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CRUSADER-CRUISER MARK VI

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A Crusader II CS with 3 inch Howitzer on the ranges, showing the degree of movement of the independently sprung road wheels which permitted fast and stable cross country mobility. (I.W.M.)

Crusader-Cruiser Mark VI By Major James Bingham

THE aim of Operation "Crusader" in November 1941 was to relieve Tobruk which had been besieged by the German and Italian forces since April, and to drive the enemy out of Tripolitania. The main obstacle in the way of the British forces was Rommel's Afrika Korps, and the immediate object was the destruction of his armour in the major tank battle that was expected. After making a wide sweep through the desert, 7th Armoured Brigade was directed on to the airfield at Sidi Rezegh, 15 miles from the Tobruk defences and, as the Crusaders of 6th Royal Tank Regiment raced up to the surprised airmen, three fighters took off. Nineteen aircraft were captured. The divisional Support Group of infantry and artillery came up next morning to reinforce the position, and the fighting which ensued during the next three days

"was the fiercest yet seen in the desert. Round Sidi Rezegh airfield in particular the action was unbelievably confused, and the rapid changes in the situation, the smoke and the dust, the sudden appearance of tanks first from one direction and then from another, made great demands on the junior leaders."*

No less than three Victoria Crosses were won there in the Support Group.

Combined with a break-out from Tobruk, the Support Group and Crusaders made an attack on the escarpment north of the airfield. As the Crusaders moved down into the valley beyond, they came under fire from very strong enemy gun positions and

suffered heavy losses. The remnants retired to support the infantry and artillery where they were soon engaged in repelling repeated German tank attacks supported by dive bombers. When the Crusaders had been reduced to seven only, they were reinforced by a squadron of the older cruiser tanks and this small force endeavoured, with further losses, to hold the enemy off. Throughout, the legendary Brigadier "Jock" Campbell, commander of the Support Group, was in action with the guns and the tanks, inspiring his dwindling force. On the third day the 22nd Armoured Brigade, now reduced to some 80 Crusaders, came up to find the field artillery concentrated on the edge of the airfield, firing over open sights against a concentrated German/Italian attack by 150 tanks. The Crusaders attacked in line abreast through the guns but, at this stage, all they could do was to prevent the enemy armour routing what remained of the force.

"The Regiments fought magnificently and though greatly outnumbered and out-ranged, fought on and never gave the Germans an opportunity to close with the Support Group or the artillery."**

DEVELOPMENT AND PRODUCTION

The Crusader was the last of the pre-war designs of cruiser tank to see action and it was a development which started in 1936 from a prototype design by the American J. Walter Christie. A War Office party

* *History of the Second World War—The Mediterranean and Middle East.* (H.M.S.O.)

** *Maj. Gen. G. L. Verney. The Desert Rats—History of the 7th Armoured Division.* (Hutchinson.)



An A9 carrying the kit and bedding for a crew of six, in the days when sun helmets were still officially necessary for health in the heat of the desert. (I.W.M.)



The A9 E2, mounting Vickers MGs in two forward sub-turrets. (R.A.C. Tank Museum)

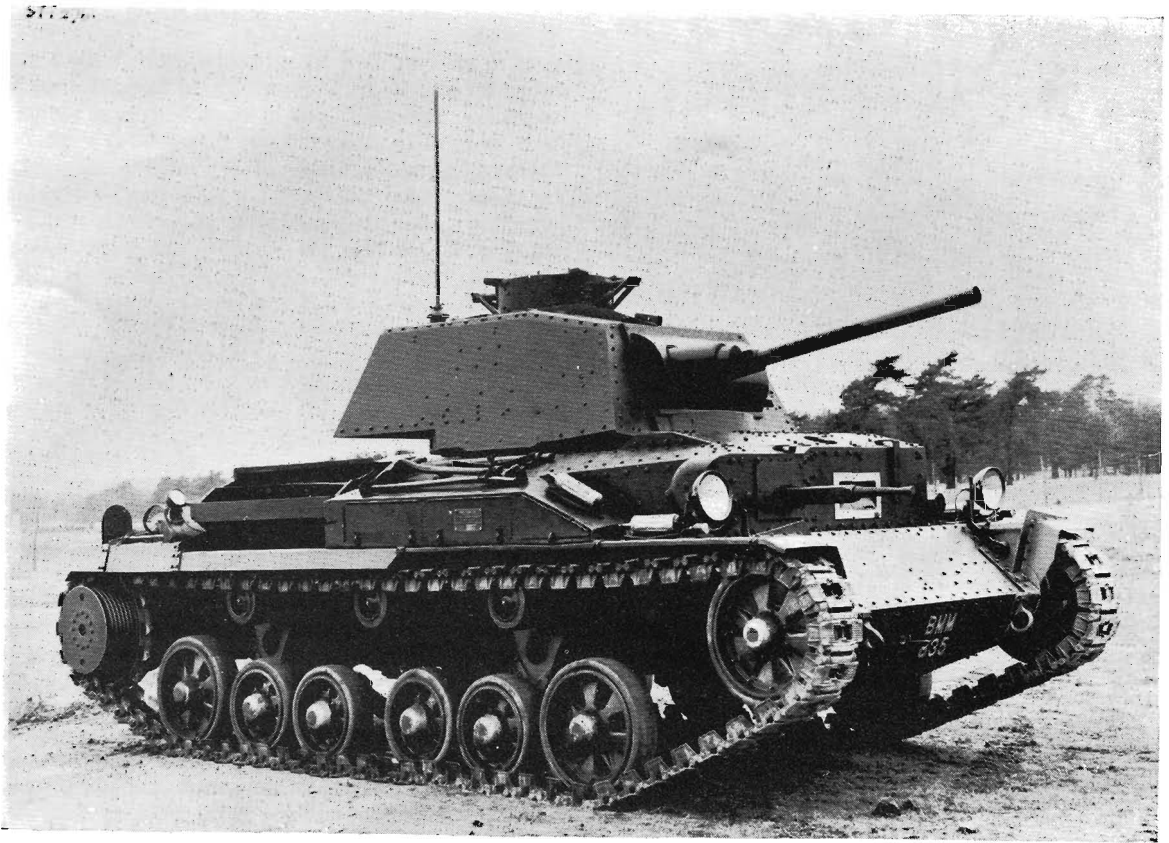
under Major-General Wavell had visited Russia during the summer manoeuvres in 1936, and had seen the *Bystrokhodnii* tanks which were most impressive on account of their speed and mobility, due in great part to the suspension developed from a prototype of the Christie tank. In the following October War Office permission was given to buy the Christie 1932 prototype from America for development of a fast British medium tank, and Lord Nuffield agreed to act as agent in buying the vehicle and patent rights. The tank arrived in November, crated and described as a “tractor” to satisfy suspicious Customs authorities; it was then officially designated A13 E1, and running trials started at once.

But one must go back a little further still in describing the growth of the “cruiser” family of tanks. During the late 1920’s and early 1930’s, revolutionary concepts of armoured warfare were being evolved in the Tank Brigade in Britain, requiring mobile forces equipped with fast tanks that could strike into the enemy’s rear areas; medium tanks—or “cruisers”,

following the simile of a Fleet action—were to be the main striking force. These concepts, however, received grudging official support when conventional ideas predominated in the General Staff, expecting tanks to be used in slow-moving waves in support of the infantry assault. The conflict of views led to the development of two classes of tank—the slow, heavily armoured “infantry” tank, and the “cruiser” for mobile operations. Even so, money for development of either type was strictly limited, and first priority in tank production was to support peace-keeping operations in “colonial type” wars for which the light tanks were more suitable. It was not until Mussolini’s campaign in Abyssinia in 1935 revealed the threat of war against the Axis powers in the Middle East and Europe that the purse strings were loosened. It became imperative to replace the medium tanks of the type that had been in service since 1923. But with no clear General Staff direction upon what was wanted, with a very small design staff and few designs under development, it would take time to achieve production

An A9 of the 1st Royal Tank Regiment in Egypt in 1940, with sand guards over the tracks for desert operations. (I.W.M.)





The A10 prototype modified with dummy Besa MG in front hull mounting. See picture below right for same prototype unmodified (R.A.C. Tank Museum)

in quantity. Inevitably, production tended to follow the use of known components, without time for major re-design or extensive trials, and at the outbreak of war only 77 of the new cruisers were in service.

A9, CRUISER MARK I

In February 1934 Sir John Carden of Vickers Armstrong was asked to design a reasonably cheap tank to replace some of the mediums, and a pilot model appeared in April 1936 as the A9 E1. It carried only 14 mm. of armour, but it had a speed of 25 m.p.h. and mounted the new 2 pdr. (40 mm.) high velocity gun with a good anti-tank performance. The A9 was not

entirely satisfactory. There were problems with gun fumes, and the suspension gave an uncomfortable and unstable gun platform over rough ground, but in July 1937, after competitive trials against other designs immediately available, the A9 was selected for limited production (125) to meet an urgent but interim need as Cruiser Mark I. First deliveries appeared in January 1939 and the tank saw action in France and the Middle East.

The A9 was a notable advance in one respect in that it was the first to have a powered traverse, the Nash and Thompson hydraulic system which was similar in operation to the Frazer-Nash equipment then being developed for the Vickers Wellington bomber. This

The A10 in desert camouflage. The signalling lamp raised through the roof was similar to one mounted on the Matilda infantry tank. (I.W.M.)



The A10 E1, with dummy guns in the turret and no place for any machine-gun in a hull mounting. (R.A.C. Tank Museum)



A10, CRUISER MARK II



A13 E2, with a heavier hull than the original Christie 1932 prototype, but running on the same type of track. (R.A.C. Tank Museum)

Also in 1936 the pilot A10 appeared from Vickers to a basically similar design but with 30 mm. armour in answer to a demand for a more heavily armoured tank to fight in close support of infantry. With the same engine, and a weight of 14 tons, the A10 had a maximum speed of 16 m.p.h. The added armour protection was provided by attaching extra plates—the first British example of composite armour construction. However, by 1937 it was realised that this armour was insufficient for the role of infantry support, and next year the A10 went into limited production (170) as an interim “heavy” cruiser. First delivery arrived in December 1939, and this basic design was later used by Vickers in development of the Infantry Tank Mark III, Valentine.

A13, CRUISER MARK III AND IV



A13, Mark II, Cruiser Mark IV, the up-armoured version of A13 with spaced armour on the turret. This mark carries the Vickers machine-gun. (I.W.M.)

Neither A9 nor A10 were regarded as fast enough for the cruiser role in the Mobile Division and great hopes were placed upon the development of the Christie tank. The chief merits of this design lay in the suspension, allied to a light but powerful engine which would give a satisfactory power/weight ratio, but the hull of the prototype would have to be enlarged to meet British ideas for the fighting compartment. Two pilots of this project, known as A13, were designed and produced by Nuffield Mechanisations and Aero, Ltd, a newly created armaments firm, and the first was delivered in October 1937, only ten months after the order had been given. These machines were over 2 tons heavier than the original Christie because of the increased armour (14 mm.) and the need to carry a 2 pdr. gun, and these factors, plus inherent defects in the engine and transmission, required extensive re-design and modifications. The initial trials were

same system was adapted for all the British cruisers up to Cromwell, and for the Infantry tanks Matilda and Valentine.

A13s, Mk IIA, of the 5th Royal Tank Regiment taking cover beside a hedge in France, 1940. On the side of the turret are the smoke dischargers which projected a 4-inch smoke canister about 150 yards. The furthest tank is a Mk I, without the extra armour on the turret. Mk IIA mounted the Besa machine-gun. (I.W.M.)





An A13, Mk IIA, of the 2nd Royal Tank Regiment in the desert. A later version with an external gun mantlet. (I.W.M.)

encouraging but the pilot models suffered many teething troubles. Despite this a production order was given in January 1938, and in December the first deliveries were made of A13 Mark I, as Cruiser Mark III. It was a remarkable achievement in two years from the order for pilot models of a completely new design. To meet the need for 30 mm. armour, a second mark of A13 was then produced as Cruiser Mark IV, but despite the extra weight it could still attain a speed approaching 40 m.p.h. Production of the A13 was also taken up by the L.M.S. Railway, English Electric, and Leylands, and by the time manufacture ceased in 1941 a total of 665 had been made of these two marks.

The A13 was looked upon as a "light" cruiser needing the support of a more powerful "battle" tank, and in April 1937 a specification was drawn up for a "heavy" cruiser as an entirely new medium tank. It was to have a 2 pdr. gun in the main turret plus three machine-guns in sub-turrets, 30 mm. armour, a cross-

Polish soldiers in Scotland being instructed on the Christie suspension of a Covenanter I. The assembly was mounted on the hull side, protected by the outer skin of armour plate. (I.W.M.)



country speed of 25 m.p.h. and to weigh about 25 tons; but the projects started under this specification (A14 and A16) proved to have no material advantage over the up-armoured A13.

A13 MARK III, CRUISER MARK V, COVENANTER

A third mark of A13 was then used as the basis for a new "heavy" cruiser project under the Mechanisation Board in conjunction with the L.M.S. Railway (hull), Meadows (engine), and Nuffields (turret); the new tank was to have the same A13 suspension in a lower hull, with a Meadows flat horizontally opposed 12-cylinder engine, and the radiator in the front beside the driver. An important innovation was the Wilson epicyclic steering gears which provided more efficient and flexible steering than the simpler clutch and brake systems used on earlier tanks. The Wilson epicyclic



A Covenanter I, in which the crew are wearing the protective helmet introduced in the early part of the war but which was seldom, if ever, worn in action. (I.W.M.)

Covenanter I, followed by Mark II's. The driver's hatch on Crusader was made to open in two halves, so that the forward part could be opened in any position of the turret. (I.W.M.)





Covenanters of 'C' Squadron, 15th/19th The King's Royal Hussars at Ashridge, Herts., July 1941. The nearest is a Mark II. The 15th/19th at this time formed part of 28th Armoured Brigade, 9th Armoured Division. (I.W.M.)

steering units were also fitted in the next mark of cruiser, the Crusader, and later in the Cavalier.

In the haste to produce tanks in quantity, the new design was accepted in April 1939 for production without trials of a pilot model, and a "drawing board order" for production was placed. Deliveries began in the summer of 1940 as Cruiser Mark V, which was later named Covenanter. As trials progressed on the first production models a major weakness was found in the engine cooling system, and tanks were modified in a re-work programme at service workshops and factories. Covenanter Mark II appeared with service modifications to improve the cooling. A third mark then incorporated a new design of air louvres and some internal changes. Finally, Covenanter Mark IV

was produced as a new machine which embodied the improved features of Mark III. Production was given to the L.M.S. Railway, English Electric, and Leylands, who turned out a total of 1,365 Covenanters before manufacture ceased in January 1943.

A15, CRUISER MARK VI, CRUSADER

Meanwhile Nuffields, who had been involved in the development of Covenanter, put forward a proposal in mid-1939 to develop their own version of a "heavy" cruiser from the A13, rather than manufacture Covenanter. This had the advantage of using their own Liberty engine and gearbox, which would minimise

Winston Churchill inspecting the 9th Armoured Division in May 1942, accompanied by Major-General B. G. Horrocks, riding on a Covenanter III of the 4th/7th Royal Dragoon Guards, 27th Armoured Brigade. The Australian Minister for External Affairs, Dr. H. V. Evatt, is on the second tank. The panda's head, formation sign of 9th Armoured, is in the centre of the front plate. The 27th Armoured Brigade was later under command of 79th Armoured Division. (I.W.M.)





Covenanter IV in September 1942, showing air vents in the hull side below the track guard. The air louvres were similar to those on Mark III but the front stowage bins were removed and others mounted on the turret sides. (I.W.M.)



The Covenanter III Bridgelayer could lay, and recover, its Scissors Bridge over a 30 ft. gap for a tracked vehicle load of 30 tons. (I.W.M.)

delays when their production of A13 ceased. As design project A15 it was accepted, and in August 1939, just before the outbreak of war, an initial order was placed without pilot trials. (This designation A15 must not be confused with another and entirely different project for a "heavy" cruiser which was given the same number in 1937. That project did not go beyond design stage.)

The new tank retained the basic engine layout of the A13 Mark II, and mounted an auxiliary machine-gun turret beside the driver, but it incorporated many features of the Covenanter. The hull, however, was lengthened slightly and an extra pair of road wheels was mounted to carry the extra weight and to reduce the ground pressure. In armour protection the new cruiser would have a basic 40 mm. on the front but in mid-1940, even before the first model appeared, demands were made for an increase. This led to the production of Crusader Mark II with 50 mm. armour on the front but identical in other respects.

Initially the armament had included a Besa machine-gun mounted in front of the driver's hood, but in mid-1940 it was decided to abolish this; a revolver port was fitted in its place. During firing trials at the end of 1940 the auxiliary turret was found to be unsafe because of the very small space and the lack of ventilation, and it was recommended that the auxiliary turret be removed. There was some confusion in the plans for removal, since the tank was well advanced in production, but in practice it was removed from many Crusaders I and II on active service and it disappeared completely from the Crusader III.

The Crusader had been designed to carry the 2 pdr. gun, which was accepted as adequate until experience in France in 1940 emphasized the urgent need for development of the 6 pdr. (57 mm.) as a tank weapon. In fact, the Director of Artillery had anticipated the General Staff in 1938 by initiating the design of a 6 pdr. anti-tank equipment which was accepted in March 1940, generally to replace the 2 pdr. Trials of the gun started in the summer of 1940 but it was not

The Anti-Mine Roller Attachment, mounted here on a Covenanter, consisted of a framework carrying spring-mounted and castoring rollers wide enough to cover the track path of the tank. (I.W.M.)





Crusader prototype which mounted a Besa machine-gun in the front of the driver's hood. This gun was removed and a revolver port fitted in place. (R.A.C. Tank Museum)

until the end of 1941 that first delivery could be made from production for both field and tank mountings. No action was taken initially to mount the 6 pdr. in Crusader because a new cruiser, Cavalier, was to be designed for the purpose, to coincide with delivery of the gun. However, after unforeseen delays with Cavalier, Nuffields were eventually asked in September 1941 to re-design the Crusader turret for 6 pdr. This was quickly done and deliveries of Crusader III were made in May 1942.

The A13 had its mechanical troubles and Crusader inherited many, plus those in new components common to the Covenanter, which were not eradicated until much later when the tank was almost obsolescent. But, a total of 4,350 gun tanks were produced, plus 1,373 in special roles, and Crusader became the standard British tank of the armoured brigades in action until replaced by the American Grants and Shermans.

DESCRIPTION OF CRUSADER

All three marks of Crusader were generally the same, the main differences being in the thickness of armour and the new 6 pdr. turret in Crusader III. The hull was formed by a structure of hardened steel plates to which the homogeneous armour plate was bolted, the whole being braced by three transverse bulkheads and by the cross-tubes through which the suspension axle arm shafts stretched right across the floor. The suspension assemblies were mounted on the hull sides in a space between the inner and outer plates. The bulkheads divided the hull into four compartments, the two at the rear containing the engine and transmission which drove the rear track sprockets. The crew of five were in the two forward compartments.

The driver sat on the right of the front compartment, under a raised hood, separated from the front gunner by a partition with access hole. The gear change lever was between his knees and steering levers on either side were mounted above the compressed air steering control valves. Normal accelerator, brake



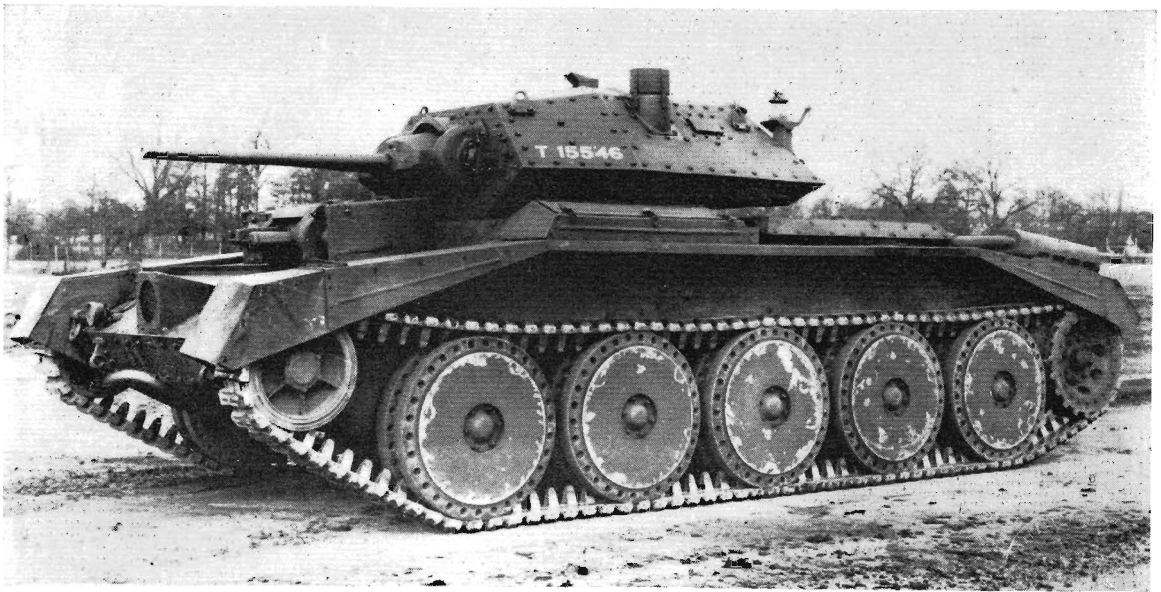
Front view of Crusader. (I.W.M.)

and clutch pedals provided driving controls, and a parking ratchet connected to the foot brake held the brakes on for parking. Armoured and prismatic visors were mounted on an outward opening door on the front plate of the driver's hood; the prisms could be quickly changed if damaged but, if necessary, the driver could raise the armoured visor over the aperture to see through narrow slits. A revolver port was fitted to the right of the visor, and on the right side of the hood was a shutter-type look-out. The front gunner was enclosed in the small auxiliary turret mounting a Besa machine-gun which could be traversed through 150° by handwheel. When closed down, the gunner had no vision apart from the telescopic sight. Where this turret was removed, the space below was used for storage of kit and extra ammunition. The unsatisfactory nature of the auxiliary turret led to development of the ball-mounted Besa in the straight front which later appeared in the Cavalier and Cromwell.

The turret was polygonal in shape, formed by welded, hardened steel plates to which the outer armour plate was bolted. The following description of the turret arrangement applies to the Crusader I and II, and material differences in Crusader III will be

Crusader, showing a view of the top deck of the hull with hatches, fuel tank, and auxiliary turret. (R.A.C. Tank Museum)





Test model of Crusader I, which had the A13 type of gun mantlet. The bulbous external mantlet came later, but both types are found on Crusader and Covenanter. Note the hinged aerial base at the rear of the turret, used with the No. 9 set. (R.A.C. Tank Museum)

outlined later. The turntable suspended from the turret carried the crew of three, commander, loader/wireless operator and gunner.

The commander sat in the centre, behind the gun, with a single, standard rotating periscope mounted in the roof for vision. Additionally for the commander there was a look-out with triplex block on each side of the turret. Vision for the gunner was provided by a shutter type look-out in the turret front plate, whilst the loader/operator had a periscope in the turret roof. A single blade vane sight for the commander was fitted on the front edge of the turret roof to help direct the gunner who sat on the left of the co-axially mounted 2 pdr. and Besa guns.

The guns moved freely in elevation under shoulder control and were fired mechanically from trigger grips in the right hand. Traverse was by the left hand,

The Commander-in-Chief Home Forces, General Sir Bernard Paget, following the progress of a major armoured exercise in September 1942 from the turret of a Crusader. (I.W.M.)



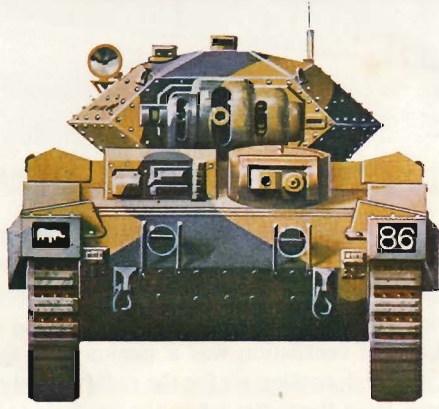
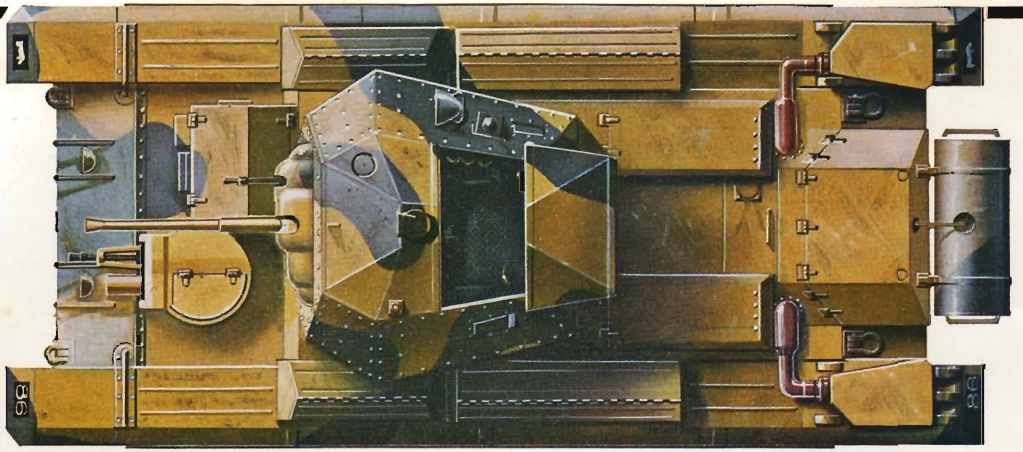
either by spade grip on the powered traverse or by handwheel. Under power the turret could be rotated completely in 10 seconds as well as controlled for fine-laying on the target.

Lack of ventilation was a weakness in this turret, even though cooling air for the radiators was partially drawn from the turret when the engine was running; space was made for air to be drawn under the back of the roof door when closed down, but this was not sufficient and an extractor fan was fitted in Crusader III above the guns. Besides attending to both guns and the wireless set, the loader/operator also controlled the 2-inch bomb thrower, which was mounted on the right of the turret front plate but independently of the main gun mounting.

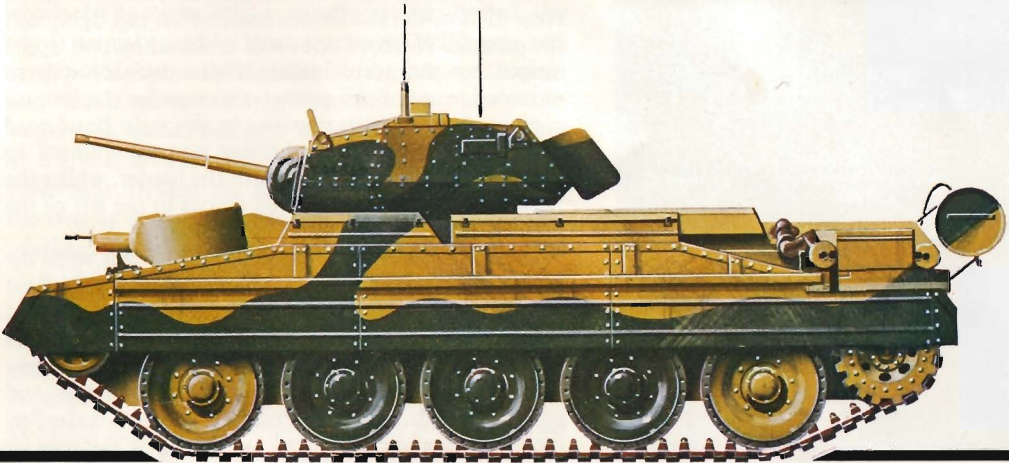
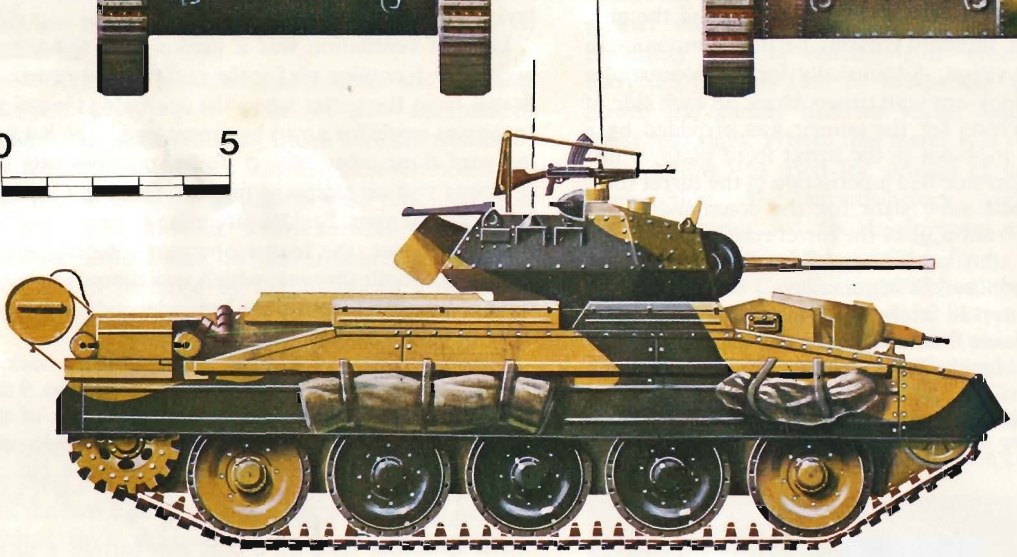
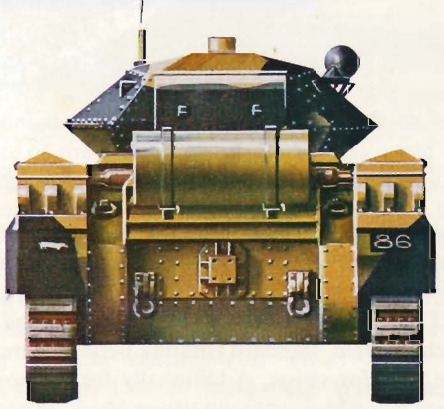
The wireless set was fitted in the bulge at the back of the turret and in earlier models this was the No. 9 set, with a single aerial on a bracket at the back of the turret, providing communication on a single net. However, the majority of Crusaders had the No. 19 set which consisted of two sets ("A" and "B") with two separate aerial bases on the roof.

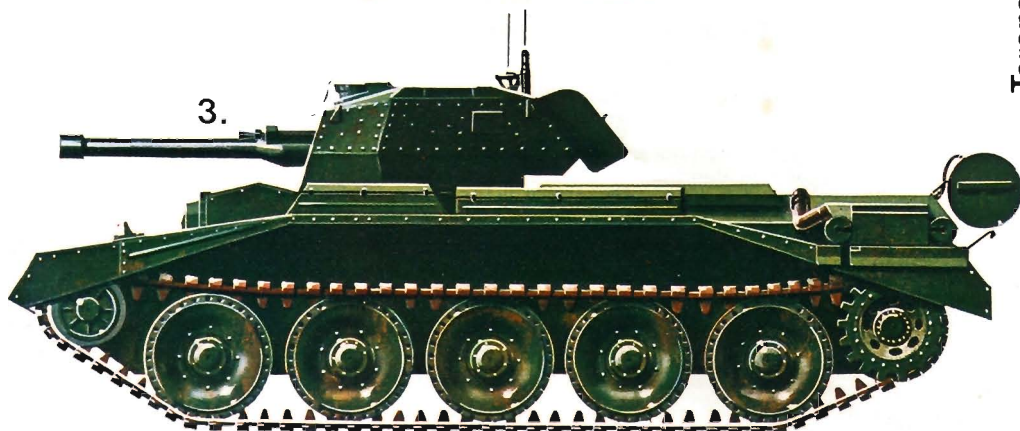
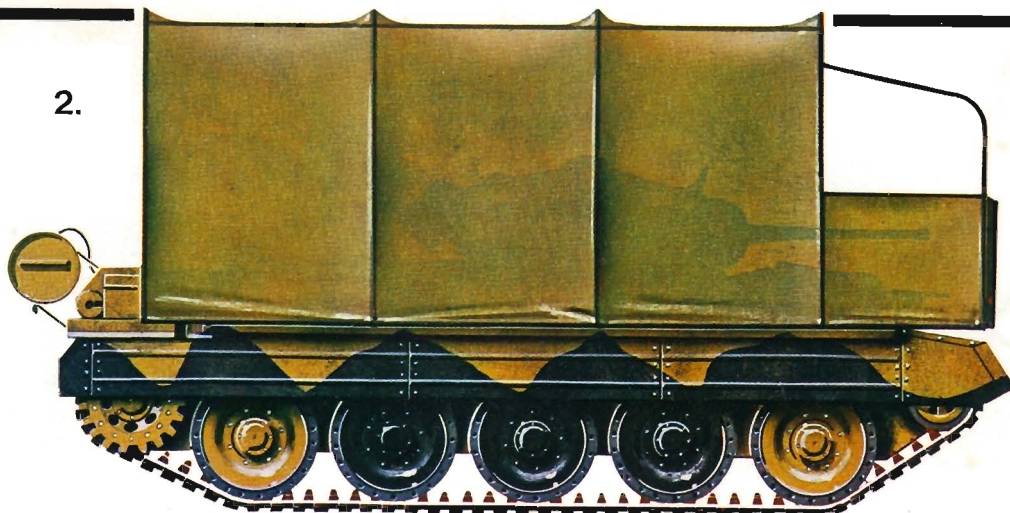
The Crusader III with 6 pdr. gun carried a turret crew of two, the loader/commander on the right, and the gunner. The roof door was replaced by two doors hinged on the turret sides. Three periscopes were mounted, one for the gunner and two for the loader/commander of which one was in the right hand roof door. The 2-inch bomb thrower was re-mounted to fire through the roof, forward of the loader, whilst the Besa machine-gun was moved across to the left of the main gun.

On both sides of the engine compartment were the fuel tanks, against the hull sides, and between them and the engine were two radiators housed almost vertically. Two chain-driven fans, mounted in the bulkhead at the rear of the engine compartment, drew cooling air through louvres above the radiators and partly from the turret. In addition to the main fuel tanks, an auxiliary fuel tank was fitted at the rear; it



1.





1. Crusader II with auxiliary sub-turret, of the 9th Queen's Lancers, 1st Armoured Division. The 9th Lancers arrived in the Western Desert in December, 1941.

2. Crusader in desert disguise. The "Sun Shield" as it was called was a cage of hessian covered tubing intended to make the tank resemble a large lorry at a distance.

3. Crusader III (6 pounder) of 6th Armoured Division in Tunisia where it retained its U.K. camouflage.

4. Formation Signs of Armoured Divisions that fought with Crusaders in North Africa, from left to right:- 1st, 10th, 6th and 7th.

4.





Crusader patrol in the desert. The pennants on the aerials were fixed in different positions each day for identification purposes. (I.W.M.)

could quickly be jettisoned by hand controls from the fighting compartment. Oil bath air cleaners for the carburettors were mounted externally at the rear end of each track guard. To combat fire in the engine and transmission compartments, distributor nozzles were connected to a Pyrene carbon dioxide cylinder in the fighting compartment; the system was released manually.

The Wilson epicyclic steering units were mounted on each end of the gearbox, designed with two brake bands and gear trains to "drive" and "steer". Use of the "steering" gear train, in effect, meant changing gear down for that track and so permitting gradual turns with power to both tracks, but for sharp, skid turns a positive brake was applied to the appropriate track through the main brake drums. Control of the brake bands on steering units and main brake drums was by compressed air which was supplied by a compressor system mounted on the front of the engine.

This system was of vital importance because the tank could neither be moved nor steered if the air supply failed.

Compressed air was stored in a cylinder at the front of the engine compartment and delivered to the control valves operated by the driver's steering levers. The foot brake pedal operated mechanically on both main brake drums simultaneously, but this did not have the power of the pneumatic steering controls.

The tank crews' cooking arrangements were simple but quick to prepare the evening meal before bedding down beside the tank. (I.W.M.)



The suspension was adapted from the original Christie design which provided a fast and stable gun platform. Crusader could not attain the speed of the A13, being nearly 5 tons heavier and powered by the same engine, but the Christie suspension was again to prove itself at speed in the Cromwell.

One external feature was the Lakeman anti-aircraft mounting. It was a simple detachable device mounted on a spigot on the left side of the turret, with springs to balance the weight of the Bren light machine-gun suspended from hooks.

CRUSADERS IN SPECIALIST ROLES

Although Crusader was mechanically unreliable at first, the main faults were overcome in the production of later versions of specialist vehicles for which there was no other chassis available. Some of these saw action in North-West Europe in 1944:

CRUSADER COMMAND TANK

To provide more space for working in command tanks at brigade or divisional headquarters, and for more wireless sets, the turret guns were removed and replaced by a dummy gun to retain the same general appearance. Otherwise these were normal gun tanks.

A heavy lift for a radiator change on a Crusader II from the regimental Light Aid Detachment. (I.W.M.)



CRUSADER III (OP)

These served as observation posts in artillery regiments supporting armoured units equipped with Crusader; the 6 pdr. gun and mounting was removed and replaced by a dummy; the Besa machine-gun was retained for protection. For communication to infantry and armoured units, one No. 18 and two No. 19 sets were carried in the turret with cable reels, extra batteries and auxiliary charging engine in the forward compartment beside the driver. Identification is possible through the extra aerial on the turret and the auxiliary engine silencer on the front hull roof plate.

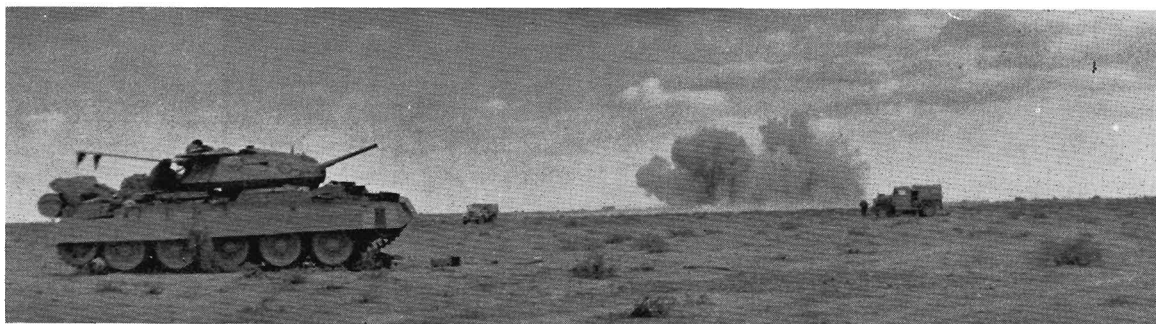
CRUSADER III ANTI-AIRCRAFT

Three versions were issued, each with three-man crew. Mark I with 40 mm. Bofors was issued to artillery units; this had hydraulic powered traverse driven by a small two-stroke engine in the fighting compartment and controlled by joystick from the gunlayer's seat. The gun could also be controlled by hand in independent traverse and elevation, but the handles were normally removed. Marks II and III were issued to anti-aircraft troops of armoured units and mounted twin Oerlikon (20 mm.) with co-axial gas-operated



A Crusader I towing a captured SP 15 cm. howitzer Lorraine Schlepper (SdKfz 135/1), a German conversion of the French Lorraine tractor. (I.W.M.)

Vickers machine-gun for ground protection; hydraulic powered traverse was adapted from the normal tank arrangement. In Mark III the wireless set was moved from the turret to the left forward compartment where it was operated by the driver, and the turret was extended to give more room for the commander/gunner in the rear of the turret.



The No. 9 set aerial base was made to hinge back so that the aerial and pennants would be less conspicuous in action. The white, red, white stripes on the nose, for recognition, were dropped later. (I.W.M.)

Tank casualties in the desert were heavy, either from enemy action or from breakdowns. Quick recovery for repair during the battle was vital. A Crusader I with No. 9 set. (I.W.M.)





Crusader II moving with Shermans along a well-used track. (I.W.M.)

CRUSADER ARMoured RECOVERY VEHICLE

The A.R.V. was based on the Crusader hull, fitted with tools and equipment for front line repairs and recovery, and with a jib crane for lifting major assemblies. Twin Bren A.A. machine-guns could be mounted in the space of the fighting compartment. One A.R.V. was normally deployed to each squadron.

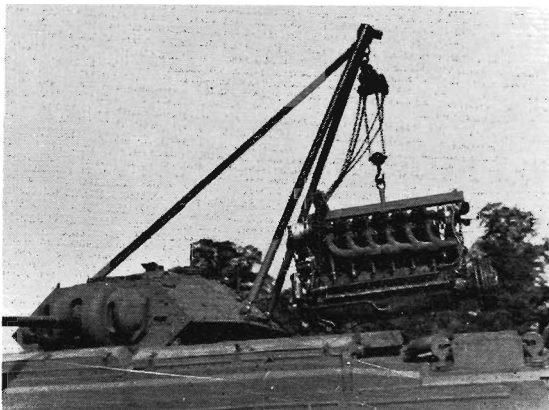
CRUSADER GUN TRACTOR

This was designed to tow the 17 pdr. anti-tank gun, with a completely new arrangement of the hull carrying a crew of eight and 40 rounds of 17 pdr. ammunition. The 17 pdr. gave the British forces a weapon which could defeat the Tiger and the Panther, and this gun tractor was reported as mechanically reliable and a success in Normandy in 1944.

CRUSADER BULLDOZER

This had the dozer blade attached by arms to the side of the tank, suspended from a jib and controlled by a

The Atherton Jack fixed to the Crusader turret to lift out the engine. (I.W.M.)



winch in the fighting compartment. The turret was removed.

EMPLOYMENT OF THE EARLY CRUISERS

COVENANTER

The Covenanter was not a success as a fighting vehicle. There was a host of minor defects, particularly affecting the compressed air system which controlled the transmission and steering, and many of the parts needing repair and maintenance were almost inaccessible. The engine cooling system, however, was the main weakness and this restricted the tank's use to temperate areas only until Mark IV was produced. But by then the Crusader was in full production for the battles in the Middle East. Covenanter stayed at home, where it was extensively used as a training vehicle in the re-

In the desert fighting superstructures to disguise cruiser tanks as lorries were widely used, to be discarded in the final stages of the approach march. To complete the illusion the centre roadwheels were blacked out. (I.W.M.)





Crusader II Close Support in a tank column with Shermans moving up at El Alamein. This tank has had extra armour plates bolted on the glacis and nose plates, an unusual addition. (I.W.M.)

equipment and build-up of forces after the losses on the Continent in 1940.

The need for more armoured formations was urgent, whether in preparation for future offensives in Europe or the Middle East, or in defence of Great Britain against the very real threat of invasion. During the next three years the Covenanter was widely deployed in the re-equipment and training of many units converting to the new tactics of armoured warfare, from the 1st Polish Armoured Division in Scotland, to the 9th Armoured Division on the East Coast, to the Guards Armoured Division in the South. Regimental histories write of the value gained from training with the Covenanter and, in overcoming its maintenance problems, of their preparation for more

difficult situations later. Tank crews at the time did not take such a dispassionate view as they struggled to keep their machines fit. But, for all its defects and the mistakes in the hurried production of the tank, Covenanter temporarily filled a vital gap in the build-up and training of new armoured forces.

In the development of mine-clearing devices, the Anti-Mine Roller Attachment was fitted to the Covenanter, as well as to other tanks of that period. It consisted of heavy rollers carried on a frame and positioned so that they covered the track path of the tank, but the device was not an operational success.

The Covenanter Mark IV Bridgelayer, however, was a more promising development, with a Scissors Bridge of the same type as that mounted on the Valentine. It could bridge a gap of 30 ft. and carry a tracked vehicle load of 30 tons. Like the other Covenanters it was used for training and was not called upon for operational use by British forces, but it was used by the Australian Army against the Japanese in 1945. There are at least two recorded instances of the Covenanter Bridgelayer being used in jungle operations on Bougainville Island in support of the Matildas of 2/4 Australian Armoured Regiment.

Not an impressive fighting record for the Covenanter but, at least, it was represented on the battlefield before the end.

A9, A10 AND A13

The other cruiser tanks in production before the war were generally known by their numbers and had no type names. They went into battle in France and the Middle East in 1940 and provided the main striking power of the armoured divisions until replaced by the

The dreaded 88 mm. Flak gun. A First Army Crusader in Tunisia passes one that has been silenced. (I.W.M.)



Crusader. In my own experience with A13s in France and with A10s and A13s in the Western Desert, these cruisers were, in their time and in the balance of gun-power and armour, the equal in quality with their German opponents—Pz Kpfw III and Pz Kpfw IV. The weakness in France lay in numbers, when two armoured brigades of 1st Armoured Division with a total of about 150 hastily issued A9s and A13s landed at Calais and Cherbourg in May in an attempt to check the German *blitzkrieg*. At Calais all were lost but some of the cruisers and light tanks south of the Somme returned to England after a series of long and tiring moves that ended in a grim race for Cherbourg against Rommel's 7th Panzer Division.

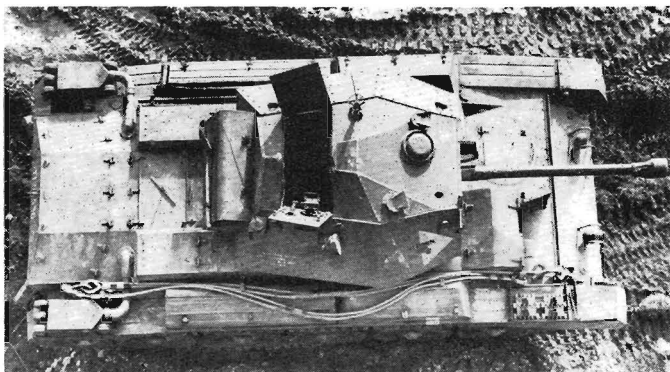
In Egypt the 7th Armoured Division was then reinforced to provide each armoured regiment with a balance of cruisers (A9, A10 and A13) and Light Tanks Mark VI. The balance was achieved in different ways and when the 3rd The King's Own Hussars arrived with a full complement of light tanks, one squadron was exchanged for an A10 squadron from the 2nd Royal Tank Regiment which had all cruisers.

In General Wavell's campaign against the Italians in Libya the division struck fast and wide through the desert to hold the ring during December 1940 and January 1941, whilst Matilda tanks with 4th Indian Division broke into the forts at Sidi Barrani and supported the 6th Australian Division in capturing Bardia and Tobruk. Then, striking across 240 miles of desert in Cyrenaica, 7th Armoured Division with only 39 cruisers in action caught the retreating Italians at Beda Fomm and completed the annihilation of the Italian Tenth Army.

Against Rommel's Afrika Korps in 1941 the same cruisers continued the fighting alongside the Matildas in Tobruk, and provided the mobile striking force of 7th Armoured Division in the battles on the Egyptian frontier until replaced by Crusader. The A9 and A10 were the first to go but in General Auchinleck's offensive to relieve Tobruk in November 1941, the A13s still formed half the strength of 7th Armoured Brigade. In the fighting at Sidi Rezegh and in the days that followed, the A13 made a gallant departure from the battlefield.

TACTICAL EMPLOYMENT OF CRUSADER

Crusader first went into action in June 1941 on the western frontier of Egypt, in the abortive operation "Battleaxe" aimed at the relief of Tobruk. The tanks had been shipped in the "Tiger" convoy which had been fought through the Mediterranean in May with urgent reinforcements of tanks, aircraft, and ammunition, and Winston Churchill expected good use to be made of his "Tiger Cubs". In the event there were delays in preparing the tanks for desert operations and in training the crews, and only one regiment of Crusaders was ready in June to fight beside the A9s and A13s in 7th Armoured Brigade. Much was expected of the new cruiser tank, but the attack was shattered against the skillfully deployed and concealed anti-tank guns. It was the first major confrontation between British and German tanks and many were the



The re-designed turret for the 6 pdr. gun in Crusader III provided two sideways opening hatches in the roof. The 2-inch bomb-thrower was positioned to fire through the roof, and an extractor fan was mounted above the guns. (R.A.C. Tank Museum)



Front view of Crusader III. This particular tank is now in the R.A.C. Tank Museum.

complaints afterwards about unreliable tanks which mounted a 2 pdr. gun that could do no damage at the ranges they were themselves receiving punishment from the enemy. The criticisms were not, however, entirely justified in comparison with the German tanks; the Pz Kpfw III with short 50 mm. gun held

Crusader III crossing an anti-tank ditch at Mersa Matruh in the advance after El Alamein, November 1942. (I.W.M.)





A Crusader III of the 6th Armoured Division on the Bou Arada road in Tunisia, wearing the green camouflage of the Anglo-American forces in the fighting during the winter of 1942/43. (I.W.M.)

no advantage in range over the cruisers, and the low velocity 75 mm. gun on the Pz Kpfw IV was not a "tank killer", even though it could shell the British tanks at longer ranges. The main cause of the British tank casualties was the 88 mm. Flak gun, sited and used in the anti-tank role, and the new 50 mm. Pak 38 anti-tank gun.

In the next major action in November 1941, operation "Crusader", the cruiser tank strength was increased by the arrival of three yeomanry regiments in 22nd Armoured Brigade fully equipped with Crusaders. In five weeks of bitter fighting the Afrika Korps was driven from Cyrenaica, but the toll was heavy. Again it was the 88 mm. gun and the 50 mm. Pak 38 in larger numbers which caused the most damage as Rommel skilfully used his anti-tank weapons in close co-operation with his tanks. The most effective British answer to both was the 25 pdr. field gun, but the British formations were neither organized nor trained for such close combination

Crusader II followed by Crusader III advancing in Tunisia with Eighth Army, near the end of the Battle of Mareth, March 19-29, 1943. These are tanks of the 9th Queen's Royal Lancers, 1st Armoured Division. (I.W.M.)



between tanks and artillery. This was improved later but the tank crews wanted a heavier anti-tank gun and their own high explosive weapon.

The armoured brigade in the Middle East in 1941 contained three armoured regiments each totalling 52 cruisers in three squadrons. In each squadron there were four troops each of three tanks, and four tanks at squadron headquarters where two were for close support, armed with a 3-inch Howitzer. The close support tanks were useful in providing protective smoke, but their HE performance was poor both in range and in lethality. Early in the following year the Grant tank began to arrive in the Middle East and was incorporated in the Crusader regiments on the basis of one squadron of Grants to two of Crusaders. With its 75 mm. gun the regiments at last had a weapon with which they could hit back at longer range. At the same time, however, the Afrika Korps began to receive the Pz Kpfw III (J) Special—with long 50 mm. gun—which had the advantage in range over the 2 pdr. Crusader. It was not until the summer of 1942, when the Eighth Army was back on the El Alamein line, that the Crusader III—with 6 pdr.—began to arrive in Egypt.

The 6 pdr. was useless as an HE weapon but it was a most effective anti-tank gun which enabled the Crusader III to compete with the formidable Pz Kpfw IV with the long 75 mm. gun when that too arrived in the desert. The Grant and Crusader III made a strong combination. At the Battle of El Alamein some 300 Crusaders were deployed to all three armoured divisions, and of these about one third were Crusader III. The proportion of 6 pdr. tanks increased steadily as the Eighth Army fought its way westwards to Tunisia, but the Sherman was gradually superseding Crusader.

In the First Army invasion in Algeria and Tunisia, the 6th Armoured Division was equipped with Crusaders until they could be replaced by a special diversion of Shermans in February 1943. At the end of the North African campaign the Crusader went out of service as a combat tank except in the specialist roles.

Crusaders were under-gunned for their time, a failing shared with most British tanks in the war years.

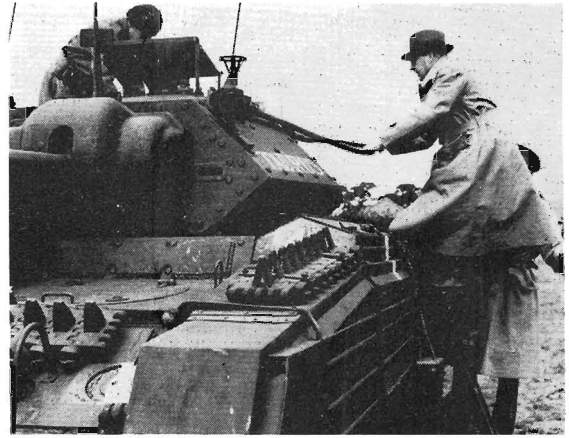
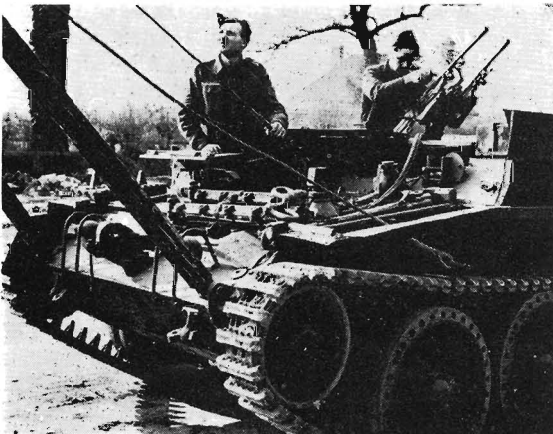


Repairs to a Crusader III of 6th Armoured Division in Tunisia. Holders for smoke dischargers, known as rear smoke emitters, can be seen on each side. This tank mounts a substantial towing hook. (I.W.M.)

Another common failing was shown in the reputation for unreliability, due largely to the complexity and need for constant maintenance. Tank crews were glad to exchange their Crusaders for Grants and Shermans. But for nearly two years the Crusader was the only modern British cruiser tank fit for operations, and it led, through the Cavalier and Centaur, to the Cromwell which proved in 1944 to be an effective, fast and reliable tank during operations in North-West Europe.

A.F.V. Series Editor: DUNCAN CROW

The Crusader Armoured Recovery Vehicle showing the method of staying the jib crane by brackets fixed to the tracks. Twin Bren light machine-guns could be mounted in the cockpit. (I.W.M.)



Sir James Grigg, Secretary of State for War, climbing onto a Crusader Command tank of HQ 11th Armoured Division. Extra wireless aerials and a mapboard are mounted on the roof, while a dummy gun is fitted in the mantlet. (I.W.M.)

SPECIFICATION

A15 CRUISER MARK VI—CRUSADER II

General

Crew: Five—commander, gunner, loader/wireless operator, driver front gunner.
 Battle weight: 19 tons.
 Bridge classification: 19.
 Power/weight ratio: 17.9 to 1 b.h.p./ton.
 Ground pressure: 14-65 lb./sq. in.

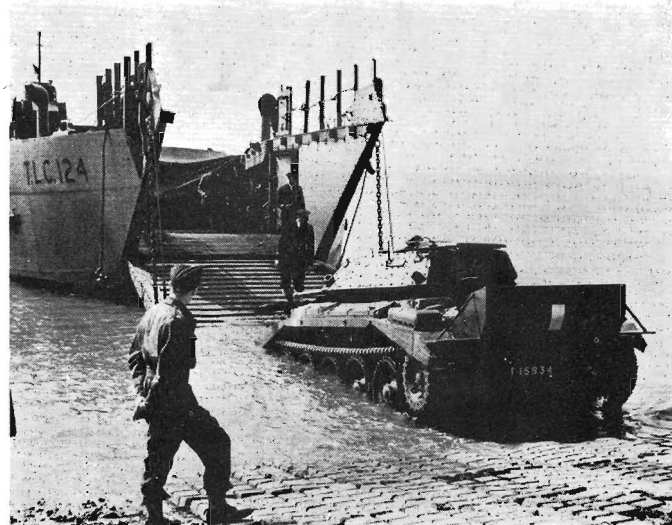
Dimensions

Length overall: 19 ft. 7½ in.
 Length including fuel tank: 20 ft. 8½ in.
 Height overall: 7 ft. 4 in.
 Width over track guards: 8 ft. 8 in.
 Width over sand shields: 9 ft. 1 in.
 Width over tracks: 8 ft. 5½ in.
 Track centres: 7 ft. 6¾ in.
 Track width: 10.7 in.
 Length of track on ground: 11 ft. 4 in.

Armament

Main—QF 2 pdr. Mark IX or X.
 Auxiliary—Two 7.92 mm. Besa machine-guns one co-axially mounted and one in auxiliary turret (which was often removed). Bomb thrower 2-in. mounted in turret front plate. .303 Bren light machine-gun.

Crusader fitted for wading trials. (I.W.M.)





Crusader III AA Mark I with 3-man crew, mounting the 40 mm. Bofors gun, used by light anti-aircraft artillery units. Normally operated by hydraulic power in traverse and elevation by joystick from the gunlayer's seat. (I.W.M.)



Standing-by to protect a column of tanks moving forward in Normandy, a Crusader III AA Mark III of the East Riding Yeomanry of 27th Armoured Brigade. (I.W.M.)

Fire Control

Turret: Shoulder controlled in free elevation (+20° to -15°). Traverse by hydraulic power from variable flow pump driven by main engine, with auxiliary hand traverse. Mechanically operated firing gear from pistol grips.

Auxiliary turret: Mechanical firing gear, free elevation. Traverse 150° by handwheel.

Ammunition

2 pdr.: 110.

Besa: 4,500 (20 boxes)—with auxiliary turret.

Bren: 600.

Bomb thrower: 26.

Crusader III AA Mark III, of the 4th/7th Royal Dragoon Guards, loading on to a tail flat. The co-axial Vickers MG is clearly visible. (I.W.M.)



Sighting and Vision

Commander: Periscope centrally in roof. Look-out with visor and Triplex block on both sides of turret.

Loader: Periscope in roof.

Turret gunner: Telescopic Sight No. 30 Mark I and IA, or No. 33.

Shutter type look-out in turret front plate.

Front gunner: Telescope.

Driver: Armoured visor in front plate of hood and shutter type look-out on right side.

Communications

Wireless Set No. 19. Two sets "A" (squadron/regimental net) and "B" (troop net). Intercommunications between all crew.

Armour

Hull: Riveted skin of hardened steel, outer armour bolted. Detachable armour plate over suspension assemblies mounted on hull sides of hardened steel plate.

Thicknesses are aggregate of steel skin and armour plate.

Front: 30 mm./30°.

Driver's hood front: 40 mm. (cast visor and pistol port nominal 50 mm.).

Glacis: 20 mm./60°.

Nose: 33 mm./29°.

Side inner: 14 mm.

outer: 14 mm.

Rear: 28 mm./11°.

Top: 7 mm.

Floor: 10 mm.

Turret: Welded skin, outer armour bolted.

Front: 49 mm./7°.

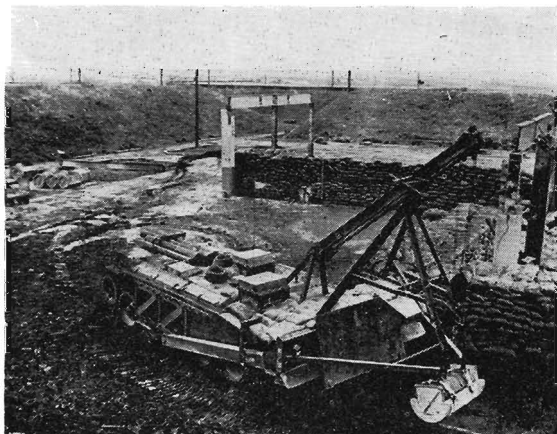
Sides: 24 mm./45°.

Rear: 30 mm./32°.

Top: 12 mm.

Engine

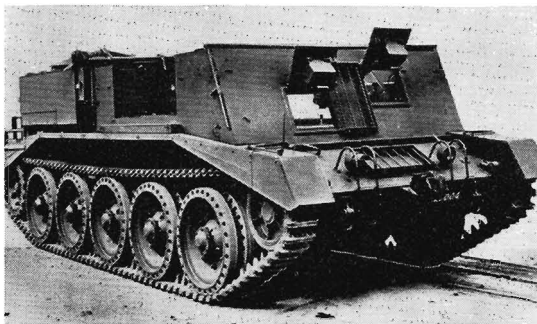
Nuffield Liberty Mark III, petrol, 45° V-12 cylinder, water cooled, 27 litres. 340 b.h.p. at 1,500 r.p.m. Fuel—110 gallons in main tanks, 30 gallons in auxiliary tank.



A Crusader Dozer which was specially protected and fitted with a crane and grab for removing unexploded ammunition after fires at the Royal Ordnance Factory, Kirkby. Salvage work extended over three months without a single casualty. (I.W.M.)

Crusader III AA Mark II, with twin 40 mm. Oerlikon. The sign on the turret is that of a trials establishment. (R.A.C. Tank Museum)





The Crusader III Gun Tractor for the 17 pdr. gun, with a re-designed hull to carry a crew of eight. It was a reliable and successful vehicle in the 1944 campaign in North-West Europe. (I.W.M)

Transmission

Clutch: Multi-plate, dry.

Gearbox: Mechanisations and Aero Ltd., constant mesh second, third and fourth gears. Four forward speeds and reverse.

Steering: Dual two-speed Wilson epicyclic steering units, or skid steering. Both pneumatic operation.

Brakes: External contracting.

Final Drive Reduction: 4.08 to 1.

Suspension

Christie Type, five road wheels each side on pivoting axle arms supported in cross tubes fixed to bottom plate of hull. Hydraulic shock absorbers fitted to all except centre assembly. Track rests on centre road wheels returning round idler (tensioner) at front.

Track: 118 links each side with centre lug, manganese steel.
Pitch: 4.035 in.

Electrical System

12 volt system, with two 6 volt batteries mounted in fighting compartment.

Performance

Maximum speed: 27.5 m.p.h. (governed engine).

Vertical obstacle: 2 ft. 6 in.

Trench: 7 ft. 6 in.

Wading depth: 3 ft. 3 in.

Road range: 200 miles.

Cross country range: 146 miles.

CRUISER TANK SERIES

Name	Weight Tons	Armament	Armour	Engine	Remarks
A9 Cruiser Mark I	12.5	1 2 pdr. 3 Vickers ·303 MG	14 mm.	AEC Petrol 150 b.h.p.	Close support version mounted 3.7-in. Mortar
A10 Cruiser Mark II	13.75	1 2 pdr. 1 Vickers ·303 MG	30 mm.	AEC Petrol 150 b.h.p.	Close support version mounted 3.7-in. Mortar. Mark IIA mounted 2 Besa (one in hull)
A13 Mark I Cruiser Mark III	14.2	1 2 pdr. 1 Vickers ·303 MG	14 mm.	Nuffield Liberty I 340 b.h.p.	
A13 Mark II Cruiser Mark IV	14.75	1 2 pdr. 1 Vickers ·303 MG	30 mm.	Nuffield Liberty I 340 b.h.p.	Spaced armour on turret Mark IVA mounted Besa instead of Vickers MG
A13 Mark III Cruiser Mark V Covenanter	18	1 2 pdr. 1 Besa	40 mm.	Meadows D.A.V. 280 b.h.p.	Four marks of Covenanter. Close support version mounted 3-in. Howitzer
A15 Cruiser Mark VI Crusader I	18.8	1 2 pdr. 2 Besa	40 mm.	Nuffield Liberty II 340 b.h.p.	} Auxiliary turret with Besa MG sometimes removed. Close support version mounted 3-in. Howitzer
Crusader II	19	1 2 pdr. 2 Besa	49 mm.	Nuffield Liberty III 340 b.h.p.	
Crusader III	19.75	1 6 pdr. 1 Besa	51 mm.	Nuffield Liberty III or IV 340 b.h.p.	Three-man crew
Crusader III (OP)	19.5	1 Besa	51 mm.	Nuffield Liberty III or IV 340 b.h.p.	Artillery observation post tank. Extra wireless sets, dummy 6 pdr. gun
Crusader III AA Mark I	19	1 40 mm. Bofors		Nuffield Liberty III or IV 340 b.h.p.	
Crusader III AA Mark II and III	19	2 20 mm. Oerlikon 1 Vickers, gas operated ·303 MG		Nuffield Liberty III or IV 340 b.h.p.	Mark III with extended turret at rear and wireless aerial on front hull compartment
Crusader Gun Tractor	23			Nuffield Liberty III or IV 340 b.h.p.	Redesigned hull to carry crew and ammunition for 17 pdr. gun

AFV

The new **Profile Publications** AFV Series of books on the Armoured Fighting Vehicles of the World, continues the pattern established by the twenty-four issues of *Armour in Profile*. But there is a big difference—in presentation, format and size.

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1	Churchill—British Infantry Tank Mark IV	16	Churchill and Sherman Specials
2	PanzerKampfwagen III	17	Russian KV
3	Tanks Marks I–V	18	PanzerKampfwagen 38(t)
4	Light Tanks M1–M5 (Stuart/‘Honey’)	19	Armoured Cars—Guy, Daimler, Humber
5	Light Tanks Marks I–VI	20	Sherman ‘75’
6	Valentine—British Infantry Tank Mark III	21	French Mediums
7	Mediums Marks A–D	22	T–54/T–62
8	Crusader—Cruiser Tank Mark VI	23	LVT I–IV
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10	PanzerKampfwagen V Panther	25	M48/M60
11	M3 Grant	26	Russian BT
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15	PanzerKampfwagen I and II	30	Leopard, Chieftain

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