

WITH THE TANKS

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I. ANATOMY AND HABITAT

I

WE were not always with the Tanks. We came from the infantry, from the cavalry, from the artillery, from the Machine-Gun Corps, the Motor-Machine guns, the Flying Corps, the Army Service Corps, and even from the navy. We came at first in the varied uniforms of our various regiments, and a motley crowd we were — the British infantryman in his turned-over trousers, the Scotsman in his kilt, the artillery boys in riding breeches and jaunty bandoliers, and he of the senior service in regulation navy blue. Some of us came with the mud of the trenches on our boots and the stains of war on our clothing; others, who had not been overseas, were more presentable in clean khaki.

We were not always known as the Tanks. At first, a great deal of secrecy was thrown about us, and we were called the Heavy Branch, Machine-Gun Corps, wearing the crossed-machine-gun insignia of that service. Later, in the summer of 1917, after we had cut our teeth and done a little biting on our own account, we became the Tank Corps, and the insignia was changed to a tank surrounded by laurel leaves, surmounted by a crown. By that time we had grown, and four original companies had become many battalions, the first handful of tanks had been multiplied and were legion, and we had

established a dépôt in France in addition to dépôts in England, schools for gunnery and for driving, great workshops and stores behind the line, and advanced workshops and stores near the line. Also, we had taken part in many battles, and done a little toward winning some of them, perhaps, learning how most effectively to use our new engine of war, and improving upon it so much that, when the enemy used tanks against us, we were able to outdistance and outmanœuvre his machines to his very great astonishment and dismay.

The spirit of adventure called most of us to the Tanks. This was not because we were any braver than our comrades-in-arms, but because our natures demanded a change to new conditions; for we were of that kind whose natures always demanded a change. And so the call for volunteers found us ready, and when the word of acceptance came, our hearts beat quickly and our hopes rose high; for we were tired of the monotony of the trenches and the monotony of the guns. And yet, when we came together, we wondered why many of us were there; for while some of us were selected because we were machine-gunners, and others because we were motor-drivers, there were many of us to whom the machine-gun and the motor were incomprehensible things. But in the end we did not find this lack of knowledge any han-

dicap; for the army authorities, who were wiser than we, knew that to men of average intelligence and education these things were easy to learn; and to our very great amazement, we found that a week was all that was necessary thoroughly to master any machine-gun and to qualify with it at the range, and that two weeks were all that was necessary to grasp the principle of the internal-combustion engine and the mechanism of the tank.

All that, however, was only the preliminary training, and there followed weeks and often months of instruction and of drill until we became letter-perfect. In those later weeks, of course, some of us fell by the wayside and were returned to the infantry or the cavalry or the guns.

There were times when the spirit of adventure within us received a severe jolt. That was when we had to haul about cases of petrol, drums of oil, and tins of grease; for with every move — and we were constantly moving — it was necessary to form a 'dump' of such things as were necessary for the beast to move and have its being; and our minds will always turn back to nights of rain, and to roads of mud along which we struggled bitterly, bearing upon our shoulders or our backs great loads, the petrol leaking from its tins against our heads and so into our eyes, the thick oil escaping from its drums and trickling down our backs. All this was sheer navvying and not at all what we expected, but it was most necessary.

Later, when we converted obsolete tanks into supply-tanks, much of this work was done by them and it became so organized that supply-tanks brought petrol, oil, and grease up to us in action, or established dumps at certain designated points to which we turned back during the course of the battle, so that we could refill, return, and carry on. Thus the beast of prey did not alto-

gether lose its usefulness with old age, but became a beast of burden and, as such, took no small part in making the fighting tank an efficient and formidable weapon.

Not all tanks were to survive for this service, however, for many went into action never to return; others sank from view in the Flanders mud, and our men dug down to them and converted them into bomb-proofs; and six of the first ever to be used lie along the Arras-Albert highroad, some on their sides, some on their backs, others still head-on toward the enemy's line, all of them broken and black with rust; for time and battle have shown them little mercy and left them merely unattractive hulks on the high tide of the German trenches.

Our first impression of the tank was one of disappointment. So much had been printed, after their first appearance in battle, of their freakish appearance and their great size, that we expected something far more strange in design, more monstrous, more dragon-like, and twice as big. However, when we came to go into action with them and to see some of them lurch clumsily when they were struck by armor-piercing shells, we inclined to the belief that they were quite large enough, and we even came to cherish a secret feeling that it would be much nicer and more comfortable and safer and healthier all round, if the tank could be made smaller and less conspicuous. Later it was made smaller; but the small tank was for special work and the large tank remained as large as ever, although certain internal improvements made it easier to handle and thereby increasingly difficult to hit. How increasingly difficult to hit they became, may be appreciated when it is known that the first time the improved tanks were used in battle, not one of them was lost. That action took place during the mer-

cifully sheltering cover of the darkness of a morning in the early summer of 1918; and while sixty tanks were used, the German official statement gave the number as eight hundred!

We were disappointed, too, to find that the tank could not do all that we had heard it could do. We had quite expected to climb to the house-tops, or, failing that, to go right through houses, to uproot great trees, and to waddle through wide rivers. The newspapers had depicted the tanks doing all these things; but we were to learn that roofs have a habit of giving way under the weight of 35 tons, which is the weight of a large tank, and that it was easier to go round houses than to go straight through them; and we were to learn that large trees, deeply rooted, successfully resist great force, and that the rivers of France are so muddy in the bed, that to cross them, as indeed once we had to in action, it was necessary to lay down a causeway of barrels filled with cement.

But, in spite of these early disappointments, there was much about the tank that satisfied the spirit of adventure, and there is not one of us who will ever forget his first ride — the crawling in at the sides, the discovery that the height did not permit a man of medium stature to stand erect, the sudden starting of the engine, the roar of it all when the throttle opened, the jolt forward, and the sliding through the mud that followed, until at last we came to the 'jump' which had been prepared. Then came the downward motion, which suddenly threw us off our feet and caused us to stretch trusting hands toward the nearest object — usually, at first, a hot pipe through which the water from the cylinder jackets flowed to the condenser. So, down and down and down, the throttle almost closed, the engine just 'ticking over,' until at last the bottom was reached, and as the

power was turned full on, the tank raised herself to the incline, like a ship rising on a wave, and we were all jolted the other way, only to clutch again frantically for things which were hot and burned, until at last, with a swing over the top, we regained level ground. And in that moment we discovered that the trenches and the mud and the rain and the shells and the daily curse of bully beef had not killed everything within, for there came to us a thrill of happiness in that we were to sail over stranger seas than man had ever crossed, and set out on a great adventure. And some of us were to do great deeds, and others were to do simple things; some of us were to win great glory, and others of us were to crumple up against the engine or the guns, never again to stir; but all of us were to learn that it is not life that matters, but the courage which one brings to life.

II

One who volunteered for the Tanks waited for four months outside Lens before the call came. During all that time he did his turn in the trenches and his 'rests' in a concrete dugout in Noulette Wood. And as the weeks passed and no word of his transfer came, he despaired of its ever being granted.

Lens has since fallen into British hands, but when he was there, the enemy's position was too strong to be captured by direct assault, although the fighting reached the outskirts of it and hiding men threw bomb at hiding man in the little yards and gardens where once children played. Also he heard that the French civil authorities had requested that the city be shelled as little as possible, because it was understood that the enemy was holding civilians there, women as well as men, and because it was sought to save Lens

from the ruin and desolation that lay around; for one had only to look upon the high ground that borders the Lens plain, to see the leafless, lifeless thing which was once the wood of Notre Dame de Lorette, the wreck and ruins which were once Souchez and Angres, and the fallen towers which were once the coal-mines of Liévin.

And in those weeks while he waited for his transfer, it was to this high ground that he often walked on summer evenings and, standing where the wire is still black and the bones of those who died upon it could even then be disturbed by the trespasser, he would look out into the night upon the lights that went up from the line, as far as La Bassée and Armentières.

Once, after a visit to Château Nouvelle, of which part of the walls alone stand, and where a great German 'dud' shell may yet be seen on the ground between the greenhouse and the artificial lake, he returned, to be told that the orderly sergeant had been looking for him.

'It's about your transfer to the Tanks,' one told him.

His transfer! He had forgotten about that. And now it had come through!

With a queer feeling inside him, he looked at the men with whom he had shared so many hardships.

'That right?' he asked casually, as if it did not matter at all.

Some one replied that he was to start in the morning; so he turned to his kit and started packing that and buckling it together without a word, for he could not trust himself to speak. And he was engaged in that when the orderly sergeant came and told him what he already knew.

In the morning, after shaking hands all round and wishing and being wished good luck, he paraded at the company office. He was given a movement order for Headquarters, Tanks, and instructed

to go to Noeux-les-Mines, the nearest railhead.

'You'll have to march it, I'm afraid,' the captain said, 'because the road's under shell-fire and closed to lorries.'

The soldier saluted and moved off. Across country he marched, until he reached the Bethune-Arras road, on the shell-riven trees of which were nailed signs that read, —

DRIVE SLOWLY

to avoid raising dust

which attracts

SHELL-FIRE

In most cases, however, the last line had been altered by erasing the S, making it 'Hell-Fire,' which was more appropriate and exact.

There was little shelling of the road that morning, however, for it was under observation from the German 'sausages,' and for that reason was void of transport and troops. Shells could be seen dropping in the general direction of Noeux-les-Mines, though, and the prospect was not quite pleasant.

At times the soldier, in whose pocket was the paper which stated that he had been transferred to the Tanks for 'the good of the service and at his own request,' unbuckled his equipment and, dropping it to the ground beside the road, flung himself there to rest and smoke, for the way was long and dusty and the day was hot. But at last the great slag-heaps which surround Noeux-les-Mines came into view, and then the little city nestling there, houses here and there in ruins, the result of shelling or of bombs.

Some shells were falling on the railhead as the soldier made his way toward the station. He was very dusty, very hungry, and very tired, and he wanted to wash, eat, and rest, for it was past noon and he had been marching since early morning.

Arriving at the station, he reported to the Railway Transport Officer, more generally known as the R.T.O.; for the army delights in being enigmatical and has its A.G., its D.A.G., its D.A.A.G., its H.Q., its B.H.Q., its G.H.Q., and, perhaps, its Deputy R.S.V.P., until one's head swims trying to make out who or what is meant.

After examining the soldier's movement order, the R.T.O. looked up and said that the train for that day had gone.

'Come here to-morrow morning at 10.25, and report to me. For to-night, go to the Town Major, tell him I sent you, and he'll fix you up with a billet and rations.'

III

Each one of us who transferred in France came to the reinforcement and training dépôt with a secret hope that he might be sent to Blighty for instruction. (Blighty is the soldiers' name for England. It is a corruption of the Indian word for home.) But in the first five minutes at the dépôt, that hope disappeared, and we knew that we should not see Blighty except in the ordinary routine of leave and wounds. As leave is granted only about every fifteen months, and even wounds are frequently difficult to get, the prospect of going home was soon dispelled.

In those days the dépôt was only in its infancy. It consisted of a score of tents for the men, and half a dozen small Armstrong huts for the officers. But each week it grew, and after we left and went to various battalions, it was moved elsewhere, and huts such as are used in the British camps were erected.

On our arrival at the dépôt we were classified in two lots, — drivers and gunners, — the sheep and the goats, as it turned out to be later, for the better

pay fell to the drivers and the dirtier work to the gunners. We were all given the rank of gunner, however. This was a relief. In the infantry we had been privates, but the term private soldier had ever been a source of mystery to us, for we had never discovered anything private in our lives to warrant the title. Even our private letters were not sealed, and had to be censored before they could be dispatched. Also, we were not permitted to have any private property; for a soldier belongs, body, soul, and belongings, to the army, at least theoretically, for of course we did have private property. This consisted mostly of the photographs of our wives, our children, and our sweethearts. The rest was what we bought in the way of soap and polish; for the one piece of soap and the single tin of blacking which the army issues to each recruit upon joining, can scarcely be expected to last through a campaign, be the soldier ever so economical in washing his body or in cleaning his boots!

Just what was the mode of procedure in selecting some men to be drivers and other men to be gunners, we never knew. Perhaps it was gauged by the size of one's boots or the color of one's eyes. At any rate, quite frequently a skilled motor-mechanic would be sent to the gunners' company, while an expert machine-gunner, who knew nothing about internal-combustion engines, would find himself among the drivers. In the long run, however, it did not matter much, for each driver had to qualify as a gunner, and each gunner was given an elementary tank course and taught how to drive.

The reasons for so complete a training were obvious. In case a tank was knocked out or developed serious engine-trouble, the entire crew could carry on in the trenches or the field with the guns; whereas, if all the drivers

were killed, any gunner could bring the tank back. But to the average Tommy this dual instruction boded ill, for the soldier believes that the less you know, the better off you are. For instance, if you are a machine-gunner, a bomber, and a signaller, you will probably come in for more 'shows' than if you are simply a rifleman; wherefore a little knowledge is considered a dangerous thing. But later each one of us thanked his lucky stars that he was gunner and driver too; for there came a time when we did have to carry on in the trenches or the field with the guns, and there came a time, too, when the drivers all 'went West,' and the gunners had to bring back the tanks.

With the rank of gunner we drew slightly higher pay. In the infantry our rate of pay had been one shilling a day, half of which we turned over toward the support of our dependents, the government supplementing the allowance. As the Tanks were classified as artillery, and the daily rate of pay in the artillery was one shilling and twopence halfpenny, we drew this additional twopence halfpenny. Later, when the Tank Corps was established and pay in the army generally increased, we drew as much as two shillings and eightpence a day as first drivers, plus war-pay of a penny a day extra for each year we had been in the army; and the government relieved us of compulsorily contributing to the support of our dependents and itself undertook their entire support, which, however, we were permitted to increase by voluntary contributions from our pay.

The *dépôt* was in a back area. The site was ideal, a valley with woods on either side, making it difficult to observe from the air. Not infrequently hostile aircraft sailed overhead as if in search of us; but they failed to find us, for we were never subjected to aerial attack.

The camp was in a large field. The field itself was used as a parade and sports ground. Along either side were two rows of tents in which the men were housed. At one end was the mess-hall and at the other end the officers' quarters. The entire camp was surrounded by a hedge and poplar trees, so that little could be seen from the road which bordered the eastern side. Along the western side ran a double-track, wide-gauge railway, and a spur of this led into Central Workshops, less than a quarter of a mile away. In a sense, Central Workshops was a tank hospital, for it was there that tanks which had been damaged in action went for overhauling and repair, and there at any time one could see tanks with great wounds in their sides, and, searching among the heap of cartridges on the floor, find some button or shred of clothing which told only too clearly what had happened. Later we were to see much of Central Works, for it was here, too, that all new tanks arriving from England were first tested before being turned over to the men who were to take them into battle; and it was upon flat cars moved into this siding that we were to drive our tanks, and so move to within striking distance of the fighting line.

It was to a tent on the side-lines that the new arrival was sent. If he was lucky, he found himself in one occupied mostly by cooks. The luck manifested itself after 'Lights Out,' when tins of sardines and jam and pieces of bread and cheese would mysteriously appear and be passed around; for while the army ration is sufficient, manna from the soldiers' heaven, which is the cook-house, is always welcome. And almost nightly this manna rained upon this tent, and from the beginning the new arrival got a portion, for soldiers always share.

For the most part the men at the

dépôt were recruits from England sent out to reinforce battalions which had suffered losses in action. A few battalion men were there, though, and these could be distinguished by the colors on their shoulder-straps. In those days the battalions were designated by the letters of the alphabet: A Battalion, B Battalion, C Battalion, D Battalion, and so on, and the colors of A Battalion were red, of B Battalion yellow, of C Battalion green, of D Battalion blue. Later, the lettering system was discontinued, — why, we never knew, — and A Battalion became the First Battalion, B the Second, C the Third, D the Fourth, and so on.

At that time those of us who had only had instruction on tanks in England, and those of us who had never seen a tank, looked with awe upon these battalion men; for most of them had seen action in the tanks, and many of them had been wounded, gone to hospital, and subsequently been dispatched to the dépôt for return to their respective units. And because so much mystery attached to the tanks, we came to think that their risks had been greater than any we ourselves had run, and we often tried to get them to talk of it all; but found them strangely silent. Later, we were to learn how ridiculous this sense of awe had been, for we in turn were to suffer from much the same sort of thing and were to hear people in the streets murmur hoarsely to each other, 'He's with the Tanks,' as if we were the pick of the army, undergoing greater hardships than anyone else.

The officers at the dépôt were there under circumstances similar to our own. Some of them were battalion officers who had been wounded; others were reinforcements sent from England, and others were officers who had transferred in France from as many different units as ourselves.

Usually the routine of the day included physical training, squad-drill, gas-drill, machine-gun instruction, preliminary tank instruction, and fatigues. Fatigues were doing any odd job around the camp, from peeling potatoes for the cooks to unloading quartermasters' stores. And, the day finally ended, there were still pickets and guards to be done in turn. The fire picket was a more or less informal affair which we did not mind; but guard had to be mounted in full marching order, and so searching was the inspection that a spot of grease on your pack might cause you to lose three days' pay and be confined to camp as well. Guard-mounting in steel hats some thirty miles behind the line seemed to us only a ceremonial instituted purposely to aggravate the soldier, and we groused a great deal about it until we heard the reason, which may or may not be the true one. It was said that, in the first few weeks after the dépôt was started, and when there was one tank there, guard was mounted in the usual manner, the men wearing the soft field-service cap. A sentry was posted at the tank, and that night, when the corporal of the guard marched the relief to that point, he fell over the prostrate body of the sentry. He picked him up and carried him to the guard-house and later had him removed to a hospital, for he had been struck over the head with some blunt weapon. Why or how he had been struck, he never knew, nor how long he had been unconscious; but the affair was put down to espionage and resulted in an order to wear our shrapnel helmets when on guard. Color was lent to the theory of espionage by a later incident; for through papers found on a man arrested in England the intelligence officers traced a German spy, and caught him on that spur of the railway track leading to Central Workshops.

IV

It was while marching to the baths that many of us saw our first tank. For two days rain had been falling and the parade-ground was camouflaged by two inches of water and four inches of mud. Of the two the water was probably thicker than the mud; so, because we could not do squad-drill, we were warned for the baths. These were shower-baths, two kilometres distant, but they were more like an anæmic fire-sprinkler system than anything else. They were housed in a dilapidated old barn, the roof of which leaked more water than came through the sprinklers.

With towels over our left shoulders we were lined up and marched off, grousing a good deal, for it was still raining and the road was in a wretched condition. We had just passed Central Workshops when the tank appeared, moving along the road slowly, making less noise than we expected, for we were to learn that most of the noise is internal and little except the exhaust can be heard from without.

We marched to the side of the road to let Behemoth pass, and in that moment forgot the mud and the rain, and laughed as it slid past, much as the infantry are said to have laughed on that summer morning which marked the beginning of the Battle of the Somme. But our merriment lasted only a moment, for a sharp order brought us to a realization that we were marching to attention; so we set our faces and trudged on.

It has been printed that the tanks were called 'Willies.' We ourselves never used the name. At first they were known as landships, and H.M.L.S. Campania comes to mind. In those days all the tanks were named. There were Explorer and Explosive, for instance; and when the Germans came to

use tanks we found that they had named theirs, too; for one of the first German tank-commanders called his tank *Elfreda*, probably after his sweetheart. But *Elfreda* turned out to be fickle and quickly deserted to our side, and we made much of her, for she was the first of her type to be captured. With us, however, names quickly fell into disfavor, and in the end were discontinued, and tanks fell to the military routine of carrying regimental numbers.

In those early days a tank always to be relied upon to create more than usual interest was one presented to the British army by a councilor of the Malay States. In front of the tank, on either side, was painted a large staring eye, such as may be seen on the bows of Chinese junks; and the idea probably was the same, for the Chinese say, if a ship has not got eyes, how in the world can it possibly see to go?

To-day tanks are largely of four types: the male tank, the female tank, the gun-carrier (or supply) tank, and the 'whippet.' The male and female tanks are of the heavy type, and are identical in size. They differ only in armament, for the male tank carries two large cannon and five machine-guns, whereas the female variety is armed with seven machine-guns, reversing the poet's assertion that the female of the species is deadlier than the male.

While male and female work together, and probably would have entered the Ark side by side had they existed in those days, they are used for entirely different work. Generally speaking, the male tank is used first to pass over barbed wire and flatten it, so that infantry may walk through, and then goes on to the more important work of destroying 'pill-boxes,' — machine-gun emplacements, — so-called because of their appearance. It is for this work that the cannon are used and

armor-piercing shells are fired, and not infrequently what remains of the emplacement is sat upon by the tank itself. That, however, is a dangerous undertaking, for the tank might be hoist with its own petard and ditched in its own destruction.

The female tank, moving in the wake of the male, passes over the wire in the same spot, effectively flattening it, and acts as 'mopper-up' of the infantry, with the exception of those who come into direct observation of the male; for while the male is pounding the 'pill-boxes' with her guns, the female is going across the enemy's trenches and moving along the tops of them, firing her machine-guns at the infantry there.

In shape male and female, as they are to-day, are identical with that first tank used at the Battle of the Somme. One attachment that was immediately discarded, however, was the trailer of wheels. These great wheels were used to assist in steering the tank, and were so devised that, when it went into a shell-hole or a trench, they could be lifted clear by internal mechanism. They were found to be of little value, however, and were discarded without delay. That was the first improvement, and later, when certain other internal changes were made, the tank manœuvred so much better and went so much faster that, when those which had been captured from us were patched up and used against us, we found that we were able to run circles around them and defeat them at each encounter.

Of all our tanks the least successful was the gun-carrier. This was of greater length than the fighting tank, and was designed to carry a piece of ordnance of large calibre into advanced positions, newly captured; and the arrangement was such that the gun could either be fired from the tank or be dismounted and put on wheels. For some reason, however, this plan did not work

out as well as was expected, and many of the gun-carrier tanks were used to bring up supplies, and as such did highly efficient work, more than making up for their early failure.

Of all our tanks the 'whippet' was the big surprise. This was a small tank, built for the purpose of pursuit on ground which could not be traversed by an armored car. The surprise came when the whippet, built much along the lines of the gun-carrier, succeeded in traversing ground which invariably ditched the bigger supply-tank.

With the failure of the gun-carrier, we of the heavy fighting tanks came to the belief that to have the tracks—or caterpillar tread—pass completely round the hull was an essential to success; for in the gun-carriers this was not done and they found difficulty in getting out of holes. But when the whippet, whose tracks, like those of the gun-carrier, did not pass completely round the hull, proved a success, we came to change our views and to lay the blame to incorrect balance.

While whippets were first used in the early part of 1918, it was not until the second defeat of the German army on the Marne and the Somme, that this type came to be generally known. The enemy's forced retreat to the old Hindenburg line was an ideal condition for the whippet, and these little tanks, which have a greater speed than their bigger brothers and sisters, were able to harass the foe and to break up the rear-guard machine-gun fighting which he attempted to put up. This they did so effectively that, in the late summer of that year, civilians seemed to talk in terms of whippets, not realizing that the preliminary work of the male and female tanks in flattening down wire, breaking 'pill-boxes,' and causing the enemy to give up his lines of defense, was needed before the whippet's effectiveness could be complete.

These, then, were the tanks which our men took into action. In the beginning none of us knew anything about tanks. We had learned the engine and the mechanism, and had driven them over holes and trenches; but battle conditions we found to be entirely different. And because this engine of war was new, our high command had to learn tank tactics; and not before all of us had made many mistakes, did we learn how tanks should be handled and where they should be used. Those mistakes cost us dear, both in men and in tanks, and there was a time when, although we ourselves knew the tank to be a valuable instrument, we quite understood that the confidence of the public had been shaken by our failures.

How near the Tank Corps came to being abandoned, few persons know. Its fate was decided by one single engagement, and only a minor operation at that.

At one point on our line there was a German position of seven machine-gun emplacements, or 'pill-boxes,' which was forever causing trouble. It was planned to take that position, and the commander there was ordered to draw up a plan of attack and an estimate of casualties; for in the British army no attack is made without an estimate of casualties, and if they are out of proportion to the zenith of success, the attack is never made. In this instance the number was placed between 400 and 500. This figure the high command thought too high, and the tanks were asked if they could capture the position. Officers of our corps looked over the ground and examined aeroplane maps. Then they announced that they could take the position, and that, as the infantry would be used only to consolidate the ground won, the casualties would not be nearly so high as the first estimate. And so the attack

was made, and the position was taken. The casualties were only seventeen and the Tank Corps was saved.

v

We called them 'busses,' and the name stuck. 'Landship' was too long and too clumsy to last. Even 'tank' did not stand the test of time, except officially in the army forms and the army correspondence. Always it was busses.

To each bus a crew was assigned. The duties of the crew were to keep the mechanism and the guns in working order, and to take the tank into battle. With the large busses the crew consisted of one commissioned officer, one non-commissioned officer, and six men. In the case of the gun-carrier, when those busses were relegated to supply-work, only drivers were carried, as there were no guns. With the whippets the crew was not so numerous as with the male and female tanks, because the whippet was smaller, and there were fewer guns to be operated.

The general shape of the heavy British fighting tank is well known. The elevation is roughly that of a rhombus, with the two acute angles rounded off. The plan resembles somewhat the letter H, with a heavy cross-bar for the body, the sides of the letter representing the tracks.

For the most part the tanks are made of armor-plating. In some places the armor is thicker than in others, but at the thickest it is not more than three eighths of an inch. This may seem ridiculously inadequate, but the armor is hardened by a process used for ships of the British navy. It is bullet-proof and bomb-proof, and shrapnel more often than not does no harm. Armor-piercing shells, however, are effective when direct hits are made. The Germans even use an armor-piercing shell weighing only one pound, and seem to

think it quite satisfactory. These shells are fired from specially designed anti-tank guns, which are kept in the front lines or in concealed places just behind the line.

Even the tracks are made of armor-plate. These tracks in the heavy fighting tanks run completely round the body, and are made of individual plates, so that they can be 'broken,' or opened up, anywhere, to permit the mechanism underneath them to be examined. This mechanism, in a general way, consists of rollers, chains, and sprocket-wheels and differs little from that of the average American tractor, but is greatly improved. The rollers need constant lubrication, and after every trip men are assigned to greasing up. This is a job which all of us hate cordially, because it consists of forcing grease into these rollers from outside, with a grease-gun, and one not only gets very dirty but, as there are fifty-four rollers to each tank and most of these are within two inches of the ground, the job is back-breaking and often necessitates sitting down in the mud. Usually greasing up outside falls to the gunners, for the drivers have other work inside, not always so arduous but equally important, and needing their greater knowledge of the engine and controls.

Projecting from either side of the male tank are two large sponsons. These are not quite one third the entire length of the bus and are placed amidships. They are emplacements for the guns, and give the heavy cannon a wide traverse. The sponsons are removable and can be pushed in flush with the side. Were this not so, tanks could not be taken on trains because of their great width with the sponsons in position, and every move by train involves the arduous job of pushing in sponsons when entraining and pushing them out after detraining.

In the female tank the sponsons are comparatively small. The large one is not needed in this case, as the female has only machine-guns; but even the small sponson of the female is made to shut in. The supply-tanks and the whippets do not have sponsons.

Entrance, in the case of the male tank, is effected by means of doors at the back of each of the sponsons. In the case of the female these doors are underneath the sponson and open into the side. There is also a door at the rear of the heavy fighting tank, and a fourth place of entrance or exit elsewhere. All these doors are provided with locks, which are proof even against the Hun; there have been times when he has come around and tried to open them, to be greeted with revolver-fire; for each member of the tank crew carries a revolver for personal protection and close-quarters work.

The engine is installed along the centre-line of the tank and slightly forward of the middle. At first, a powerful engine designed for heavy tractor-work was used; but this was found to be scarcely strong enough, and another engine was specially designed and contributed no small part of the success of the improved tank.

It is in the front of the tank that the driver sits; for there are the throttle and the controls and the brakes and the gauges which register the oil- and petrol-pressure. Beside him usually is the non-commissioned officer, who operates the forward machine-gun; and by no means the least among the driver's annoyances are the empty cartridge-cases which are ejected from this gun and which usually find the driver's left ear or eye as a target.

The tank officer usually sits in the conning tower amidships. Observation from the driver's seat is restricted on either side because of the tracks, but from the conning tower the lookout has

an unrestricted view in all directions. Thus he can watch for 'targets,' and, being in the middle of the tank, is well situated to command it. He is so close to most of the gunners that he can communicate with them either by shouting or by making signs; but so terrific is the noise of the engine that it would be utterly impossible for the non-commissioned officer and the driver to hear him, so speaking-tubes run from the conning tower to the driver's cab.

In action in a tank, heat is one of the great hardships, for it is so exhausting that the men frequently have to buck themselves up with restoratives, carried in the tank's medicine bag. Usually, in the ordinary course of travel, or going up, men walk outside the tank, or ride on top, the driver alone being inside; but in action all have to be inside, and the tank is shut up so that in broad daylight it is quite dark within. Observation for the driver and gunners is made possible by lookout ports, in which eight tiny holes are drilled. These holes are about this size, but set farther apart.

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Strangely enough, observation is not so difficult as might be imagined. It is above these holes that the only padding in the tank is placed; for, contrary to the general impression, tanks are not padded inside, nor are men strapped into seats. The gunners for the most part stand; the two men forward are seated, and when the driver is about to take a severe drop or incline, he shouts back through the speaking-tube and the men hang on, bracing themselves against the engine or the guns. The padding over the lookout holes consists of a head-rest against which one presses the forehead in order to bring the eyes as close to the holes as possible. These lookout holes superseded periscopic

prisms, which proved unsatisfactory. The prisms were made of glass about two inches thick; but bullets striking this glass, while not breaking it, starred it so that observation became difficult if not quite impossible. To meet this, a steel reflector was tried out, but did not answer the purpose; and so the holes were resorted to, and while observation involves an unnatural straining of the neck, it is effective.

While bullets do not penetrate the armor, but only ruffle it up a bit at the point where they are deflected, a great deal of bullet 'splash' does come in. This is more annoying than serious, and after an action one could pick out any number of these tiny splinters from one's face. So, as a means of protection against 'splash,' face-armor was invented. This looks much like a bandit's mask, with a steel-mesh chain hanging from it. The mask itself is of thin steel, with slits for the eyes, the whole padded for the face and adjustable to it.

The greatest danger, however, whether in or out of action, is that of fire. Smoking inside a tank is forbidden. Usually smoking is not permitted within twenty yards of one. This is because of the great amount of petrol, or gasoline, carried, and because of the fumes. Thus an armor-piercing shell entering the tank, not only explodes in a confined area, but usually sets the machine on fire. When that happens, men have to escape as best they can, tumbling out of the doors, usually to be greeted by the enemy's machine-gun fire. Often, however, so much damage was done by the shell itself, that only those nearest the doors ever escaped. The rest perished in the flames, and those who have ever had to go back to a tank and see their comrades burned almost beyond recognition, will bear testimony that death by fire was feared more than anything else.

Such, then, is the tank. It came at a time when intense artillery barrages made the ground in front and behind the lines almost impossible to traverse. Thus the infantry was hampered in movement, and often reached the enemy's barbed wire only to find that, while its form had been destroyed, it lay there as tangled and as dangerous as ever. Furthermore these barrages were enormously expensive, and one British barrage, lasting three days, cost more than \$63,000,000.

Perhaps the most serious fault of the barrage, however, was the notice of attack which it gave the enemy. While an attack might be on a limited front and the barrage on an extended front, it was like sending a visiting card. So the Germans watched and prayed. Often they prayed for the attack to begin; for after two or three days and nights of intense artillery and trench-

mortar fire one longs to have it over and done with.

The tank virtually abolished this method of attack. Artillery barrages were kept up even after the tanks were perfected, but frequently the element of surprise was attained by the use of tanks without a preliminary fire. And so, in the dark of the early morning, the tanks go over, male and female, ahead of all others, and they cross the enemy's wire and flatten that, and then press on against his 'pill-boxes,' leaving the infantry with their bombs to settle affairs in the dugouts. Often the artillery assists the tanks, once the battle has begun, and particularly when dawn breaks and visibility exists. Then they put up smoke-barrage, and the tanks carry on with the assistance of these screens, smashing down defenses, mopping up personnel, and creating terror in the hearts of the enemy.

(To be concluded)

THE EDUCATION OF WILLIAM II

BY MAURICE MURET

In an absolute monarchy, such as the German Empire is in fact, the sovereign's personality plays a supremely important part. In the thought of the whole world, to-day, Germany is William II. Even in time of peace the Kaiser's figure aroused keen curiosity, and that curiosity has been immensely quickened since July, 1914. Everybody wants to know how far he is personally responsible for everything that has happened and is happening; and his char-

acter is scrutinized for arguments tending to prove his innocence or his guilt.

In opposition to some personal enemies of William II, — if I may call them so, — I am of the opinion that he was not essentially warlike at the outset of his career. So long as he was not subjected to the baleful influence of Prussian militarism, — or, at all events, so long as he was under other influence as well, — he justified the fairest hopes. He exhibited as a child sentiments far