a cylindrical turret mounting one .303 VMG. Suspension was by two pairs of two-wheeled leaf-sprung bogies on either side with no external girder: three return rollers mounted on the hull took the top run of the track and track adjustment was effected by the rear idler which was raised above the ground at the same height as the front driving sprocket, itself an innovation in British tank design. The idler was mounted on an eccentric bush located by a ratchet which allowed the track to be tightened when necessary.

Armour was on a 14mm basis which increased the weight to 3½ tons: a 59 hp Meadows engine gave it a top speed of 30 mph. Steering was effected by breaking the drive to either track through a clutch with subsequent application of a brake to steepen the turn if

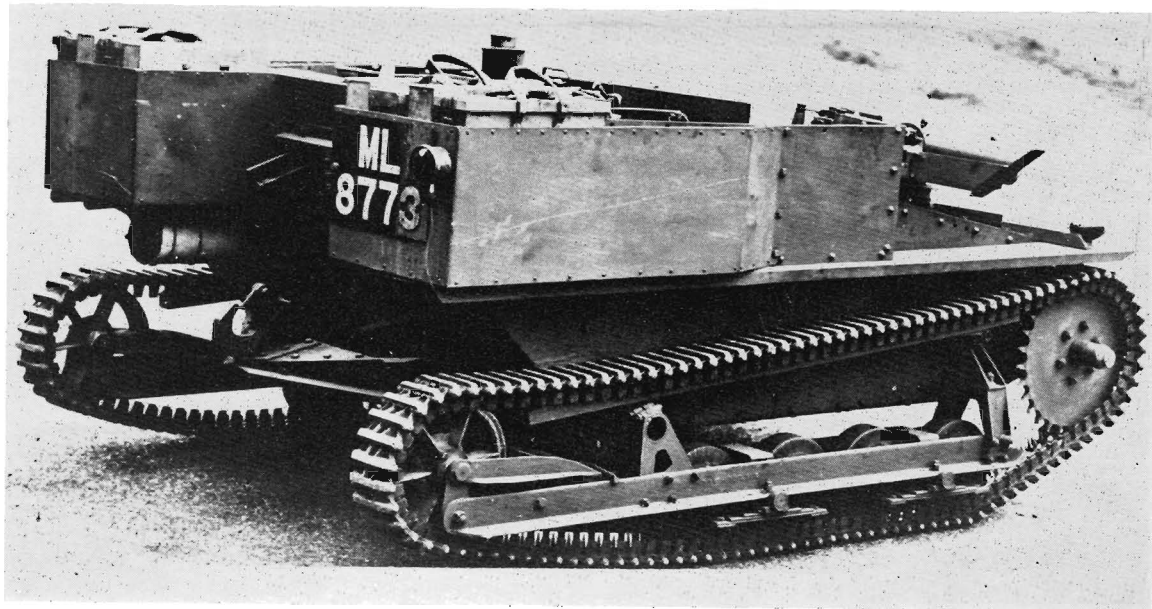
required. A normal four-speed crash gear box was used.

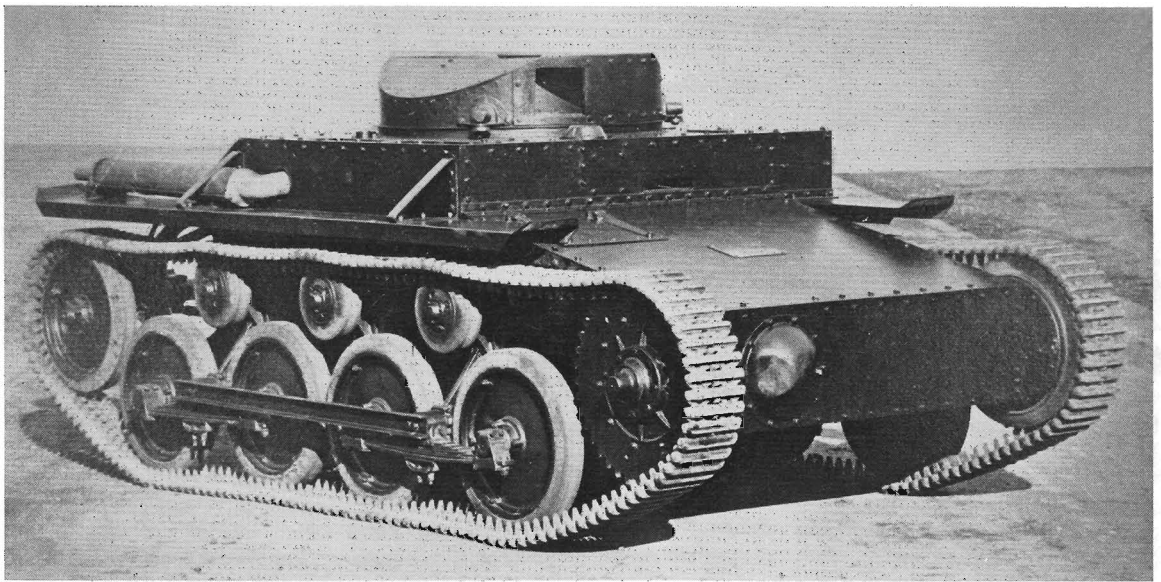
Light Tank Mark IA followed: compared with Mark I the superstructure had been built up and the cylindrical turret had been slightly enlarged to facilitate handling the VMG which was of standard infantry pattern. These guns were enclosed in armoured jackets and considerable trouble was experienced over cooling them in the earlier light tanks. A header tank for the water jacket to reduce overheating was built into the Mark IV light tank while the Mark VI had a circulating pump in addition.

Mark IA had Horstmann suspension using two horizontal coil springs in place of the leaf pattern used on the Mark I's. These coil springs bore on a ball and socket joint at the top of the quarter circle shrouds on each wheel. The shrouds were pivoted at their other corners on the hull pivot pin. This was the best suspension that had been devised for tank work up to that date although the uncontrolled springs were liable to bounce to such an extent that the tank could become almost uncontrollable. At medium speeds over reasonably good going it gave a very easy smooth ride. Three return rollers on the hull took the top run of the track.

Four of these tanks were sent to India in 1931 to undergo tropical trials. They were fitted with cupolas,

The Carden Loyd Mk. VI Machine-Gun Carrier marked the point where the design concept it represented diverged into two lines of development, the machine-gun carrier and the light tank. (RAC Tank Museum)





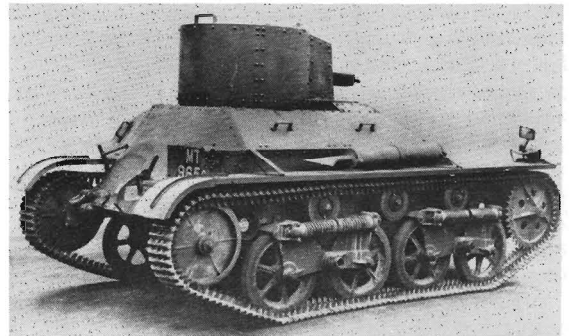
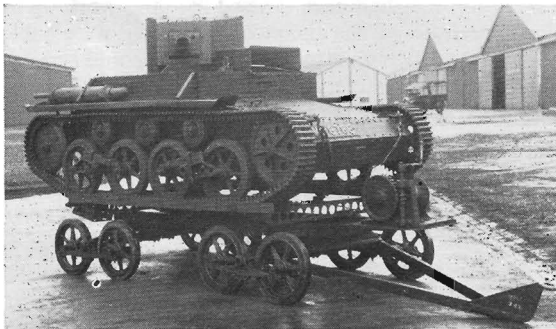
Carden Loyd Mk. VII—prototype light tank (A4), 1929, the first to incorporate a traversing turret. (Imperial War Museum)

square, bevel sided and non-rotating by Base Workshops Chaklala who also carried out other modifications principally connected with engine cooling. To reduce the temperature inside the tank experiments were carried out with various linings to absorb the heat and satisfactory results were obtained with an asbestos fabric. Modifications arising from these Indian trials

were incorporated in later tanks intended for service overseas.

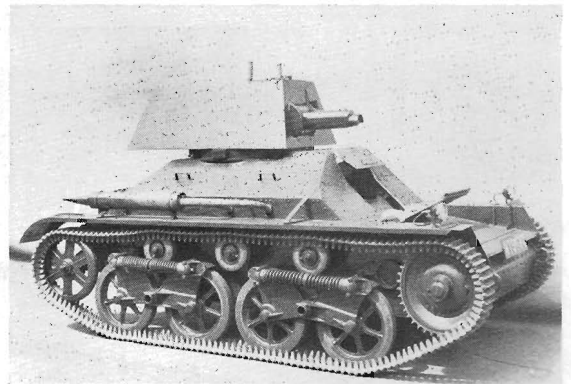
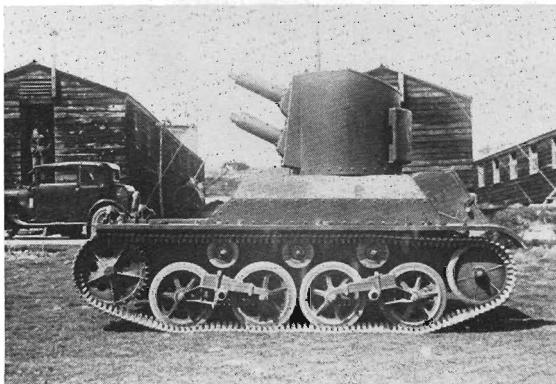
LIGHT TANK MARK II

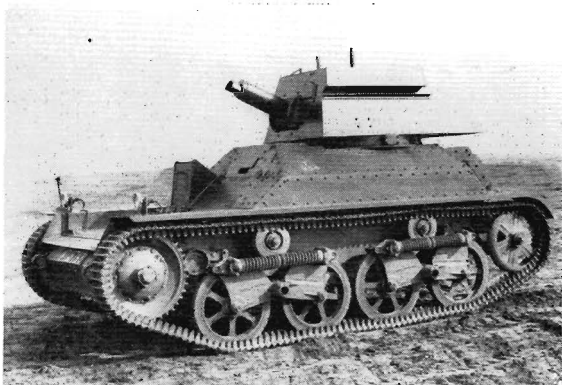
This appeared in 1930: it was the pattern on which all subsequent light tanks were based up to Mark VI. The



Left: The Light Tank Mk. I (A4E2) of 1930 which saw limited service. This hitherto unpublished picture shows it mounted on a specially built recovery trailer (designed at M.W.E.E. Kidbrooke) which was tested in 1931. It will be noted that the trailer features standard Carden Loyd road wheels as used on the tank itself. (Imperial War Museum.) Right: Prototype Light Tank Mk. IA (A4E8). (RAC Tank Museum)

Left: Prototype Light Tank Mk. IA (A4E10) with double machine-gun turret. A .5 Vickers machine-gun superimposed on a .303 Vmg. (RAC Tank Museum.) Right: The Vickers Light Tank Mk. II which was the first major production model. (Imperial War Museum)





Left: *Light Tank Mk. IIA*. Note bullet-proofed air louvres on turret and air hatch to engine beyond driver's loop-hole. (RAC Tank Museum.) Right: *Light Tank Mk. IIB—Indian pattern with cupola*. (RAC Tank Museum)



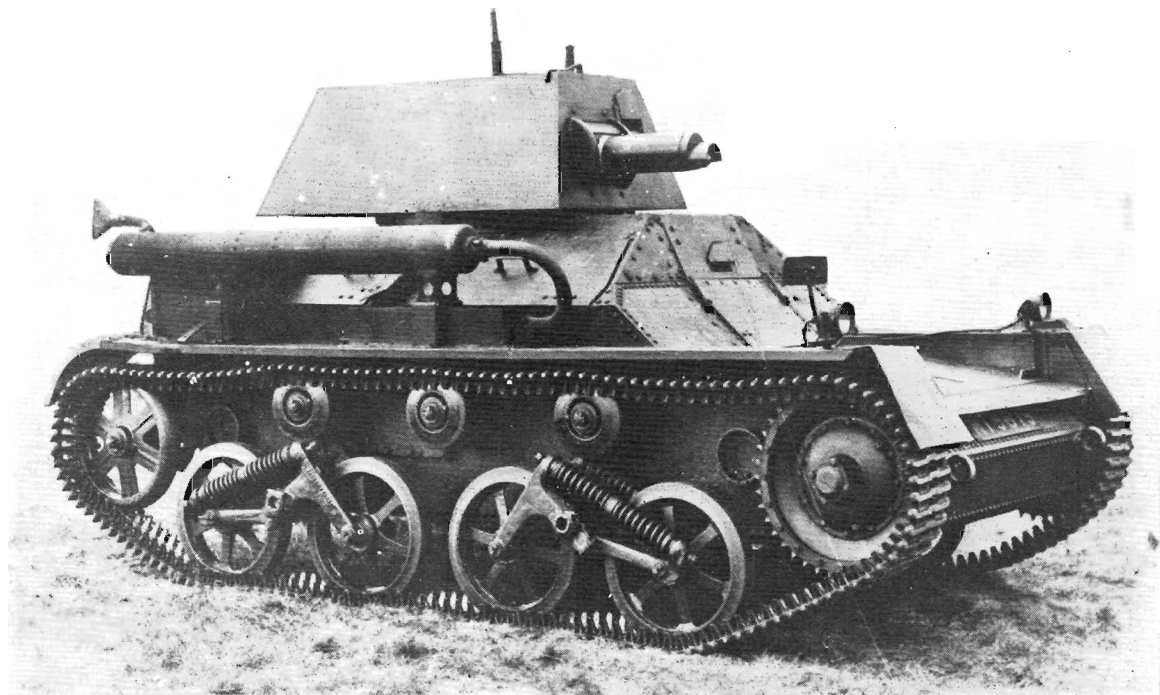
engine, gearbox and transmission were on the right-hand side of the vehicle driving forward to a cross shaft, through a bevel drive, which carried on either end a clutch by which the drive to the track could be broken. The left-hand side of the tank accommodated the driver and the commander in his turret with a machine-gun and a wireless set in the turret bulge behind him. This general arrangement varies in detail with different Marks, especially when the three-man is introduced but the basic pattern remains unchanged.

Mark II had a Rolls Royce engine developing 66 bhp. This was coupled to a Wilson pre-selector gearbox, driving forward to the cross shaft. The Wilson box was very handy for cross-country work but it was more complicated than the usual pattern. Mark II's intended for service in India were engined with a Meadows 85 hp EST engine and had a normal crash gearbox. Those intended for service in India were fitted with a square bevel sided non-rotating cupola.

Light Tank Mark II was fitted with a No 1 Mark I turret: this was rectangular in shape with sloping sides and mounted a .303 VMG, which had been specially adapted for tank use by the addition of a pistol grip incorporating a trigger and an ejector tube through which spent cases were passed into another tube in the gun mantlet and so into a cartridge bag which hung below the jackets outside the tank. The turret had no air louvres and a small aperture for the commander in the roof was closed by a sliding door. The No 1 Mark II turret fitted to Marks IIA and B was similar in construction but had unguarded air louvres fitted at the top of the side plates. These two turrets were subsequently reconstructed as Mark I* and Mark II* with anti-bullet splash baffles fitted into the louvres that now covered the air intakes in the turret sides. The unsatisfactory small sliding door was replaced by a larger pair of folding doors which could be locked from either inside or outside the tank.

Light Tank Mk. II with experimental Horstmann modified suspension.

(RAC Tank Museum)



The bulge at the back of the turret housed a No 1 Wireless set, an instrument of uncertain behaviour and widely varying range. Designed for voice communication up to three miles, it was sometimes mute at 400 yards, occasionally gave ten miles, and with an outside aerial enabled voice communication to be established between Tidworth and Cairo until the International Board of Wireless Control put a stop to that practice!!

LIGHT TANK MARK III

This tank was similar in shape to the Mark II except that the hull superstructure was carried further to the rear. A modified Horstmann suspension with inclined double springs, one to absorb shock and the other to check rebound, were fitted either side of the suspension wheels. The quarter circle shrouds of the Mark II's were abandoned. Production models had two return rollers either side on the hull, although the prototype models appeared with three.

The Mark III was originally fitted with a Rolls Royce engine and a Wilson gearbox. 36 of the Mark were built and were sent to Egypt where they were used by the 6th Bn Royal Tank Corps.

The engine fitted to Mark II and Mark III can be distinguished by the silencer. The Rolls Royce pattern is about half the length of the off side track guard, from level with the driver to the rear of the turret and has a final exhaust pipe with a fish tail protruding above the silencer. The Meadows engine used a short silencer with a tail pipe protruding straight to the rear with no fish tail.

Mark III was fitted with either a Mark I or a Mark II turret. The only difference between these two patterns lay in the top plate. In the Mark II this was higher to incorporate a header tank for gun cooling. No cupolas were fitted.



Light Tank Mk. IIB Indian pattern of the 2nd Light Tank Company, R.T.C., crossing the Nahakki Pass by mule track, Mohmand Operations, North-West Frontier, September 1935. This was the first British operational use of tanks after 1920 in south Russia. (Chamberlain Collection)

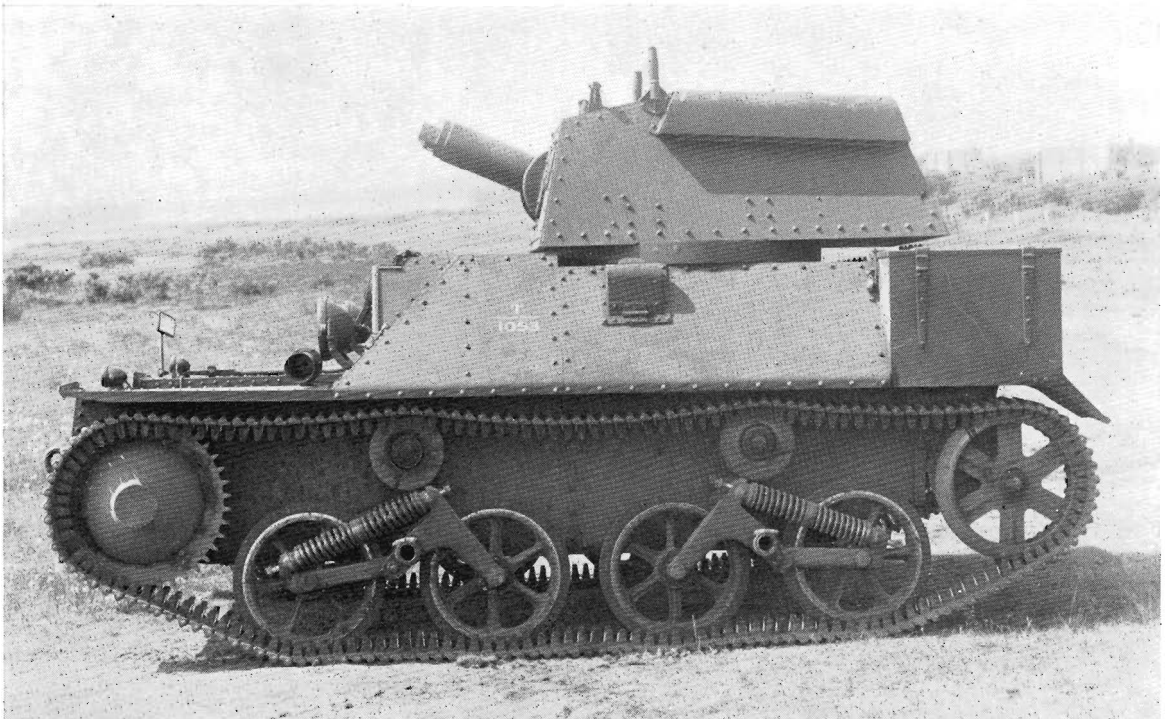
Up to and including Mark III all light tanks had a rear idler wheel clear of the ground which also served as a means of adjusting track tension. The top run of the track was horizontal with the ground and the whole suspension gave a very comfortable ride, especially in the Mark III where the modified Horstmann springing greatly reduced the tendency to bounce which had been noticeable in the Mark II's.

LIGHT TANK MARK IV

This was the first light tank to use the hull as a chassis and to mount automotive components directly

Light Tank Mk. III which was the production model introducing the revised type of Horstmann suspension.

(RAC Tank Museum)





A Light Tank Mk. IIA, with revised Horstmann suspension, and an assortment of Bren Carriers form the motley equipment of an Australian-manned light tank squadron in training in Egypt in summer 1940. (Imperial War Museum)

on to it. Earlier models had their armour-plate attached to a chassis. The new construction saved weight and gave a more rigid structure which was less liable to distortion over bad going. Considerable changes had been made in the external appearance of the tank: the superstructure was higher than in earlier models and the turret was set further back. There was no rear idler although the modified Horstmann suspension using the two springs either side of the bogie was retained. In the Mark III the angle of the springs was opposed, that of the front bogie pointing forward, that of the rear one pointing aft. In the Mark IV both springs pointed forwards. Track adjustment was effected by moving the rear wheel of the back bogie forwards or back in its housing. Lacking a rear idler wheel clear of the ground the suspension was not so smooth as on

An umpire leaves the turret of a Light Tank Mk. IV after hitching a lift in the 1938 summer manoeuvres on Salisbury Plain. (RAC Tank Museum)



previous Marks—a matter of considerable importance where firing on the move was concerned.

A 90 Meadows EST engine with a four speed synchromesh gearbox was used and armour was on a 12 mm basis.

The turret mounted the usual tank pattern machine-gun: this was located by two bevel sided slides on the bottom of the breech casing which fitted into two bevelled grooves machined in the gun jacket. These guns were very satisfactory and the cooling problem had been largely overcome with the header tank in the turret roof. Turret rotation had provided many problems and in Marks I and II a circular roller path had been formed on the upper side of the traversing rack. Six traversing rollers mounted on ball bearings were secured to the turret base and side thrust was taken by a vertical flange on the traversing ring bearing against a roller fitted ring on the underside of the turret. Six “L” shaped clamps on the turret, bearing against the traversing rack, prevented the turret coming off. Raising gear, an eccentric cam, was fitted at four points on the turret and was always to be used when there was no likelihood of turret rotation being required. This was to avoid “pitting” the surface of the traversing rack or forming “flats” on it which would have hindered the traverse.

A different system was adopted on the Mark IV. A turret ring on the underside of the turret rested on nine ball bearing rollers secured to brackets on the traversing ring. These rollers had a double profile; part at a slight inclination to take the weight of the turret, the rest at an acuter angle to locate the turret in its ring. Clips to prevent the turret coming off were secured to six of the roller brackets.

One revolution of the traverse wheel gave a movement of 5 degrees: an adjustable brake was fitted which prevented rotation until released by pressing the hand grip.

Wireless batteries were housed in a box, pivotted on the bottom of the tank and moved with the turret



*Light Tank Mk. IV in use for training in summer 1940. Note hand-grips for commander (also fitted in Mk. II and III).
(Chamberlain Collection)*

through an arm joining the two. In the Mark IV this was elaborated, the battery box being mounted on roller bearings which considerably reduced friction.

The Mark IV light tank's centre of gravity was too high in relation to tank length. Its cross-country performance was poor although its maximum speed had been increased and it was still only armed with one .303 VMG. It was to be the last of the two-man tanks for by the time it appeared it had been realised that the demands made on the commander were more than one man could possibly carry out. He had to:

- i Control his driver
- ii Find his way and read a map
- iii Control other tanks under his command
- iv Acquire and fire on targets, controlling the fire of his other tanks meanwhile
- v Operate a wireless set

*Light Tank Mk. V (with another just behind it) was the model which introduced the longer, deeper hull and a two-man turret with twin machine-gun armament.
(Chamberlain Collection)*



—and, much worse, he often had to carry out several of these duties at the same time. The stage was set for the three-man light tank for which the Royal Tank Corps had been clamouring.

LIGHT TANK MARK V

This was the first British three-man light tank. It too was built by Vickers-Armstrong who were to build so many tanks for the British Army. Twelve prototype Mark V's were sent to the 1st (Light) Bn RTC in 1934 and with them came a team of Vickers-Armstrong mechanics who lived with the battalion during user trials. This was a complete innovation, almost the first direct contact between manufacturer and user, and it paid an excellent dividend. User faults were immediately rectified, internal stowage for the first time met user needs and the trials materially shortened the time into service after the first appearance of the prototypes. It was a great pity that it was so rarely possible to repeat the practice with later tanks because it did create a very valuable fund of goodwill, mutual trust and understanding between the user and the manufacturer.

One of the two men in the turret was the tank commander. The other was the gunner who was also responsible for operating the wireless set. A new trade category was instituted for these men which caused many lengthy discussions with the trades unions in order to fit a man with these qualifications into existing trade categories. However this was eventually achieved and the gunner-operator more than proved his worth in the light tank world. He made an immense difference not only when the tank was on the move or in action but also when maintenance had to be carried out and for guard duties when the tanks halted at night.

Apart from the third man the other innovation in



Light Tank Mk. V showing the sloping back turret plate. The return roller on the front bogie (see also the Mk. IVs illustrated) gave continual track trouble, accentuated no doubt by having the rear suspension wheel on the ground which seemed to transmit "shakes" in the top run of the track and make it come off. This tank is being used for training at Catterick, October 1940. (Chamberlain Collection)

this Mark was the addition of a .5 VMG to its armament in addition to the normal .303. The recognition of the need for a light tank to have some anti-tank capacity was revolutionary in its concept as far as British military thought was concerned. The .5 at the time of its introduction was a match for any comparable light tank in Europe since their armour basis was the same as that of the Mark V—12mm. However, United States tanks, which the Americans classified as light, were at that time mounting a 37mm gun and were carrying an inch of armour on the front plate. None the less the anti-tank potential was more than welcome:

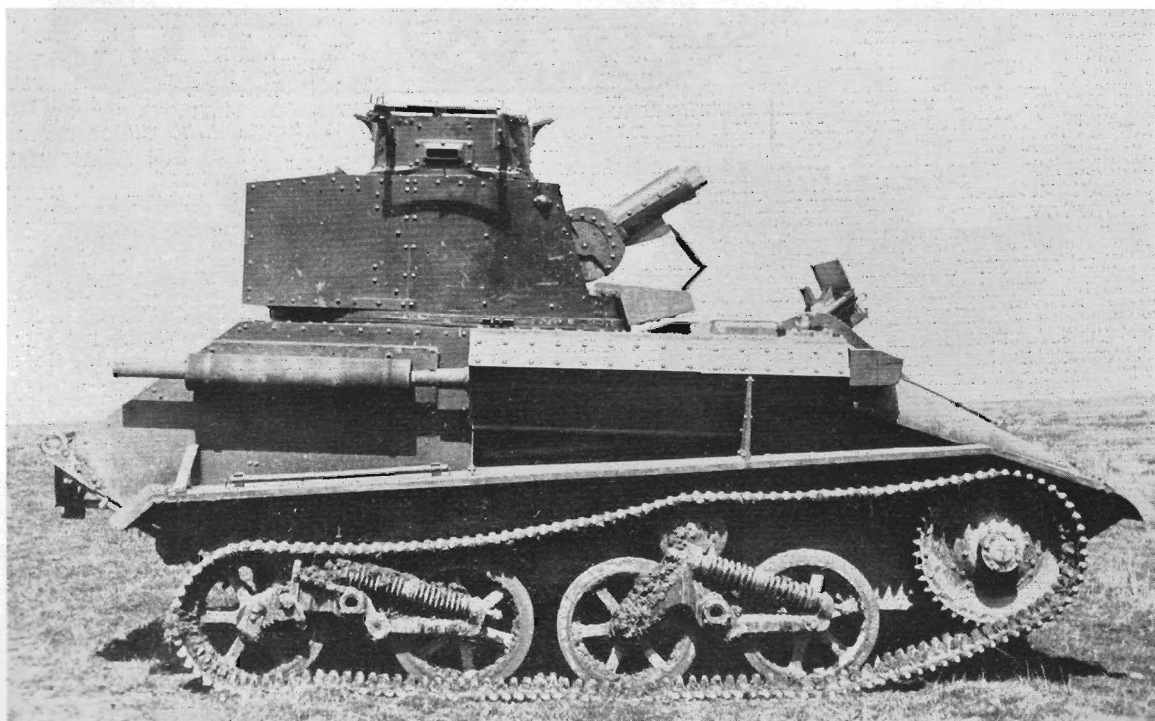
the tragedy is that no-one outside the armoured world recognised the need for upgunning in order to keep abreast of other nations.

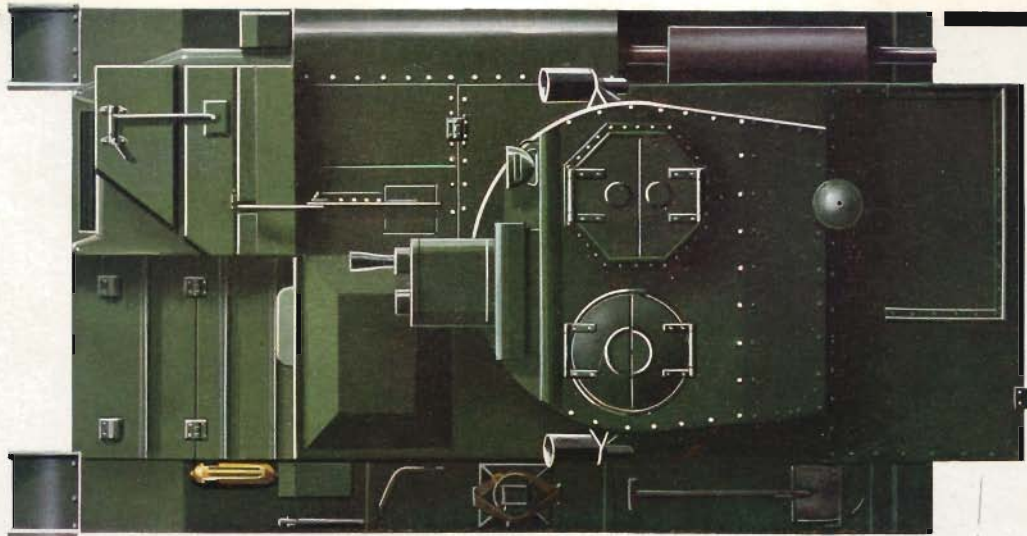
The Mark V was a little better balanced than its predecessors and its cross-country performance was distinctly better than that of the Mark IV. It had the same engine as the Mark IV and although the weight had risen by half a ton to 4.8 the radius of action of the two tanks remained approximately the same. But the top speed had been reduced to 32 mph in place of the 37 mph which the Mark IV would attain.

The turret of the Mark V was basically circular in

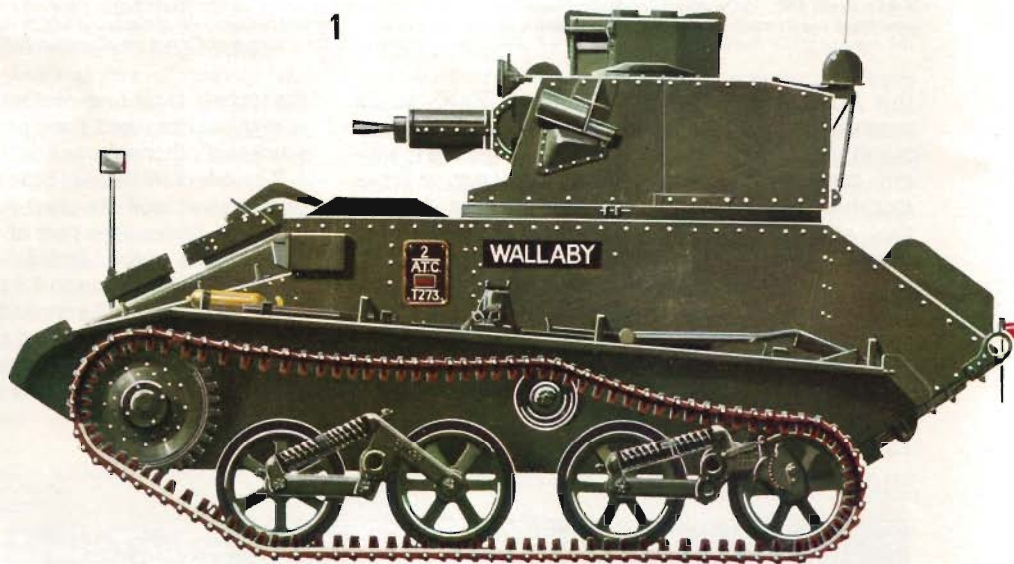
Light Tank Mk. VI, with a two-man turret and twin machine-guns.

(RAC Tank Museum)

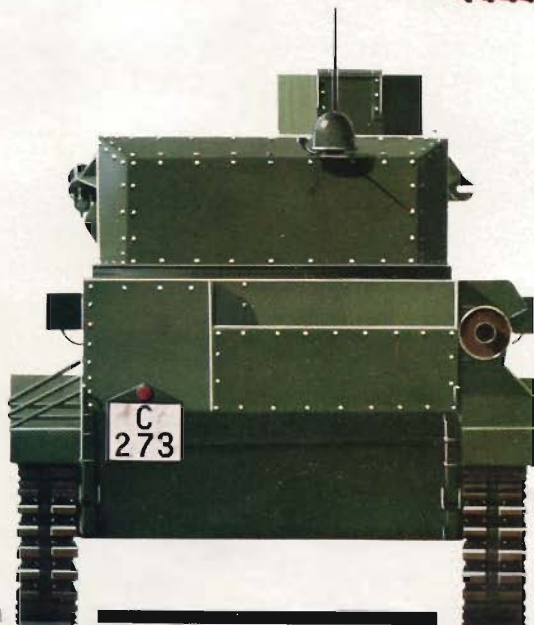


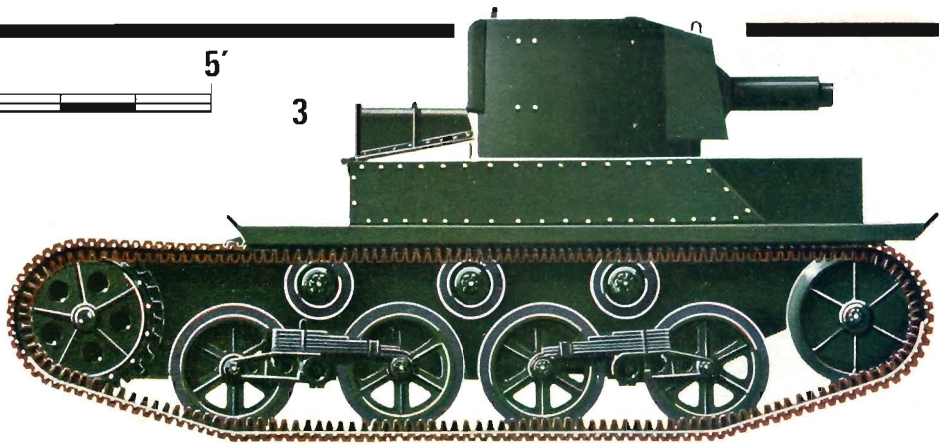


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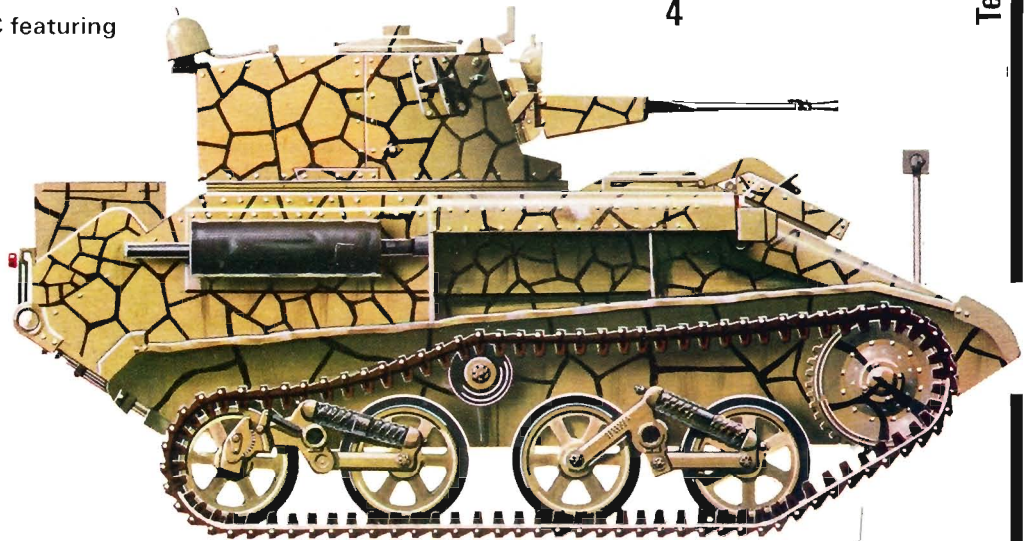
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1. Light Tank Mk VIA of the 2nd Australian Tank Corps (Australian Light Horse), October 1940, Moorabin.

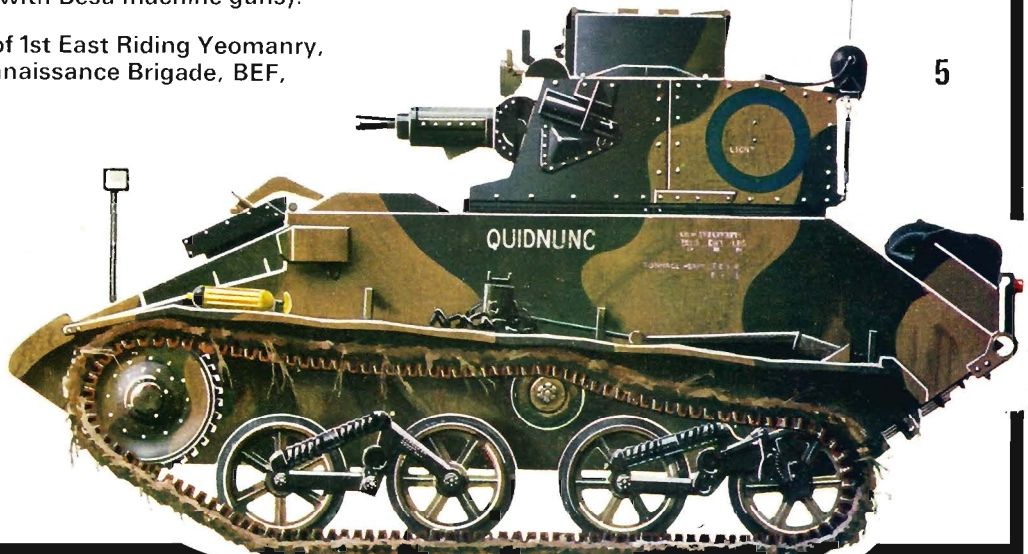
2. Emblem of 2nd ATC featuring Tank Corps colours.



3. Light Tank Mk I (A4E2) delivered for service trials, 1930.

4. Light Tank Mk VIC of 1st (Independent) Troop, Royal Tank Regiment, Malta Command, Summer 1942. (Vehicle modified to 'Indian Pattern' and with Besa machine guns).

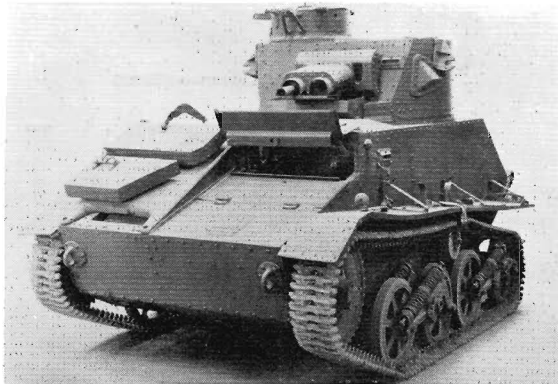
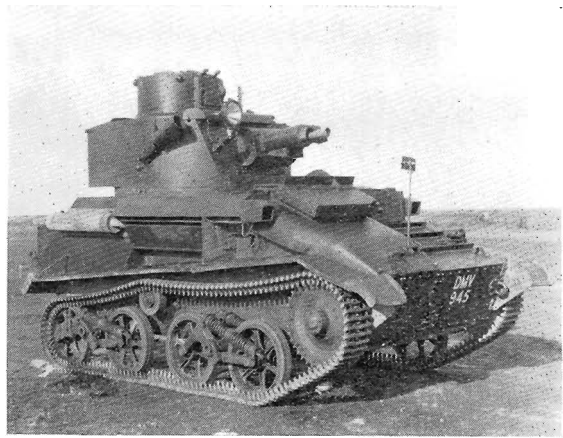
5. Light Tank Mk VIB of 1st East Riding Yeomanry, 1st Armoured Reconnaissance Brigade, BEF, France, April 1940.





Left: Based on the Mk. V, this experimental "tank destroyer" model with 2 pdr. gun developed by Vickers was tested by the army in 1938 but never went into production. (Imperial War Museum.) Right: A fine view of a Light Tank Mk. VIB showing all the standard fittings of the 1939 period, including spotlight on turret, smoke discharger, and headlights in armoured housings.

(Imperial War Museum)



Light Tank Mk. VIA distinguished from the VIB by the twin louvres over the engine. (RAC Tank Museum)

shape with vertical sides. It was interrupted both front and back by sloping plates, one of which carried the gun mantlet pierced in two places for the ejector tubes for the guns. The back plate came down at such an angle that it was difficult to get a wireless set of any power to fit in the space provided. The two machine-guns lay side by side in an armoured jacket which was so counterweighted as to make elevation and depression by shoulder-piece easy. A sighting telescope was provided with fixed graticules; range was put on the sighting drum in the sight gear assembly which raised the rear end of the telescope relative to the line of fire. Compared to later installations it was unbelievably simple, only two scales—one for each gun. The commander had a small circular revolving cupola which gave him observation of fire.

A new method of mounting the turret came in with this tank. A ball-race was machined on the under side of the turret and another on the upper side of the traverse ring. The two were separated by a "crowded" ball-race of 213 balls, and six clips were provided to avoid any danger of the turret coming off. The usual geared hand traverse was used, but one revolution of the wheel only traversed the turret 3 degrees, and the normal turret braking device was used.

A floor-mounted revolving pedestal carrying the wireless batteries, ammunition bins and a seat for the gunner was attached to the turret by a stay.

Modified Horstmann suspension like that of the Mark IV was used in Mark V, and one return roller was mounted in forks on the leading suspension bogie. Track adjustment was effected by moving the rear suspension wheel in its brackets.

LIGHT TANK MARK VI

This tank had a maximum armour thickness of 14 mm and its weight had risen to 5 tons. The engine transmission and general layout were as for the Mark V, the only major change being in the engine clutch which gave a great deal of trouble when first installed: this was rectified in due course and the machine, apart from its fighting value, proved itself reliable, easily maintained and speedy.

The turret mounting was on a crowded ball-race as in the Mark V: the turret shape was basically circular, flattened in front to take the gun mantlet and with the sides extended at the back to house a No 7 wireless set, a very much better affair than the No 1, with a range of

A training turret for crews on the pellet range at the 56th Training Regt., RAC, Catterick, October 1940. This view shows the position of the commander and gunner inside the turret. Radio on the actual Mk. VI fitted in the turret rear where the pellet range equipment is here. (Imperial War Museum)





Light Tank Mk. VIB negotiating an obstacle with a crew of officer cadets at the OCTU, R.M.C., Sandhurst, late in 1940.
(Chamberlain Collection)



Light Tank Mk. VIB Indian pattern was distinguished from the standard VIB by the absence of the cupola. Some VIBs in Britain were later modified to this standard. (Imperial War Museum)

hill on the engine “overrun”, “reverse steering” was experienced. Once the drive to a track had been broken by the steering clutch, the tank’s weight swung the free track round the one still connected to the engine and the tank went the opposite way to that intended by the operation of the steering lever. The phenomenon could be dangerous: the remedy was always to steer with the engine pulling.

LIGHT TANK MARK VIA

An octagonal commander’s cupola was substituted for the circular pattern of the Mark VI. One return roller was positioned on the hull instead of on the suspension bogie. A Meadows ESTB engine was used in place of the Meadows ESTL on the Mark VI: both were of the same hp.

LIGHT TANK MARK VIB

This model reverted to the circular cupola of the Mark VI but it had only one cooling louvre on the inclined plate that covered the radiator instead of the two used on Mark VI and VIA.

Mark VIB’s for India had no cupola but were provided with a single periscope for the commander which was located in one half of the hinged conical-shaped hatch.

An experimental Mark VIB appeared in 1940 with a rear idler similar to those on the Mark II and III. It was a great success and gave a very smooth ride together with a better cross-country performance but the modification was never adopted for service use.

LIGHT TANK MARK VIC

This was a Mark VIB with wider suspension wheels and a broader track. No cupola was fitted but the commander had a periscope as for the Indian pattern Mark VIB. Otherwise the turret was the same but the armament had completely changed and Besa air-cooled machine-guns of 7.92 and 15 mm respectively replaced the Vickers pattern used in earlier tanks. These guns, adapted from a Czech design, had been standardized for the Royal Armoured Corps: they used, for the first time in the British Army, rimless cases in place of rimmed cartridges. The Besa was a

ten miles using a rod aerial. It was a precision instrument whose assembly, like all other pre-war sets, demanded a high proportion of skilled labour. It was not until the greatly increased demands of the war required quicker production that the 19 set, requiring only 5% skilled labour in its manufacture, was designed for use in tanks.

The geared traverse gave a movement of 3 degrees for each revolution of the wheel; quite enough because this Mark had a revolving platform on which both commander and gunner stood and which housed beneath the floor boards ammunition boxes and wireless batteries. A rotary connection in the centre of the floor brought current from the dynamo to the wireless batteries and also provided voice-pipe connection between the commander and the driver—in theory. No satisfactory means of communication between the members of a tank crew had been evolved up to that date. Every kind of device had been tried, reins attached to the driver’s arms, flashing lights and hose-pipes with funnels at each end. All these had failed because of turret rotation, and while the Mark VI had the germ of success in it, voices were so distorted by the long passage and abrupt bends in the voice-tube that little benefit resulted from it. Again it was not until the advent of the 19 set that clear and satisfactory communication between all members of the crew was achieved.

Horstmann suspension with the inclined springs of the Mark V was also used on the Mark VI with a return roller on the front bogie assembly. In spite of its increased weight, the power/weight ratio of 16:1 was better than that of any British medium or heavy tank. The centre of gravity had been brought further forward and the tank was a better ride than any of its predecessors although it was distinctly uncomfortable at speed on rough going.

If an attempt was made to steer a light tank down



A few Mk. VIs were modified by the provision of larger diameter sprocket wheels, as shown on this VIB at 102nd OCTU, Blackdown, August 1940. The badge painted on the turret below the wireless aerial is of the Westminster Dragoons. (Chamberlain Collection)

good gun but the earlier varieties were liable to many stoppages. The 7.92 was used on all British tanks up to 1958 but the 15 mm gun was dropped very early on in World War II.

LIGHT TANK AA MARK I

In action the Mark VI's, undergunned and under-armoured, soon showed their inferiority to their opponents. They were withdrawn from service as the

Stuart tanks arrived in the Middle East from America and were then converted into AA tanks mounting either quadruple Besa 7.92 mm guns or two Besa 15 mm. The crew was reduced to two men but the vehicle, lacking any form of power traverse for the turret, was never particularly effective.

2-PDR. LIGHT TANK

One Mark V light tank chassis was modified to take a

Line up at 102nd OCTU in August 1940 shows some of the external differences between Vickers light tank models. Mk. IV is nearest, then come two Mk. VIBs, then a Mk. V. Note the trays in each case for empty shell cases. (Chamberlain Collection)





A picture taken at the same OCTU which clearly illustrates how much smaller the Mk. IV was compared with the Mk. VI. Mk. IV is second in line of Mk. VIs. (Chamberlain Collection.)

2-pdr. gun in an open topped turret in 1938. This most interesting innovation, which would have made the British light tank superior to any of its kind in the world, was never developed. No records of its performance are available and it is probable that had it been adopted some lengthening of the tank would have been required. Failure to realise that the best anti-tank weapon is another tank was probably responsible for the abandonment of the idea.

EXPERIMENTAL MARK VI B

A much modified Mark VIB appeared as a prototype in 1937. The tank was longer with a rear idler clear of the ground giving a better ride. The superstructure had been carried further to the rear to give a vertical face in which there was a door for use as an emergency exit. The centre of gravity had been shifted further forward so that cross-country performance was improved. Armour was on a 14 mm basis and for the first time the tracks were protected by shields of thin armour plate like the sand shields fitted to the normal Mark VI's in the Desert campaigns. All this had to be paid for and the weight had risen to 7½ tons: engine power remained the same and in consequence this tank was slow especially across country.

This tank came to the 1st Tank Brigade for inspec-

tion and users' comments in 1937 on Salisbury Plain. It was never heard of again and it never seems to have had a WD number: it was built by Ordnance factory.

LIGHT TANKS IN PEACE AND WAR

As a result of trials carried out by the 1st Tank Brigade in 1931 and 1932, the medium tank battalions of the Royal Tank Corps were reorganised on a mixed basis. Each had three mixed companies with a section of seven light tanks and one of five mediums: they also had one light company of four sections each of three light tanks. In 1934 the three light companies were grouped together to form the 1st (Light) Bn RTC.

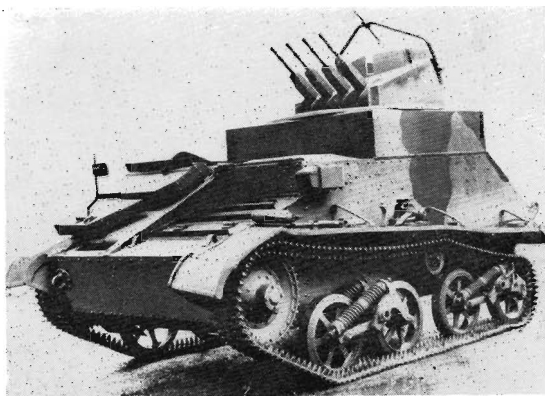
In 1938 cavalry regiments began to be converted to light tanks. On completion of their preliminary training they were either grouped in Light Armoured Brigades each of three light regiments or else they were allotted to infantry divisions as divisional cavalry regiments, providing an armoured reconnaissance element with each. Towards the end of 1938 the Mobile Division was formed with a Heavy Tank Brigade of medium tank battalions on a mixed basis and two Light Armoured Brigades of light tank regiments. In 1939 this was changed to the 1st Armoured Division with one Heavy and one Light Armoured Brigade and with this basic organisation the division went to France in May 1940. Considerable doubts had

Last of the Vickers light tank models stemming from the Carden Loyd was the Mk. VIC which had a 15 mm. Besa and 7.92 mm. Besa armament. (RAC Tank Museum)



Another view of a Mk. VIC. (Chamberlain Collection)





Light Tank AA Mk. I.

(RAC Tank Museum)

been expressed about the fighting qualities of the Mark VIB's and just before the division sailed it was reorganised with one cruiser tank squadron in each light armoured regiment and correspondingly one light tank squadron in each of the heavy armoured units which by that time were on an all cruiser tank basis. The division arrived in France and came into action against the Germans after they had broken through, and with its high proportion of light tanks (108 out of a total of 321) found the lack of gun power a considerable handicap in its withdrawal to Cherbourg.

Four Regular and three Territorial divisional cavalry regiments were in France when the Germans broke

through. They found the Mark VI lacking in gun power and too lightly armoured for its duties. All regiments suffered severely in their withdrawals to Dunkirk or St Valery.*

INDIA

In 1933 approval was given for the conversion to light tanks of two of the eight armoured car companies of the Royal Tank Corps then serving in India. 7 Light Tank Company first attracted attention by the invaluable work that it did with its tanks in patrolling the area of the Quetta earthquake in 1935 and in rescue operations in the stricken town. The ground was in such a condition that nothing except tracked vehicles could have traversed it.

2 Light Tank Company, the other unit to be converted initially, were stationed in Peshawar. They took part in the suppression of civil disturbances, the most unpleasant duty that could fall to an armoured unit. It was constantly allotted to them between 1921 and 1939 and it always posed a most difficult question to

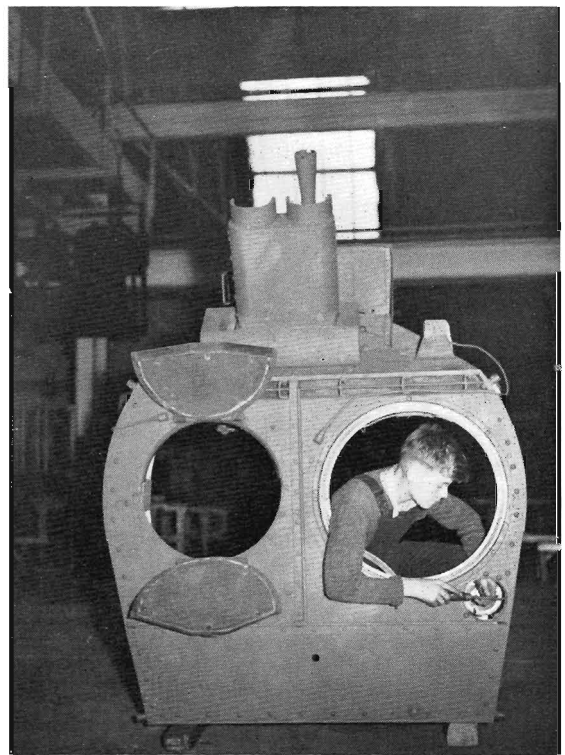
*They were the 4th/7th Dragoon Guards, the 5th Royal Inniskilling Dragoon Guards, the 13th/18th Hussars, the 15/19th Hussars, the 1st Lothians and Border Horse, the Fife and Forfar Yeomanry, and the East Riding Yeomanry. The 1st Armoured Division's two brigades were the 2nd Armoured Brigade (consisting of the Queen's Bays, the 10th Hussars, and the 9th Lancers) and the 3rd Armoured Brigade, the Heavy Brigade (consisting of the 2nd, 3rd, and 5th battalions of the Royal Tank Regiment as the Royal Tank Corps had by then been re-designated).

Another view of light tanks, Mk. VIBs in this case, being "re-manufactured" at the MG works, showing the simple lines of the Vickers design. The twin coil springs of the "four pair" Horstmann suspension are clearly shown. (Imperial War Museum)





The MG Car Co., Abingdon, Berks., part of the Nuffield Organisation, was responsible for the "re-manufacture" of over 100 light tanks from mid-1940 onwards, refurbished vehicles going initially to armoured divisions in Britain and the Libyan desert and latterly to training units. This general view of the MG assembly shed, summer 1940, shows ex-1st Armoured Division vehicles salvaged from France being stripped and overhauled.
(Imperial War Museum)



Working on the turret of a Mk. VIB at the MG works.
(Imperial War Museum)

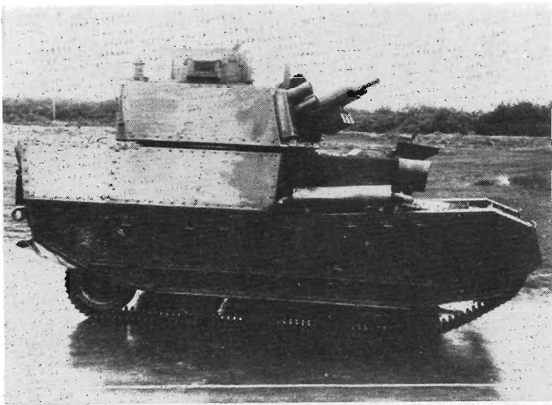
any commander detailed for the task. Armoured vehicles are not suited for mob control. Their offensive power is limited to the gun or the track: either can mean heavy casualties which may not achieve their end. If the mob rush the car or tank and surround it, the crew may be placed in a most dangerous situation and usually a show of force by armoured troops is not of itself enough to make the crowds disperse. Despite all these difficulties armoured troops were used constantly in aid of the civil power, willingly and cheerfully but with their commanders well knowing that whatever action they took, they were bound to be wrong!

Having got themselves clear of civil duties 2 Light Tank Company went to the Frontier in 1935 where

they took part in the Mohmand campaign against rebellious tribes of the district, stirred up by the Fakir of Ipi. In the course of this campaign the light tanks demonstrated their ability to go where no armoured vehicles had ever been able to go before their advent. The operation—campaign is perhaps an overstatement—lasted several months with the light tanks proving so

Refurbished vehicles were thoroughly tested before being re-issued "as new" to units. Stowage of the tow rope and tools on the track cover is here shown.
(Imperial War Museum)





Left: A5E1 or L3E1 Experimental modified Mk. VI. (RAC Tank Museum.) Right: Experimental Light Tank Mk. I in AA role. Armament is two .5 in. Vickers machine-guns. This is A4E2 modified. (RAC Tank Museum)

effective in their role that the Indian Government decided to convert the remaining armoured car companies as machines became available. A third company (9) was converted to the light tank role in the autumn of 1935 and by 1936 all eight companies in India had been converted to tracks.

The Indianisation of the Indian Army had been adopted as official policy in 1935 and conversion of Indian cavalry regiments to armour was commenced in 1937. By 1938/39 it had been completed and the light tank companies left India, having more than proved their worth in country that had been considered impossible and impassable for any tracked vehicle. Light tanks were often in action against an

enemy but his arms were inferior and he had no anti-tank potential. Under these circumstances both two- and three-man tanks performed satisfactorily: the tale of their performance against anti-tank guns is a very different one despite the bravery of their crews: personal courage is not the answer to inferiority in armament—at any rate in these days.

EGYPT AND THE WESTERN DESERT

The 6th Bn Royal Tank Corps was reorganised on a mixed basis in 1932/33 and was equipped with Mark III light tanks. The light company of this unit took part in operations in Palestine in 1936. That same year 1st

A Light Tank Mk. IV (left) passed by a line of Mk. VIs at the 102nd OCTU, August 1940.

(Chamberlain Collection)





Mk. VIBs in the Western Desert, 1940. Sandshields have been fitted over front of tracks.

(RAC Tank Museum)

(Light) Bn with Mark V's came out from England but returned home in December. It again returned to Egypt in 1938 with Mark VIB's and together with the 6th Bn formed the Heavy Brigade of the Mobile (later to become the 7th Armoured) Division (The Desert Rats) in 1939. Two of the cavalry regiments which had been converted to light tanks, the 7th and 8th Hussars, became part of the division's Light Brigade. The brigades were subsequently reorganised with one heavy and one light regiment in each. But even in the so-called heavy regiments more than half the tanks were light. In September 1940 the division (now the 7th Armoured) was reinforced by the arrival in Egypt of the 2nd Bn Royal Tank Regiment and the 3rd Hussars. The reorganised brigades now consisted of: 4th

Armoured Brigade—2 RTR, 6 RTR, 7 Hussars; 7th Armoured Brigade—1 RTR, 3 Hussars; 8 Hussars.

Light tanks Mark VI of various models were in action with all armoured regiments of the 7th Armoured Division throughout 1940. Lacking gun power and adequate armour they proved a death trap and no tears were shed when they were replaced by Stuart tanks in 1941.

A.F.V. Series Editor: DUNCAN CROW

A battered Light Tank Mk. VIB still in use for training seen in company with a Grant in August 1942 at Catterick. The light tank, fitted with No. 19 set, is probably from 51st Training Regiment.

(Chamberlain Collection)



PROTOTYPE LIGHT TANKS

Experimental No.	Vehicle	Builder	Engine/BHP	Suspension	WD Number	Reg'd. Number	Remarks
A4 E1	Carden Loyd Mk VII	CSOF	Meadows EOC/60	Leaf spring	T 1022	MT	
A4 E2	Light Tank Mk I	CSOF	Meadows EOC/60	Leaf spring	T 491	MT 8784	3 return rollers
A4 E3	Prototypes	CSOF	Meadows EOC/60	Leaf spring	T 492	MT 8785	3 return rollers
A4 E4		CSOF	Meadows EOC/60	Leaf spring	T 493	MT 8786	3 return rollers
A4 E5		CSOF	Meadows EOC/60	Leaf spring	T 494	MT 8787	3 return rollers
A4 E6	Light Tank Mk IA	Vickers	Meadows EOC/60	Leaf spring	T 855	MT 9652	Some Mk IA prototypes later converted to Horstmann suspension.
A4 E7	prototypes	Vickers	Meadows EOC/60	Leaf spring	T 856	MT 9653	
A4 E8		Vickers	Meadows EOC/60	Horstmann	T 857	MT 9654	
A4 E9		Vickers	Meadows EOC/60	Leaf spring	T 858	MT 9655	
A4 E10		Vickers	Meadows EOC/60	Leaf spring	T 859	MT 9656	Double turret: superimposed .303 and .5 V. MGs—latter lowest.
A4 E11	Amphibious Light tanks	Vickers-Armstrong	Meadows EST/100	Leaf spring	T 985	MT 9779	
A4 E12			Meadows EST/100	Leaf spring	T 986	MT 9780	
A4 E13	Light Tank Mk II	V-A	Rolls Royce/66	Horstmann	T 873	MT 9675	3 return rollers
A4 E14	prototypes	V-A	Rolls Royce/66	Horstmann	T 874	MT 9676	3 return rollers
A4 E15		CSOF	Rolls Royce/66	Horstmann	T 885	MT 9687	3 return rollers
A4 E16	Light tank Mk IIA	CSOF	Rolls Royce/66	Horstmann	T 931	MT 9725	3 return rollers
A4 E17	Light tank Mk IIB	V-A	Rolls Royce/66	Horstmann	T 967	MT 9761	3 return rollers
A4 E18	Light tank Mk IIA	CSOF	Rolls Royce/66	Horstmann	T 954	MT 9748	3 return rollers
A4 E19	Light tank Mk IV prototypes	V-A	Meadows EST/90	Modified	T 992	MT 9783	
A4 E20		V-A	Meadows EST/90	Horstmann	T 993	MT 9784	
A5 E1 or L3	E1—experimental light tanks with 3 man crew. Mark V Light Tank	V-A	Meadows EST/90	Modified Horstmann	T 1203	HX 6960	This was the first official Mk V.

The information in this table supplied by the Director Royal Armoured Corps Museum is most gratefully acknowledged.

COMPARATIVE TABLE OF LIGHT TANKS

Light Tank (Crew)	Wt.			Engine BHP/RPM	HP/ton	Suspension	Max Spd		Armament		Armour		Remarks	
	(Tons)	L.	H.				mph	Rad m/s	M.G.'s	Amn. No of rounds	Max/Min	mm		
Mark I (2)	4.8	13'2"	6'1"	57"	Meadows 6 cylinder 58/2400	12.1	Two wheel bogies leaf spring. Rear idler wheel. 3 return rollers on hull.	32	160	1	.303	2,500	14/4	
Mark IA (2)	4.8	13'2"	6'1"	57"	Meadows 6 cylinder 58/2400	12.1	Horstmann suspension horizontal coil spring.	32	160	1	.303	2,500	14/4	4 sent to India for trials and fitted with non-revolving square cupolas.
Mark II (2)	4.25	11'8"	6'1"	6'9"	Rolls Royce 6 cylinder 66/—	15.5	Horstmann horizontal springs. Fitted Wilson pre-selector gear box.	30	125	1	.303	4,000	10/4	Mark II for India Meadows 58 bhp engine and mesh gearbox. Mark II A & B as Mark II but with reconstructed turrets. Mark I* and II*.
Mark III (2)	4.5	11'10"	6'1"	7'0"	Rolls Royce 6 cylinder 66/—	14.6	Horstmann with opposed inclined springs.	30	150	1	.303	4,000	10/4	36 of these tanks sent to Egypt to 6 Bn RTC.
Mark IV (2)	4.3	11'6"	6'10"	7'1"	Meadows 6 cylinder 88/2800	20.7	Horstmann-inclined springs parallel in bogies. No return roller or one on leading bogie.	36	125	1	.303	4,000	12/4	No rear idler was fitted.
Mark V (3)	4.8	13'0"	6'10"	7'4"	Meadows 6 cylinder 88/2800	18.3	Horstmann-inclined springs parallel in bogies. Return roller on leading bogie.	32	125	1	.303	2,500 400	12/4	Circular cupola.
Mark VI (3)	4.8	13'2"	6'10"	7'5"	Meadows 6 cylinder 88/2800	18.3	Horstmann-inclined springs parallel in bogies. Return roller on leading bogie.	35	125	1	.303 1 .5	2,500 400	15/4	All Mark VI's—Mark VI C were fitted with 2 one shot 4" smoke dischargers either side of the turret. Range 50 yds. Mark VI had a circular cupola.
Mk VIA (3)	4.8	13'2"	6'10"	7'5"	Meadows 6 cylinder 88/2800	18.3	Return roller on hull.	35	125	1	.303 1 .5	2,500 400	15/4	An octagonal cupola was fitted.
Mk VI B (3)	5.2	13'2"	6'10"	7'5"	Meadows 6 cylinder 88/2800	16.9	Return roller on hull.	35	125	1	.303 1 .5	2,500 400	15/4	A circular cupola was fitted.* Only one cooling louvre on radiator cover plate.
Mk VI C (3)	5.2	13'2"	6'10"	7'5"	Meadows 6 cylinder 88/2800	16.9	Return roller on hull.	35	125	Besa M.G.'s 1 7.92mm 1 15mm	2,500 400	15/4	No cupola. Periscope in conical shaped hatch.	

*Mark VI B's for India had no cupola. A periscope was provided for the commander in a conical shaped hatch.

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