BLACK PRINCE AND EXCELSIOR

David Fletcher poses a question and reveals that new tank design and testing was as active as ever in Britain during WW2, even if the results weren't terribly successful...

Black Prince number 3 photographed outside a tank hangar. From this angle it seems quite a respectable tank.

Now here's an odd thing. You know how Britain is always getting criticised for building two classes of tank, the cruiser and infantry tank, while at the same time not having a tank to match Tiger in terms of firepower or protection? What then is the difference between an infantry tank and a heavy assault tank? And would it surprise you if I revealed that Britain designed, and built, a tank that was a match for Tiger in almost every respect except speed, towards the end of 1943? Granted, you can trace the origins of Tiger back to a drawing board project as early as July 1941 and the British rival was not really ready in prototype form before 1945 – but presumably we could have had it ready earlier had we wished. And in any case it would have given Tiger if not a run, then a very determined crawl for its money.

ARISE BLACK PRINCE

Known originally as the Super Churchill the tank which was subsequently named Black Prince, a name that does not appear to fit in with any of the known categories of British tank names, was built to General Staff specification A43, notwithstanding that the General Staff had also authorised, under GS specification A41, a tank that would ultimately appear as Centurion at around the same time. But the plan was to have a cruiser tank armed with the 17 pounder (A30 Challenger), an infantry tank (A43 Black Prince) and a future Universal design (A41 Centurion). Even so Black Prince was classed as an infantry tank at a time when, we are told, the concept of the infantry tank seems to have gone into decline. Something else that is very strange about Black Prince that defies explanation is the choice of engine. It was powered by a 350hp flat-twelve Bedford unit which essentially was no better than the powerplant first devised for the Churchill Mark I. It was probably more reliable – time and experience would have seen to that – but it was no more powerful and was regarded as somewhat underpowered for the 40-ton Churchill Mark VII. So what was it doing in the 50-ton Black Prince? It seems to make no sense at all. One can't help thinking that the 600hp Rolls-Royce Meteor might have made a more suitable choice for such a heavy tank. In fact it was suggested by a Mr AR Code of the Ministry of Supply but apparently rejected because, set upright, the V12 Meteor was a bit too tall for the engine compartment, which sounds a rather feeble excuse. After all, the Meteor fitted into the much smaller Cromwell tank.

Curiously an official document published in 1947 claims that Black Prince did have

Above: A side view of Black Prince taken at Lulworth giving a clear view of the distinctive suspension.

a Meteor engine but this appears to be a mistake. In all six pilot models were built and evidence suggests that they were all fitted with Bedford engines. Certainly the survivor, an exhibit in the Tank Museum collection, is fitted with a Bedford unit. A Meteor may have been fitted retrospectively but if so no real evidence of this survives.

BOX OF TRICKS

Black Prince also used the Merritt-Brown transmission, as did Churchill, but Vauxhall Motors developed a new five-speed gearbox for it which drivers reported was very easy to use and made the big tank a pleasure to drive. That said, the combination of weight and the underpowered engine meant that the top speed was limited to no more than 11mph (17.6km/h), which did not put it in quite the same league as Tiger, which could go twice as fast. The design of the hull was just an enlarged Churchill although it was criticised for not having a sloping front which would have enhanced armour thickness. However, the designers did lower the front idlers to some extent in an effort to improve the driver's view.

Black Prince number 3 with a measuring post alongside. From this angle you can see how the track guards sloped down at the front, ostensibly to improve the driver's view.

Armour thickness on Black Prince was to a maximum of 152mm, the same as Churchill VII, which was slightly better than Tiger II and a lot thicker than Tiger I, although the latter was a good three years older than Black Prince. The real oddity was the turret; although it mounted the same gun as Centurion, the 17 pounder, and had the semi-open mantlet, which first appeared on Comet and was designed by Stothert and Pitt of Bath, it was a large,

Below: From the rear it looks awful, very square and boxy. Notice that the engine air intakes have been relocated above the engine.

Black Prince being tested on the range. It has stopped alongside the wreck of a Churchill I.

slab-sided thing with no concessions to ballistic shape at all. Of course it was much larger than on Churchill in order to take the bigger gun, and was mounted on a larger diameter turret ring, which meant that the hull was wider, which in turn meant that it exceeded the old British railway loading gauge limitations – although they seem to have been less worried about that by 1944 than they used to be. The extra width also made it possible to relocate the engine air intakes on top of the rear deck, just behind the turret, instead of hanging them on the sides as they did with Churchill. The suspension was similar to Churchill with a multitude of short coil springs, although as a concession to the greater size and weight an extra wheel station was added to each side and the springs were of a heavier type. The ten bogies that made contact via the tracks with the ground surface were arranged in pairs attached to heavy-duty brackets which are a key feature of the tank, and something not seen on the regular Churchill. However, like the Churchill the suspension rollers were all steel rimmed, which was not only noisy, but somewhat archaic. You can understand, just, why steel rimmed rollers were specified for the early Churchills – but there is no obvious reason why they should be retained on Black Prince. A narrow tyre of rubber, or some other resilient substitute, would not have gone amiss. Tracks were somewhat wider (24in) to spread the extra weight and of a more modern pattern, like those fitted to the Centurion.

The Tank Museum exhibit, Black Prince number 4, on display. It needs quite a bit of work to put it back into full running order and one wonders if it's worth it.

TRIED AND TESTED

Tests of a prototype at the Combined Operations Experimental Establishment (COXE) in North Devon revealed that Black Prince was too wide to pass through the bow doors of a Landing Craft Tank Mk3 although it could be landed from an LCT (4). Another difficulty surfaced when someone pointed out that at 50-tons the new tank was really too heavy to ride on any tank transporter then used in Britain. The heaviest one currently in use was a three-axle trailer hauled by a Diamond T tractor in two versions, by Rogers and Cranes, and they had a maximum payload of 40-tons, just right for a late production Churchill. Black Prince was tested on this trailer anyway and it seemed to cope, not only with the additional weight but the extra width as well. In fact, a 50-ton capacity trailer was produced after WW2 (FV3601) but that was too late for Black Prince.

Strangely, the sole surviving Black Prince in the Tank Museum does not attract a lot of interest. It was planned to run it during the 2012 Tankfest event but it was touch and go; the tank had not been run for the best part of 55 years and on the day it let us down and had to be towed ignominiously around the arena.

Right: A photo taken in the old days when A33 lived outside the Tank Museum. Pictures of it doing anything are quite rare.

EXCELSIOR

Now, if you can tell me what the difference is between a heavily armoured assault tank and an old style infantry tank, I'd be grateful. To me an assault tank is just an infantry tank by another name. Britain built three assault tanks during WW2, two of which, Tortoise (CMV January 2010) and Valiant (CMV November 2002) we have covered already. Now it is the turn of the third, A33 Excelsior, although what it did to deserve that name defies explanation.

The tank was designed by the English Electric Company of Stafford and it was based upon the layout and automotive features of Cromwell. That is to say it had a Rolls-Royce Meteor engine and Merritt-Brown transmission which in this case gave the tank a top speed of 24mph (38.4km/h). It had much thicker armour, of course, and since it weighed around 45-tons was also too heavy to employ the Christie suspension used on Cromwell. In fact, since the idea was to build two prototypes and exchange one of them for a rival design, built in the United States and designated T14, each English Electric prototype had a different suspension. The one destined for the US had a suspension based upon the American M6 design, while that to be tested in Britain had a form of suspension devised by Rolls-Royce and the London, Midland and Scottish Railway. It was known as the RL suspension which relied on heavy-duty road wheels and a scissor action springing system using helical springs. On both tanks there were side escape hatches, similar to Churchill, in the side skirting plates, but they were very cramped. Incidentally, the skirting plates on the tank with American suspension did not cover the top run of the tracks while those fitted to the British version enclosed the tracks totally.

The A33 prototype destined for the US was armed with a six-pounder gun, while that due to be retained in Britain, which we have in the Tank Museum, has a 75mm gun. They both have provision for a co-axial Besa and potentially for a front hull machine gun as well, although the American prototype would probably have been fitted with a Browning. In both cases maximum frontal armour thickness was 114mm, the same as Valiant, while the turret is of much heavier build than on Cromwell and of all welded construction by the looks of it. Apparently there was a plan, or a suggestion more likely, that A33 should be fitted with the new high velocity 75mm gun – but since that

The prototype A33 built for the United States. The suspension is not easy to see but at least the top run of the tracks is visible.

"To me an assault tank is just an infantry tank by another name."

Below: You can get a better idea of the suspension from this side view of the 'American' A33, although why anyone should even bother to make such a useless tank remains a puzzle.

A33 Pilot A photographed at Chertsey at the end of WW2; the next destination for most of these tanks was a scrapyard.

required an enlarged turret ring diameter it was never considered seriously. Any more than the suggestion that frontal armour on A33 should be increased to 6in which was the same as Churchill.

PLAYING SWAPSIES

It is not clear whether the prototype destined for America (designated Pilot A) ever left these shores but it seems unlikely, although a prototype of T14 arrived here. Pilot A was finished first and was subjected to running trials at Stafford, in the process of which it managed to pick up about 2-tons of mud, while a subsequent 1000 mile trial seems to have effectively written it off. Pilot B was said to be virtually ready by 23 December 1943 although its suspension was criticised for being much too complicated. If it was tested too then the report hasn't survived but in any case, by the time it was ready the A33 project seems to have been abandoned.

It should perhaps be mentioned that there were a number of other assault tank projects, namely A28, A31 and A32 which were abandoned even before they reached the prototype stage along with a third version of A33, to be designated Pilot C. It was going to have what was described as the light RL suspension, although exactly what that was is not known and in any case it was never built either.

It is somewhat comforting to know that in a country desperate for more tanks and having to rely extensively on American armour we still had time to design tanks which turned out to be totally useless, not just once but a number of times. And also, at a time when manpower was in very short supply, we could spare men to build and test them. It makes you wonder whether there was a lot of sense embarking upon the assault tank programme at all, bearing in mind that the whole thing, including Tortoise, came to precisely nothing. On the other hand, I am pleased that a selection of these tanks has survived and is included in the Tank Museum collection. It is important, historically speaking, to show that we did not get it right every time.

The surviving A33 prototype having been repainted, photographed inside the Tank Museum. It actually looks quite smart although it's still rusty inside.