

THE PROBLEM OF INTRODUCING THE TANK INTO THE BRITISH ARMY  
DURING THE WAR OF 1914-1918

by

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## Abstract

The problems and difficulties of developing the tank in Great Britain during World War I did not stem solely from reactionary Army officers, as has often been alleged. Rather, it was part of the greater problem of adjusting the British nation, governmental setup, and military theory and machinery to the task of fighting a completely new and very complex kind of warfare. This adjustment, incomplete or fragmentary in many areas at the war's end, had physical, intellectual, and psychological aspects; it had to be effected at least in part before the tank could be understood and appreciated as a capable weapon, as a piece of mechanical hardware engineered to do a particular job, and as a completely new entity on the scene of contemporary warfare.

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A single practical idea flashed into somebody's brain--  
I don't know whose...-- one single idea, I say, scarcely  
new, but nicely adapted to its object, the tank. And  
from that was to come victory as Pallas came from the  
head of Zeus.

-- Jean de Pierrefeu

And therefore I consider that we were not beaten by the  
genius of General Foch, but by "General Tank."

-- General A.D. von Zwehl



## PART ONE

### A Brief Introduction and Description of the Problem

The problem of the tank is interesting because it represents one of the earliest attempts to adapt mechanical methods to warfare. Furthermore, the tank was probably the first truly revolutionary weapon to be developed during a war, and hereby hangs a tale: why this weapon was not, could not be, developed before World War I is a question to be dealt with in detail, and must be clearly understood before we can understand the unusually large and varied group of difficulties which beset tank development during 1914-1918.

These difficulties were not solely the result of opposition and stubbornness displayed by high ranking Army officials, although this is the impression one gets from much of the published material on the subject. Both personal memoirs and scholarly works of a general nature by and large offer this explanation which they all acknowledge to have existed. Most books show that there were not enough tanks, that generals would not use them properly, that tanks were ridiculed and not given a fair trial, and so on. What is rarely touched on in these books, what is not regarded as really part of the problem, and what this thesis will delve into, is the more elusive type of difficulty, which the thesis claims is most intimately and definitely part of the problem.

Examples of this include the complete surprise by which the character of the war itself took the British government institutions; in consequence, most of the government's solutions to the problems of fighting this war, including tank development, were perforce impromptu solutions involving impromptu methods, impromptu organization and impromptu personnel. Another example is the personality of one man at the center of the administration

of tank manufacture, whose impatience soon caused previously sympathetic officials to harden into an anti-tank attitude. Still a third difficulty was the shortage of materials and personnel, whose acquisition was made unusually difficult by the poor communication in government agencies due, in turn, largely to the other two problems just mentioned.

Without going into further detail at this point, we can see that the tank problem in general can be investigated fruitfully from the premise that the tank was the particular invention of a particular people at a particular time in its history. If we view tank development in this way, it will in turn tell us a great deal about the governmental and military system which produced it and show us that the system, as constituted, would likely have behaved in the same way had a repeat of the situation been offered. In other words, the nature of the system, hardly exterior to the problem, was indeed central to it. We might even venture to say that the true difficulties lay in the system itself, and that tank development reflected, was merely symptomatic of, these difficulties.

Historically, the tank problem must be viewed as a small part of one of the most enormous problems that has ever faced any nation. It is imperative, then, that some considerable space be given at the outset to describing the environment surrounding the tank's birth and early childhood, even in areas which do not appear to impinge directly. Some of these characteristics developed throughout the war years; consequently, they will be dealt with right through to 1918, although the narration of the tank development itself will begin in 1914.

Central to the approach used in this thesis is the notion that the tank was a machine. By itself, the tank is symbolic of the industrialization which was sweeping through and altering all levels of Western society in the 19th century. Although they felt the immediate effects of this great change quite intimately, most people failed to perceive the new outlook embodied in the mechanical approach: by substituting machines for men, science was

shortening communication distances and creating a multitude of new and revolutionary devices and substances which contained power, ability and energy heretofore unavailable to mankind. We of 1960, being more used to this pattern, can see more clearly than could Englishmen of 1900 how easily the new creations of science and industry could be adapted and applied to war.

Perhaps the military consequences of the industrial revolution are second only to the social ones. As a result of these developments, wars could not only spring up faster and involve many more people, but they could be fought much harder than ever before. The interdependence of nations produced by increased trade and communication was a great influence on the rise of the net of alliances which dragged so many nations into war in 1914. Even during the conflict, however, only a few people, among them Germany's Rathnau and Britain's Lloyd George, realized even in the most hazy fashion that the war was a war between "the smokestacks", more than between the armies in the field.

Our tank is typical of these developments. Like the machinegun which it was meant to destroy, it was the child of the mechanical approach, the attempt to substitute machines for humans. Like so many other such inventions, its ability to effect this substitution was badly underrated. Once again we must remember that this effort to make a fighting engine was one of the first such attempts to be made by the fledgeling industrialized nations as they embarked on their first industrialized war.

## PART TWO

### The Environment: A Family Portrait

The background material will be divided into five groups; first the nature of the British Army and its personnel; second, descriptions of some of the key persons involved in the British central government and high Army command; third, the nature of war at the turn of the century and the development of tactics before and during World War I; fourth, the nature of British central government including its rise to meet the new kind of war described in the preceding section; fifth, a description of the three great, general conflicts which prevailed within the halls of government during those hectic years. As the complexities of the situation become clearer, the twists and turns in the path of tank development will, we trust, become clearer also.

#### I: The Army

In the 1890's the British Army basked in the sunshine of many glorious years of conquest in the far corners of the earth. It was the child of the aristocracy, which with solemn eagerness sent its sons to become officers. It is well to remember this when we come to consider the political conditions in England, for these were also the years of liberalism, and of all the levelling of society which accompanies such movements. The training of young officer candidates at Sandhurst was generally doctrinaire; it was heavily weighted with apothegms and was guided by a single handbook, the Field Service Regulations. The FSR was revived rarely and only painfully for it provided a comfortable refuge and was a genuine answerbook. In it were enshrined numberless outdated but thoroughly standard methods.

One officer, Colonel J.F.C. Fuller, shows that his training, received around 1890, tried to instill a strict and unquestioning adherence to the dogmas of the past; it forced him into standardized thinking which tended

to eliminate any questioning attitudes, and generally displayed a removed and unrealistic attitude toward war.<sup>1</sup> When Fuller saw a real battle close up, he felt like Rip van Winkle, looking up from a twenty year perusal of the FSR to find things strangely changed.

The soldier, of course, was in a disadvantageous position with regard to progress. He spent most of his time in a world of make believe wars called maneuvers, for he could not easily manufacture real wars in which to test his ideas. Since he could rarely see out of his position, and the civilian or other type of outsider was rarely allowed to see in, he relied more and more heavily on past experience which he believed still applicable. In the generations of peace after 1815, the strategists and generals could do little but think about Napoleon: his published apothegms made marvellous talking material, and so for over 100 years strategists did little but talk of Napoleon and his philosopher-spokesman, Clausewitz. Unfortunately, the apothegms were so generalized that while they helped generals to talk and write FSR's, they turned out not to help them fight. The input of corrective notions was hampered by the guild complex which obsessed these men, and by a strong tendency to consider that rank, seniority and wisdom all went together. There was and likely still is "a deeply rooted bias in the British fighting services against novel ideas, especially when they emanate from below. Suggestions from juniors smack of presumption."<sup>2</sup>

One consequence emerges in common from these comments, and observation of history confirms it: changes in war take soldiers by surprise; foresight is made difficult by many factors, and reliable principles to guide strategic thinking have yet to be found.<sup>3</sup> As a result, "battle is unrehearsed, even unprincipled." This, even though there is much inter-war maneuvering and practice.<sup>4</sup>

1. Fuller, Colonel J.F.C., Memoirs of an Unconventional Soldier, ch. 1.
2. Swinton, Sir Ernest D., Eyewitness, pp 96-7.
3. See Bernard Brodie, "Strategy as a Science," Foreign Affairs, October, 1959.
4. Wintringham, Tom, The Story of Weapons and Tactics, pp 17-19.

What about the organization in which the soldier operated and the decision-making processes which prevailed within it? The seclusion of the military profession and the doctrinaire method of thinking combined in the long periods between wars in the last century to freeze the military organization into bureaucratic processes which did their part to embalm obsolete policies which should long before have been recognized as dead. Command processes seem to have degenerated into a job of passing paper orders down the line, waiting for replies, and then passing down new paper orders. In this way the high commanders thought, in their seclusion, that they were solving problems by thus ordering solutions to be effected; actually they were only passing the problem down the line.

But surely, one asks, there were new ideas: smooth bore cannon and cavalry are not used anymore. Where, then, did these innovations come from? Generally, there seem to have been two main sources, civilians and junior officers, or the enemy. Since custom dictated that a man had to have some 40 years practice in the military routine before he could be given responsibility for strategic decisions, he was probably among the least suited to supply the broad knowledge and outlook called for by such a position. He had spent his life behind the wall of doctrine and what new ideas did come forth from the "other world" burst upon him with a suddenness which regularly precluded his ever understanding them. Thus it was typical that most innovations should be offered and properly understood by only junior officers or civilians.<sup>1</sup>

An example of the other method of introducing ideas was the trench mortar, which the British high command vigorously rejected until the Germans proved its effectiveness by the most indelible method available. For better or worse, this method did not obtain in the case of tanks.<sup>2</sup> The first method was by far the most common, however, and points up the great contradiction in

1. Liddell Hart, B.H., The War in Outline, p. ix.

2. Swinton, op.cit., p. 106.

in the military structure, that those most highly ranked and regarded men are the least likely to originate and appreciate ideas, whereas those who do produce ideas are the most likely to be scorned by the men above them.

One of the largest consequences of seclusion was that the soldiers, like so many others, did not comprehend what the industrial revolution was doing to power relationships between nations; they did not see the intimate relation between military power and the harnessing of national resources which was felt so keenly and imprecisely by such men as David Lloyd George, who built Britain's munitions industry during the war.<sup>1</sup> Out of touch with the developing machine age, they were also unfamiliar with the characteristics and difficulties which we of a later generation quite naturally associate with machinery. What effect this had on tanks we shall see presently.

At the top of the Army were two major policy formation groups; the War Office in London was a civilian-military group of over 2000 people which also handled all supplies, munitions, transport and other administrative requirements of war; the other group was the all military General Headquarters Staff of the Commander in Chief in a given theater of operations. See Figure 1, page 8. Colonel Fuller described the War Office as it looked to him in 1918: "Four years ago it had been a combination club, monastery and office in which etiquette dominated, in which rituals were rigidly observed and in which regulations, however out of date, were laws. Now (August, 1918) it was a kind of Epsom Downs, a sprawling gathering of Generals, Colonels, lesser fry, civil servants (over 12,000 in all) among each class of which were to be found numbers of cold footed people whose one object in life was not to win the war but to stay out of it... At 10 am on 1st August, I joined this ink-slinging fraternity..." He quickly discovered that "there was no policy, no plan, no coordination and no control: absolute ways and dogmas choked every department... all things new were automatically pinched out by so many things old."<sup>2</sup>

1. Vagts, Alfred, A History of Militarism, p. 241.  
2. Fuller, op.cit., p. 342.

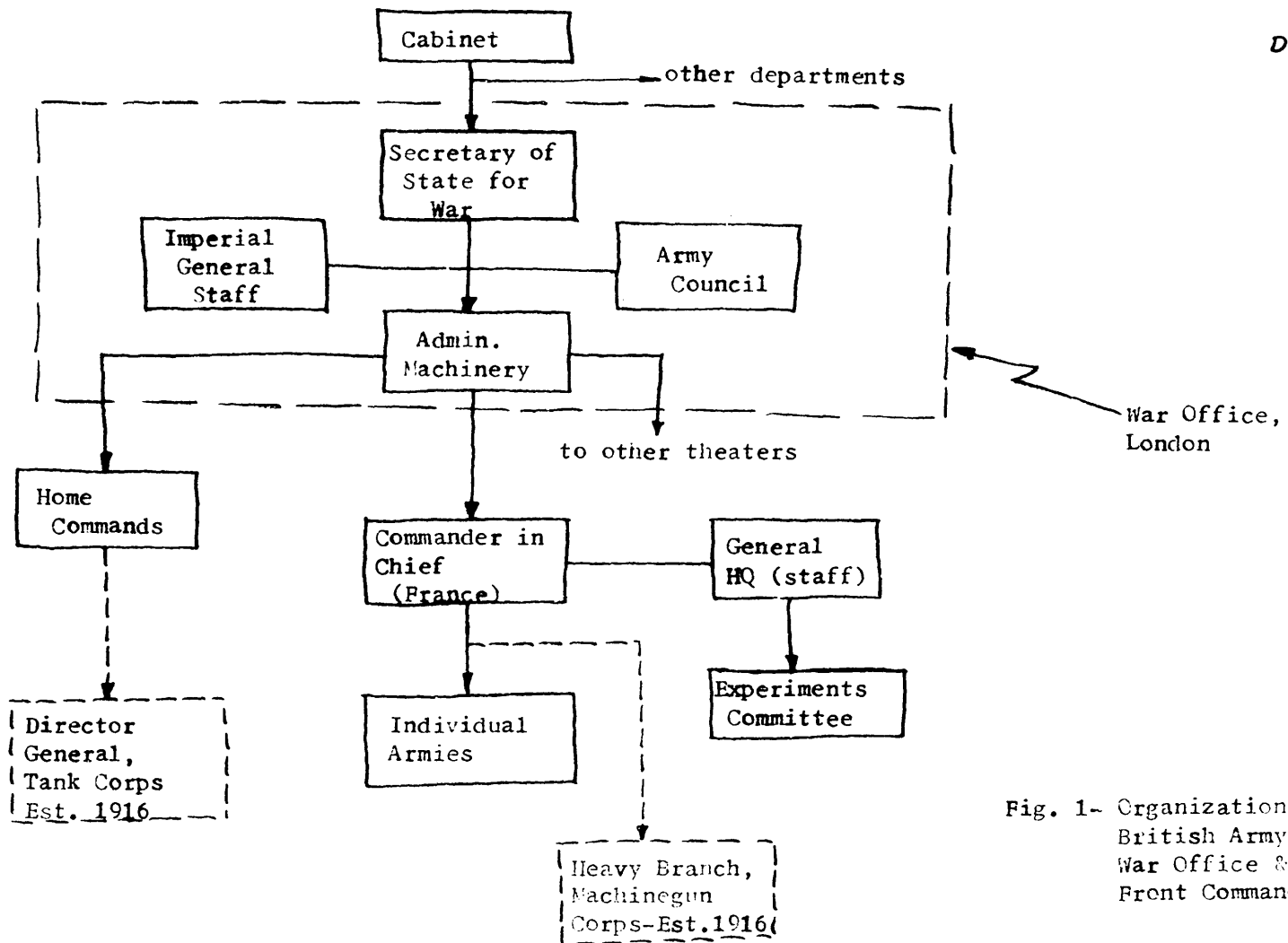


Fig. 1- Organization of British Army, showing War Office & Western Front Command

Fig. 1



As we shall see later on, the War Office was terribly overburdened with work, processing all of the administrative details for campaigns on over half a dozen widely scattered fronts involving some seven million fighting men. Some of its difficulties arose from the fact that both civilians and soldiers were working under the same roof and the inevitable frictions arose, especially in the top echelons. Yet civilian influence was sufficient to keep the War Office from being a pure example of the military mind in action. For that we must look at the Commander in Chief's General Staff.

The Staff was a group of 50 to 200 officers educated at the Army Staff School in the administrative and theoretical methods of planning and carrying out campaigns down to the smallest detail. The one we will be dealing with was in France, undoubtedly the most important, and always referred to as GHQ, General Headquarters. Here, as in similar groups, we find that the complexity of operations with armies of over a million men forced command to be fantastically fragmented; most of the actual command initiative rested finally in the hands of countless company and platoon leaders with never more than 50 to 100 men in their charge. The men at the top were consequently transformed into a board of directors, deprived of personal experience and battlefield reality, completely at the mercy of their sources of information.

General John Charteris, the Intelligence Officer at GHQ for most of the war, remarked in his diary for 7 April, 1917, that GHQ suffered from this great weakness: all of the work was systematized into a routine and most of it was done in an office some twenty miles behind the front. The members of the Staff had the greatest difficulty breaking away from their desks long enough to maintain close touch with the front. They could sometimes make a quick auto trip to within ten miles, but rarely got as close as two, and almost never made the hike over the last two miles to visit the trenches. On this date, Charteris remarked that it had been a month since he had made this hike, and this is the Intelligence Officer speaking.<sup>1</sup>

1. Charteris, General John, At GHQ, pp 209-10.

GHQ delegated its power so completely that at one high level conference just before a battle, the Generals told the Colonels to tell the Captains to tell the Lieutenants and NCO's to take the initiative and lead the men. Having done with the tactics for the coming battle, the Generals spent the greater part of the meeting debating what the men should eat the night before the assault, porridge or muffins.<sup>1</sup> This is a far cry from the days of JEB Stuart and Stonewall Jackson who themselves led the attacks of their small groups.

One estimate of the men at GHQ declares that "The vastness of the material and mechanical power available in modern war seemed to produce [in them] a kind of dull megalomania in which the ingenuity of execution was sacrificed to the immensity and elaboration of the preparation."<sup>2</sup> Notice, though, that these latter descriptions follow rather well what one might expect if this group were to be made up entirely of soldiers produced by the system described above, as of course it was. This was a group which found it easier to produce the paperwork for "unimaginative" sledgehammer blows than to think up a new kind of attack.

## II. People at the Top

Before we can go much further we must know something about the individual people who hold key places in the story. Sir Douglas Haig, the Commander in Chief in France, was one of the Haigs of Scotland whose family fortune had been made in whiskey some 100 years before. He had passed into Sandhurst with little difficulty and served as a cavalry officer in Africa for several years with much success. During the first years of the century Haig rose through the India Army where he made a name as an administrator and late in the decade returned to London to help Lord Haldane reorganize the War Office. When the war started he was given a Corps command, later an Army, and when Sir John French was removed as Commander in Chief in December, 1915, Haig took his place and retained it for the duration of the war.<sup>3</sup>

1. Fuller, op.cit., p 169. 3. Blake, R., Private Papers of Douglas Haig, pp. i-x.  
2. Cruttwell, C.R.M.F., A History of the Great War, p. 260.

Although descriptions of his character vary, most of them agree that he was clear headed, thorough and obstinate, "with an iron contempt for anything showy, vague, or insincere; he intensely disliked politicians, among whom he believed intrigue was almost universal."<sup>1</sup> His close friend John Charteris describes him as leading a mechanical life; he was systematic in the extreme, verbally uncommunicative, humorless, studious, well-read in military history, and he considered himself "the predestined instrument of Providence for the achievement of victory for the British Armies."<sup>2</sup> He was "unfortunately a cavalryman"<sup>3</sup> and believed that cavalry was the decisive weapon, while infantry and artillery paved the way for the horse charge which smashed the enemy. We will hear again of this paving, which Haig called the wearing down phase of a battle.

His colleagues agree that he had great difficulty expressing himself verbally, though in writing he was quite effective. (The phrase "With our backs to the wall..." comes from his famous dispatch in the Spring of 1918.) This inability to talk effectively isolated him from his intimates at GHQ, made it difficult for him to make his ideas understood by his Army commanders, and left him at a serious disadvantage in dealing with the more forensic statesmen of London, before whom he had to defend most of his major plans. In addition, he seems to have shared to a greater extent than usual the soldier's tendency toward optimism. His colleagues, political enemies and letters all testify to this tendency to emphasize the bright side and minimize the dull when speaking to superiors of subordinates. He seemed to feel, as we shall see, that he was doing all right without tanks.

Winston Churchill, the First Lord of the Admiralty, displayed the same forceful and determined character during World War I as he did when Prime Minister in World War II. Sometimes in, sometimes out of the Government,

1. Cruttwell, op.cit., p. 169.
2. Quoted in Fuller, op. cit., p. 136.
3. Cruttwell, op.cit., p. 169.

he nonetheless made his influence felt through his friends in the Cabinet, constantly writing letters and memoranda on many varied subjects. At the outset of the war, as First Lord, he defined his job in the widest sense: he intended to keep close watch on every phase of the Naval war. Yet he also ventured into land warfare, presenting several theoretical papers and even some suggestions for specific operations. He became, in a sense, a volunteer general staff. He was a shrewd politician and his quick mind and wit allowed him to "move like a panther" among his slower colleagues.<sup>1</sup>

David Lloyd George, a leading Liberal as was Churchill, differed from both Churchill and Haig in his very humble origins. Rising through the ranks of his party on the strength of his keen political instinct and skilful debating, he held in succession the posts of Chancellor of the Exchequer, Minister of Munitions, Secretary of State for War, and finally Prime Minister, which he attained in December, 1916 and held until 1922. He had a thorough distrust for the ability of military minds, and most of the military minds, conservative by instinct and political leanings, returned this distrust in full.

### III. A New and Unexpected Kind of War

Our background study now turns to the kind of war which this Army and these men were preparing themselves to fight. After 1871, the standard theory of what the next war would be like dictated a repeat of the 1871 pattern, a series of initial shocks administered with rapidity from which the recipient never recovered. A decision could then be expected within a year of fighting or perhaps less. This attitude arose both from a close historical appreciation of the War of 1871 and of Napoleon's dictum that attack power equals mass times velocity.<sup>2</sup> Only the Prussians had followed this dictum closely, but after the War of 1871, the French, having watched their compact professional army trampled by the Prussian mass, built a mass army of their own. The British, however, stuck to their professional fighting

1. Earle, E.M., ed., Makers of Modern Strategy, p 292.

2. Ropp, Theodore, War in the Modern World, p 186.

machine until after World War I started. This maintained the monastery-like nature of the British Army far into the war years.

In the 1880's an American named Hiram Maxim invented a rapid firing machine gun which was to have great repercussions on mass armies. This gun could fire between 250 and 300 rounds per minute, some ten to twenty times as much volume of fire as could be dealt by the infantry rifle. The range and power of artillery were also being increased at this time, and with these two developments came a vast increase in the firepower of armies. Even though the machine gun had the ability to make its operator equal to ten or twenty or more of his enemy, and even more if he were hidden, the generals of the time continued to measure and compare strength of armies in terms of absolute numbers of men. This was in accordance with Napoleon and Clausewitz, so it seemed, and kept generals from recognizing the growing evidence that numerical preponderance did not any longer equal strength, nor did concentration of numbers of men guarantee concentration of force.<sup>1</sup>

As a matter of fact, military strategists did not really know what to do with their new gift of firepower; the value of fire for defense was fully recognized and yet the partisans of the mass attack, who were legion, felt that morale, strong leadership at the lowest command levels (see pages 9 and 10), rapidity and energy of action, and surprise would maintain the balance on the side of the attackers. Marshall Foch seems to have been the foremost exponent of the offense and mass attack. An instructor at the French Staff School in the first years of the century, he took his lectures largely from Clausewitz and Napoleon. He was hardly alone in these convictions, however, for most of the General Staffs of Europe shared them.. All felt that the increase in firepower favoured the offense.<sup>2</sup>

Around 1906, Britain began to consider its most formidable possible enemy to be Germany and no longer France. Army policy thereupon shifted radically

1. Liddell Hart, op.cit., p. 71.

2. Ropp, op.cit., p. 200.

from its traditional role of defense against invasion with a compact army, (which task passed into the hands of the Navy) to that of conducting a large continental campaign side by side with the French. At this time, then, began both the increase in the size of the British Army and its now famous negotiations with the French Army.<sup>1</sup>

As a result of all this theory and negotiation, the war plans of all the Continental General Staffs were offensive, and all ultimately failed. Of them all, the Germans' Schlieffen Plan was the most appreciative of fire power. Anticipating the terrific casualties which fire power would cause, this plan, more than any other, sought to gain a really quick victory and came the closest to achieving it.<sup>2</sup>

A quick summary of the early events of the war will show what happened to these theories and plans: the Germans made a great drive on Paris, but it died short of its goal largely because of logistic difficulties. They tried to shift segments of their army back and forth along their line attempting to achieve a concentration at an enemy weak point, but the distances were so great and numbers of men so large that these movements were never quick enough; units were usually late and caught out of position. The gaps thus produced were poked at by the tired British and decimated French, but the Germans wisely saw the futility of the effort and pulled back. The two exhausted adversaries lay panting and staring helplessly at each other for a spell and then, attempting to avoid the frontal attack which was being thwarted by machine guns, began efforts to turn each other's flanks. This again failed for lack of speed in maneuver; the armies merely played leapfrog along the line until hastily improvised trenches, dug to avoid machine gun fire, stretched all the way from Switzerland to the sea. With this, the great and intricate plans for quick mobile warfare came to an end, smashed by firepower which forced the armies underground. Since there were no longer

1. Ehrman, John, Cabinet Government and War, pp 38-9.

2. Ropp, op. cit., p 204.

any flanks to turn, the armies were forced to return to the frontal assault.<sup>1</sup>

After this initial battle, the Germans turned their offensive attentions to Russia, in the end a most profitable move, but it gave the British time to raise a New Army of volunteers which would fight its first battle in 1916. On the Western Front siege tactics were adopted by September, 1914, in the belief that massed artillery bombardments would enable the infantry to "walk through the German lines," according to Haig. Later on, Haig was forced to admit the formidable nature of the defensive emplacements and therefore prescribed even larger bombardments. By 1917, preliminary artillery attacks of 21 days' duration were common. Yet this method of attack was never really successful where the defensive emplacements were carefully constructed; whole campaigns of a summer's length netted gains no greater than five miles at the cost of half a million casualties in most cases. Even a few machine guns, carefully placed in the defensive line, produced an interlocked web of fire which completely blanketed the front line area.

It had finally been admitted, then, that machine guns could lock the front. After an attack one could observe dead British soldiers piled around enemy machine gun emplacements like bugs around a light bulb after a summer evening. Thus grew the attempt to blast holes in the defenses with masses of artillery. This method seems to have failed for two reasons. First, it made the ground between the trench lines practically impassible to the infantry, removing the obstacle of barbed wire and replacing it with mud. Second, the long artillery preparation required for any attack removed any chance for surprise. The practitioners of the offense seemed to forget that they had prescribed surprise as a requisite to attack against massed firepower, and as surprise vanished, they continued to pound away, not realizing the enormity of the loss of that vital condition of success.

Mass artillery attacks had another side effect. The great dumps of shells

1. Ropp, op.cit., pp 223-5.

required precluded any great concentration on one part of the front, and made it almost impossible to shift the attack to another sector. Thus we see that not only was forward mobility eliminated by firepower but so was side-to-side mobility. For these reasons, there was no such thing as a surprise attack.

Consider for a moment what is perhaps the most far reaching effect of this method of attack: toward the middle of the war the British were firing off about 10,000 tons of shells per day, on the average. This put enormous strains on the productive forces of the nation and on the administrative sectors of government charged with supplying shells and the guns to fire them. In addition to guns and shells, of course, were countless other supplies to be produced, including tanks. The supply problem was worsened as Lord Kitchener, the Secretary of State for War, planned to raise his New Armies from raw recruits instead of using troops from the Territories, as was later done. This meant that each man and unit had to be equipped from scratch.<sup>1</sup>

As the struggle wore on, the defenses grew more careful and thus more formidable. Conventional siege tactics were insufficient because the defense was not a solid wall of one piece, but a series of meshes, alternating lines of barbed wire, trench and machine gun, barbed wire, another trench, more machineguns, which had to be cut piecemeal. As the strength of the defense rose, the siege methods were bloated in an attempt to cope with it; as a reaction, the defense only got deeper, deeper perpendicular to the line, and deeper into the ground.<sup>2</sup> Altogether, the great frontal artillery-infantry attacks gained little ground and ate men and material at a fantastic rate, unknown in the annals of warfare.

#### IV. British Government: Organization and Methods

The Central Government which had to face these challenges was, at the turn of the century, as ignorant of their impending threat as anyone else.

1. Ropp, op.cit., p 227.

2. Sheppard, E.W., Tanks in the Next War, pp 16-17.



Most central governments at that time could afford virtually to ignore the demands of war and were still not attuned in many respects to the full implications of peace or war in an industrial society. The full meaning of a nation at war fell upon central governments only after World War I began, as the problem of controlling sectors of the effort led to ultimate control over all sectors, until almost every aspect of national life came under central supervision.<sup>1</sup>

The principle agent in the process of development of the British Cabinet system since the turn of the century has been a central committee system which until at least 1920 was small and informal. This system "revolved a good deal-- even more than government at the center normally revolves-- around the contributions and interplay of personalities."<sup>2</sup> These committees arose as the technology of war became increasingly complex. The many ministries and departments which were created in the first 20 years of the century to cope with the problems of war administration called forth a vast array of committees to coordinate their efforts.

Just at the turn of the century the Boer War kicked off this process by revealing that the War Office (see Figure 2, page 18 and Figure 1, page 8) was entirely unfit to handle anything larger than a small colonial expedition. It could not plan or direct strategic policy, that task having been left to the commanders down in Africa. It was obvious that reform was the order of the day, that a thinking body had to be introduced, similar to the Board of Admiralty, which could produce strategic policy.

The first workable attempt to supply the War Office with such a group stemmed from the establishment of the Committee of Imperial Defense (CID) in December, 1902. Its members were the civilian Service Secretaries, the First Sea Lord, the Commander in Chief of the Army, the Prime Minister, and the Service Intelligence Officers. Thus the CID was centrally oriented

1. Most of the following, except where noted, is taken from Ehrman, op.cit.,  
2. Ehrman, op.cit., p. ix. Chaps. 1, 2, 3.

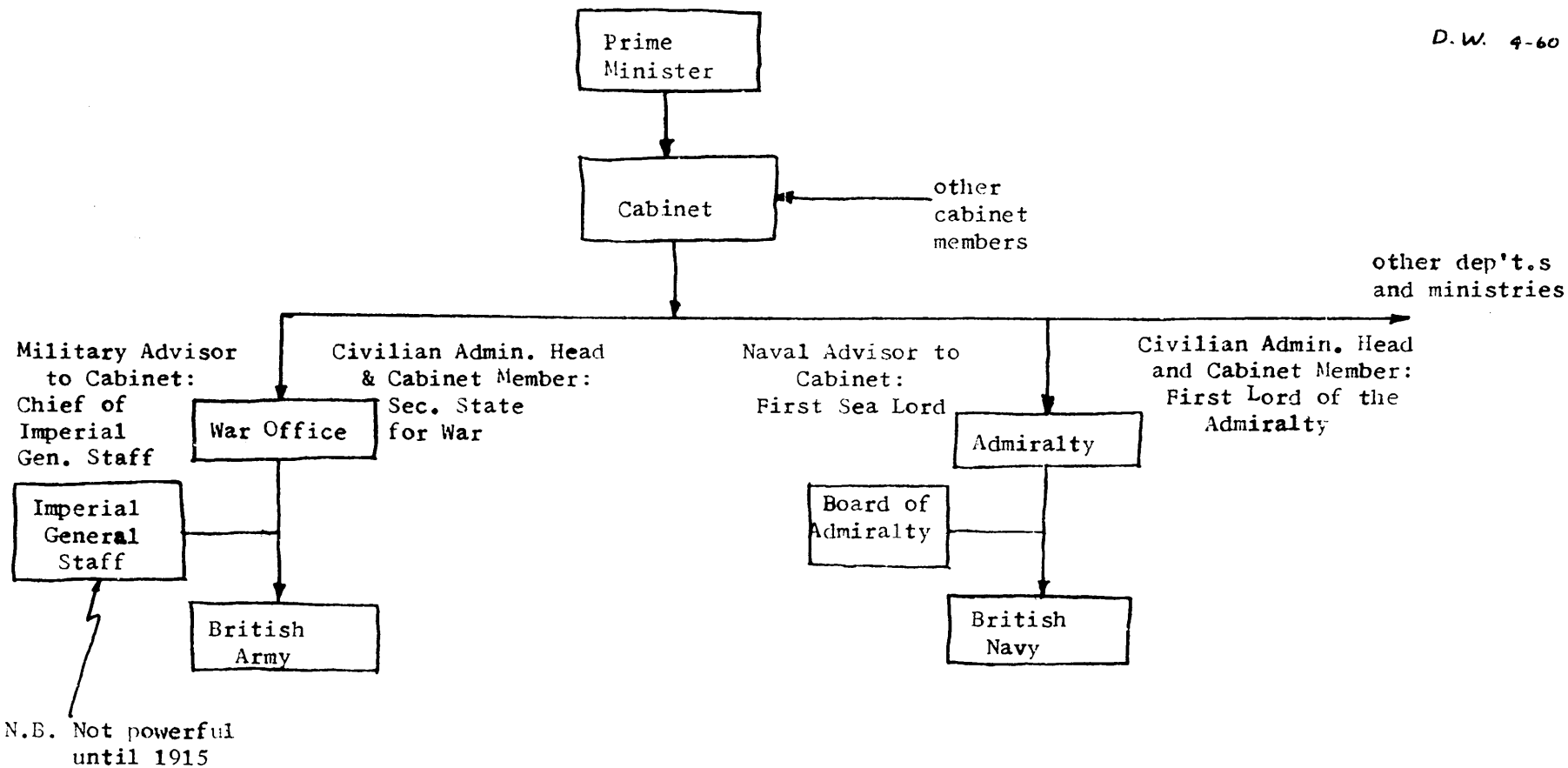


Fig. 2

Fig. 2- Military and Naval Sectors of British Government in 1914, showing relations between Prime Minister, Cabinet, Department Heads, and Service Chiefs (advisors)

from the start. "Never before had sailors and soldiers sat together with Ministers on a standing Cabinet committee."<sup>1</sup> The appearance of the CID made War Office reform inevitable and in 1904 the Select Commission of Parliament under Lord Esher made its famous report. As a result, the post of Commander in Chief of the Army was abolished and replaced by an Army Council similar to the Board of Admiralty, and the Secretary of State was given a Chief of Staff. Soon after, a General Staff was established.

The CID, though it made much progress, did its best work in administration. It was intended to be a study and advisory group, not one to produce binding strategic decisions, this function being left to the General Staff and the Board of Admiralty, respectively. In addition, the CID was at no time during its life accepted without question in all circles. It was an uncertain and often slightly suspect group whose usefulness was sometimes called into doubt. Thus at the outset of the war, a powerful central body with knowledge and authority for making strategic decisions was still lacking; for the first two years of the conflict, strategic efforts made by the Cabinet consisted of a "formless search for professional advice, based on no proper system, which was henceforward to distinguish the conduct of central bodies."<sup>2</sup> The Cabinet's effort took the form of establishing a specialized committee to handle strategy for all of the theaters of operations; for this purpose the CID was useless since it had established itself to concentrate on a single objective.

As the CID vanished from power (though it remained constituted), Prime Minister Asquith created a War Council in November, 1914 with the intent "to combine rapid and effective action with Cabinet responsibility and control."<sup>3</sup> This council had a varying name and membership, and usually was made of the Prime Minister, the Service Secretaries, their Military advisers, and several

1. Ehrman, op.cit., pp 28-9.

2. Ibid., pp 51-56.

3. Chambers, Frank, The War Behind the War, p 47.

other members of the Cabinet chosen by the Prime Minister, depending on how useful they might be in solving current problems. It took its name from the theater of operations currently commanding attention: War Committee, Dardanelles Committee, War Committee of the Cabinet. See Figure 3, page 21.

These successive committees, though representing the government's main instrument for coordinating political and military leadership, were nonetheless limited in their executive authority, since any great amount of such authority had to be obtained or captured from the Cabinet itself. Since the Cabinet was none too sure of itself politically, especially after May, 1915, it was rather reluctant to give much executive power away. The War Councils, being so weak compared to the Cabinet, were correspondingly weaker with respect to the Service Departments. The appointment of an eminent soldier, Lord Kitchener, as Secretary of State for War at the outbreak of hostilities, an unprecedented move, caused the almost immediate death of these committees as formers of strategy. In turn, he dominated the uncertain Cabinet and virtually abolished the General Staff, exiling it to France to become GHQ. He was then free to impose his highly personal methods on the department. The amalgamation of the administrative and strategic functions in one man at the War Office and their ambiguity at the Admiralty were equally disrupting, and staff work was virtually at a standstill.

The organization for strategic decision, thus awkwardly constructed, could only respond in jerks to the fast moving events. The Cabinet War Councils, whose names changed so often but which were so similar, reflect not flexibility but rather show an inadequate system reacting to situations as they arose. Such was the problem presented to these people as a result of the unexpected magnitude and complexity of the war. The difficulties sprang up and grew faster than the government could grow to cope with them and this, we shall see, is the story in most areas, not only central control,

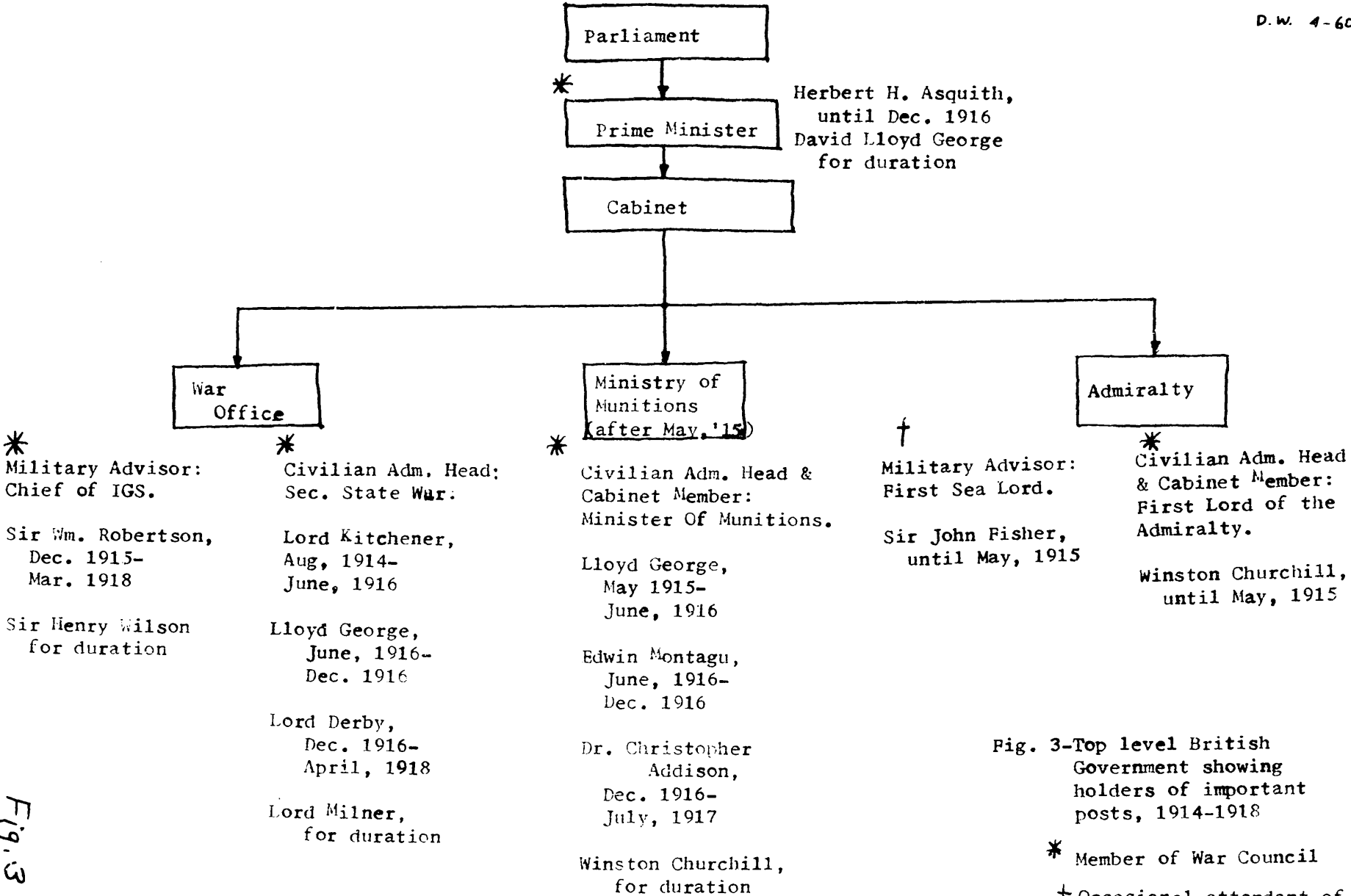


Fig. 3-Top level British Government showing holders of important posts, 1914-1918

\* Member of War Council  
† Occasional attendant of War Council

Fig. 3

but munitions, manpower, and as we have seen, tactics.

This confusion soon began to take its toll: in May, 1915 the public and the opposition Conservatives were presented with the failure of the Dardanelles Expedition and the revelation of an acute shell shortage on the Western Front. It was clear that changes would have to be made. To placate the Conservatives, Asquith formed a coalition government and removed Churchill as First Lord of the Admiralty for his part in the Dardanelles disaster. To correct the shell situation, and concurrently to curtail Kitchener's power and reduce his work load, he called upon Lloyd George to form a Ministry of Munitions, which will be dealt with in more detail later on. Asquith later rehabilitated the General Staff at the War Office (December, 1915), calling it the Imperial General Staff (IGS) and recalling Sir William Robertson from France to be its Chief. Thus in two quick moves Lord Kitchener's power and range of authority were cut back to proper proportions and staff work began again. However, central control remained as weak as ever, and as losses to submarines and casualties on the Western Front continued to rise alarmingly throughout 1916, the new government was soon forced out of office; in December 1916 Lloyd George formed a new and more equally balanced coalition.

Upon Lloyd George's becoming Prime Minister, great administrative changes took place: within a month four new ministries and three new departments were set up, mostly as reactions to the anticipated future magnitude of effort which the previous summer on the Somme had predicted would be necessary, but also to correct the mistakes of organization experienced in the first two and one half years of the war. The uneasy alliance of Cabinet and War Council was replaced by a small War Cabinet of semipermanent membership and great powers. Lloyd George intentionally made his War Cabinet of men unencumbered by departmental responsibilities so that it could function with some freedom and could devote full time to the job.<sup>1</sup>

1. Chambers, op.cit., p. 270.

Yet even this group neither obtained nor sought rigid control over all strategic decisions. It was Lloyd George's intention to allow the system to function informally, permitting the detailed strategic thinking to be carried out at the staff levels where it belonged. The development of the staff system was therefore given a boost and made much progress during 1917. Especially at the War Office, the Staff took its rightful place. Upon Kitchener's death in June, 1916, the experiment of a soldier Secretary of State for War was abandoned and civilians held the post for the rest of the war, ensuring the position of the staff. Yet all was not sweetness and light: Lloyd George had inherited Robertson and Haig from Asquith's era. The large casualty list from the 1916 battles on the Somme confirmed Lloyd George's suspicion and distrust for the capabilities of his Chief of the IGS and his Commander in France. Unfortunately these two men were far too popular with the Conservatives and the public to be removed. As we shall see, Lloyd George soon found that he had to clip the wings of his newly emancipated staff.

We must also understand some of the difficulties of government by committee, which permeated all levels of government throughout the war. Committees by their very nature seem to do much more talking than deciding. Committees of both soldiers and civilians soon find that two languages are being spoken at the conference table. Committees of soldiers of different ranks are regularly dominated by those who rank highest. Colonel Fuller recalls vividly that many of the meetings he attended decided little or nothing. Yet neither he nor any of the other principals involved seem to have doubted the efficacy of government by committee; we shall see them forming committees at the slightest excuse. The proliferation of interlocking groups of people coming from scattered spots in the government, representing and defending conflicting interests and policies, produced some truly amazing deadlocks and animosities.

It is useful at this point to investigate the very relevant problem of supply, both because it impinges directly on the development of tanks and also because it illustrates quite graphically the committee method of grappling with the enormous new problems which this war thrust upon the few people at the top of the government. It will also illustrate, as did the description of the War Office, how difficult it was for these enormous agencies to hold themselves together as their size increased so vastly and rapidly.

Long before the shell shortage broke onto the public scene, some of the men at the top of the government were becoming aware that the front was not getting as many shells as it could well use. Over the period from December, 1914, to May, 1915, nearly half a dozen committees of rapidly increasing size and urgency were set up to deal with this problem, all under the chairmanship of Lloyd George, then Chancellor of the Exchequer. Each committee in its turn gave way before the flood and a newer, larger, and still insufficient one was frantically thrust up in its place. The simple fact which was making itself clear for the first time was that trench warfare used up material faster than anyone had imagined.

Prior to May, 1915, control of munitions supply was exercised by the War Office, which meant Lord Kitchener. It soon became evident to the civilians in the government that 1) the soldiers simply could not direct such a vast effort of manufacture, organization and supply as this was going to be, and 2) that the soldiers would not admit that the problem was going to get that big, at least while Kitchener had anything to say about it.<sup>1</sup> In May the correct move was finally made: a separate Ministry of Munitions was set up independent of the War Office and the Admiralty to direct the entire munitions effort. After a few brief weeks of doubt the new ministry under Lloyd George grew quickly in its power and ability. This move was

1. Earle, op. cit., p. 290.



one of the first steps in the effort of the civilians, led by Lloyd George, to regain much of the control of the war effort from Lord Kitchener and the rest of the military.

The reaction of Kitchener and many of the other military leaders to the impending size of the war effort was to call for more soldiers. (The poster of Kitchener saying "I want more men and more men and more men until this war is won" is as famous in Britain as that of Uncle Sam saying "I want you!" is in this country.) Lloyd George's counter consisted of the two-fold concept that not only were many more guns going to be required, but that, parallel to the usual industrial principle, the employment of mechanical aids would effectively multiply the number of men on hand.<sup>1</sup> Whether the new Minister of Munitions realized this explicitly or implicitly, there is no doubt that he had no qualms about invading Kitchener's sphere of influence in munitions supply and taking it completely over for himself.

The theory of military supply is a complex one and a short review will help us understand what the Ministry of Munitions stood for. The problem involves the following five elements or processes: 1) there must be a need for a kind of supply, and its extent must be formulated quantitatively; 2) there follows development, experiment and modification of existing ideas, or 3) independent and original research, to produce new ideas; 4) production involves both state owned and private facilities, programming and supervision; 5) inspection guarantees the quality of the materials being produced. All of these factors may be observed in the growth of the tank.

This simple division of elements is, of course, too theoretical; overlaps are bound to exist. The overlapping, combined with the complexity of modern weaponry and the large portions of the national economy required for munitions production, make supply a very important and controversial problem. Inevitable difficulties arise between the supplier and the user over

1. Vagts, op. cit., p. 238.

production schedules, promised delivery dates, the substitution of the "quantity now" criterion for that of "quality later", and most acutely over the relationship between design and strategy. Of all these, the last brings most sharply to a head the great problem of who exists to serve whom.<sup>1</sup> The experienced reader will see instantly what difficulties can arise if one begins with the assumption that the military exists to serve the government's policy, and yet a part of that same government exists to serve the policy of the military. For he who calls the shots on design calls many of the strategic shots as well; as such, it is possible for either of two groups which nominally exist to serve to be in a great position to dictate, employing the supply problem like a great Archimedian lever.

Now, what actually happened in May, 1915, when the Ministry of Munitions was set up? The initial task of the Ministry was limited in the vital element of need to a passive role: it was to supply and supply only, determining neither the character nor the amount of the supplies. However, the Order in Council which defined the powers of the Ministry stated that the Minister's duty was to supply munitions as required by the Army Council, the Admiralty, "or as may otherwise be found to be necessary."<sup>2</sup> One can surmise that this vital change was made at the instigation of Lloyd George himself, who was thus empowered to take the liberty, as he often did, to overproduce some munitions on the assumption, rarely incorrect, that there would be an increased demand later on. We shall see below how conflict arose when the Ministry and the Army disagreed over how many tanks were needed. We will also see that, because of the high degree of Ministry initiative in design, the Generals never quite realized what was being built for them, in terms of the tank's capabilities.

The Munitions effort faced many problems besides relations with its customers. The supply of skilled labor was always short even at the beginning:

1. Chester and Willson, The Organization of British Central Government,  
2. Ibid., pp 222-3. Italics Chester and Willson's 1914-1956, pp 217-8.

skilled workers for the munitions effort had to be appropriated from the Army over Kitchener's loud objections. In 1915, however, it did not seem as though the nation would ever run short of resources. By July, 1917, when Churchill returned to the Government as Minister of Munitions, he found the situation much changed. He entered a new world governed by a new king-- the priority list. For as the great factories which Lloyd George had established were beginning at this time to produce and the whole nation was becoming an arsenal, the great bottomless maw of the Western Front was easily devouring the great rivers of supply which were now flowing. The most important items in short supply were shipping, steel, skilled labor, and money. Since the U-boats were taking their most terrible toll at this time, the Navy and merchant marine got first call on all of these items. Only after this could steel and labor go to guns, shells, tanks, and the myriad of other munitions products which Churchill tried to supply to the Services.<sup>1</sup>

Churchill found the Ministry a bloated organization, having in its haste to meet the exploding demand, added a greater and greater number of peripheral departments and committees (all impromptu creations) which revolved solidly around the hub of the Minister, who was saddled with all central control, coordination and responsibility. In order to ease this load on himself and give him time to make long range plans, he redistributed this maze of departments into ten broad groups and set up a "Clamping Committee" to hold them all together.<sup>2</sup>

By the end of 1917, after the third summer of terrible losses on the Continent, the shortages had become so acute that there were fierce battles for men and supplies between the Admiralty, War Office, and Air Ministry. The hardest fighting occurred in the area of manpower: both the War Office and the Admiralty demanded supplies by the thousands of tons and yet demanded more fighting men, men who were presently manufacturing those very

1. Churchill, Winston, The World Crisis, IV, pp 1-4.

2. Ibid., IV, pp 6-7.

supplies. The Minister of Munitions, thus caught in a cross-fire, was forced to ask for the establishment of a Priorities Committee to arbitrate the allocations among the services. General Smuts chaired this group and helped to quell the fight somewhat.<sup>1</sup>

#### V. Atmosphere and Attitudes at the Top

Now we must look at the most difficult area of all these, that of how these people at the top of the government and Army felt about each other. Some pages above we learned that personalities were important in this story, and we must keep this in mind as the story unfolds. For here at the top of the Government, leading a nation of some 40 millions through a terrible war was a group of hardly 100 men with an unbelievably enormous and urgent job to do. The physical problems of shortages were accompanied by the mental problems of anxiety, the pressure of time, the impact of events, and the knowledge that in their hands lay the fate of their nation. A small scale analogy to their situation would be a contest for their lives of threading needles against time while bouncing on trampolines. The reader must feel some of Churchill's humiliation upon being thrown out of the Government in May of 1915; he must know the battle Lloyd George fought with himself at the end of 1917 before he put out a draft call for 40 year old married men and men thrice wounded; he must understand Kitchener's position upon seeing his cherished prerogatives stripped away during 1915, until he was a mere shadow of his former self; he should go to the appendix of Lord Beaverbrook's Men and Power, 1917-1918, and read some of the frantic and pleading notes which these men scribbled to each other during the press of a parliamentary debate or after a sleepless night of doubt and fear.

Even if the reader cannot comprehend the meaning of 320,000 casualties incurred in capturing 42 square miles of mud near Ypres in 1917 (hardly

1. Churchill, op.cit., IV, pp 19-20.

enough ground to bury the dead in), he can perhaps share some of the feelings which these few men at the top felt as they tried to do their job, fight and win a war. The situation was made more difficult as each of them believed that the war could not be won without his plans and person being employed. So deep were some of these convictions that Colonel Fuller once remarked exasperatedly that it was next to impossible to argue with a man (Haig) "who considered himself God's messenger."

The story of high level relations is cut across by plot, intrigue, and personal antipathies. Policies and decisions were never arrived at without great interplay of a complicated set of forces which has yet to be historically analyzed. However, three main conflicts can be extracted from the morass. 1) Easterners versus Westerners: This was a strategy conflict. The Easterners thought that no way existed to break decisively the deadlock on the Western Front, and therefore pushed for offensives in the Mediterranean, Palestine, Africa, the Balkans, the Dardanelles, and other diverse areas. The Westerners felt that since Germany was the main enemy, Germany and not its satellites had to be attacked and beaten directly. Generally the Easterners were civilians (Lloyd George and, in a different way, Churchill) while the Westerners were soldiers (most particularly the team of Robertson and Haig. 2) Soldiers versus politicians: This was a fight for control of strategy and command prerogatives. Civil-military relations had been strained ever since the Army had won a clear victory in prerogative during the Irish revolt just before the war. These relations were strained even more as the growing totality of the war blurred the boundaries between the spheres of the Army and the government. The difficult questions of military policy also involved public morale and funds, manpower, and great constitutional difficulties, all too much for the soldiers to handle. In fact no really satisfactory solution to this problem was found during the war.

3) Liberals versus Conservatives: This was a struggle for control of

the central government, in which the soldiers took sides, mainly the Conservative side. The two parties were rather equally matched in power and relations had long been bitter. Although both pledged their support of the war effort, the old hostilities were not far below the surface. The Liberals feared the imperialistic tendencies of the Conservatives while the latter feared the former's pacificism and doubted their ability to prosecute the war vigorously. As we have seen, the situation soon forced a coalition Government to be formed, but the Prime Minister was a Liberal throughout the war.<sup>1</sup>

In general, the main problems seemed to align the soldiers against the politicians, and especially placed Lloyd George opposite Haig and Robertson. The difference was in part temperamental: the politicians were daring, casting their eyes about the world for offensive possibilities, while the soldiers were cautious and tried to restrain this free wheeling attitude. Lloyd George also shared more than usual the politician's contempt for the soldier's mind, and constantly could be found trying to limit the military's prerogatives in strategy formation. Most of his later administrative creations, the War Cabinet, the Supreme Allied War Council at Versailles, and others "had that undeniable air of being intrigues intended to side-step professional military advice."<sup>2</sup>

Each group thought that only chaos and defeat could result from the other's leadership.<sup>3</sup> Haig for his part considered Lloyd George "astute and cunning, with much energy and push, but shifty and unreliable." A. Bonar Law, leader of the Conservatives, was, in Haig's view, "a straightforward, honorable man."<sup>4</sup>

Before we discuss in detail the history of Haig-Robertson-Lloyd George relations, we should investigate the general nature of the civilian official's position. His job included maintaining public morale and confidence, and

1. Blake, op.cit., pp 31ff.

2. Chambers, op.cit., pp 260-1.

3. Beaverbrook, Lord, Men and Power, 1917-1918, pp 116, 187, and passim.

4. Haig's diary, quoted in Vagts, op.cit., p 237.

thus he was often forced to exaggerate the successes and minimize the mistakes of the military leaders; as a result the soldiers became demigods to the public, and the ministers found it most difficult to control or dismiss Generals in whom they had lost confidence sooner than had the public. Consequently, the ministers were caught at the disadvantageous end of a difficult power triangle. Another difficulty which civilian ministers had in controlling the soldiers arose from the great complexity of the new war. Soldiers would bury any plan they disliked by calling forth a mass of technically worded and computed objections which ignorant ministers could not bring themselves to counteract. Because the battle line had no flanks to be turned, strategy degenerated into massed tactics which had to be carefully, painstakingly calculated. No layman could object to the presentations of a commander who gave assurances that his calculations were sound.<sup>1</sup> The soldiers had, as a result of their domination of certain information sources, a great deal of power. The only way the civilians could escape this power triangle was to await some defeat to befall the soldiers which was too great for propaganda to make into victory; then they could take the opportunity to call the Generals' methods or policies into question.

The specific conflict between Lloyd George and his Chief of Staff and his Commander in Chief in France began long before Lloyd George became Prime Minister. He took over as Secretary of State for War after Kitchener was killed in June, 1916. Immediately he felt cramped in the reduced power position to which Robertson had reduced Kitchener, and though Lloyd George had once approved the reduction, he now resented Robertson for it. He pressed for greater powers but did not receive them. His attempt was to defend the ministerial powers against the growing encroachment of the soldiers, but was also a reaction to the Western strategy of Haig and Robertson. It is not surprising that upon becoming Prime Minister he continued his efforts to reduce the military men's strength, especially as their conduct of the

1. Cruttwell, op.cit., pp 625-6.

Somme offensive had aggravated his low opinion of their abilities.<sup>1</sup>

The new Prime Minister was not aided in his efforts by the method through which he reached the top. It was an intrigue-filled political maneuver which involved scuttling the current Prime Minister and idol of the Liberals, Herbert Henry Asquith. He had, as a result, little support from the Asquith faction of his party and, at the outset, little more from the public. All through the remainder of the war he had to tread a very narrow path in order not to upset his delicate coalition. The Liberal Party never did recover from this split of December, 1916. Lloyd George was also hampered in his efforts to further Eastern strategic ideas, for those who supported his scuttling of Asquith were mostly Westerners. His position in the coalition was further weakened by the fact that the rank and file of Conservatives tended to have the instinctive conviction that only the sailor and soldier could be correct on military matters.<sup>2</sup> Thus he was forced, by his great lack of power, to retain the Chief of Staff and Commander in Chief whom he had inherited, though his trust in them was daily declining. It was a year before he attempted to challenge them.<sup>3</sup>

As the year 1917 wore on, the Cabinet had to approve Haig's plans for protracted seige operations, though it had the greatest misgivings. The Cabinet people were led to approve, it seems, by Haig's optimism and his equally optimistic intelligence reports. All through the debate and battle, Haig and his plans were staunchly supported by Robertson. But the War Cabinet had to give its sanction and thus it assumed the entire responsibility for the vast casualties which inevitably resulted from this "wearing down" phase of the war. Their feeling of blood-guilt after the Battle for Passchendaele (320,000 casualties in 1917) was as great as it was understandable. The seige tactics produced only casualties, and that autumn, Lloyd George said to Haig, "You capture a village in Flanders and Serbia goes smash. You

1. Ehrman, op.cit., pp 86-7.

2. Liddell Hart, op.cit., p 163.

3. Blake, op.cit., pp 40-1.



capture another village in Flanders and Romania goes smash. Next week you will capture another village in Flanders and Italy will go smash."<sup>1</sup> When, he was implying, would Haig produce such a smashing victory?

Lloyd George realized soon after taking office that straight-forward methods would not suffice to remove Robertson from office and that nothing would oust Haig. So the Prime Minister turned to more devious paths. At one point in the fall of 1917 he deliberately consulted soldiers outside the Government for long range advice, hoping to make Robertson resign, but the staunch soldier held on in this spirit of no confidence until the following spring. He also began attacking Haig's staff, forcing the removal of some of its high ranking members. A simultaneous attempt to remove Haig was stopped cold by the Conservative Secretary of State for War, whose threatened resignation would have smashed the coalition.

Lloyd George finally found two keys to curtailing the military and their seige tactics: remove them from effective command by establishing a Supreme Allied Commander, and rob them of fighting strength for an offensive by withholding reinforcements. As a result of these moves, an Allied Supreme War Council was established at Versailles, with Sir Henry Wilson as the British representative, having orders to report directly to Lloyd George. This was too much for Robertson, who was effectively cut out of the picture entirely; he resigned in February, 1918. Lloyd George then recalled Wilson to be CIGS, and since Wilson was the special nominee of Lloyd George, he came under the latter's thumb quite effectively. The British collapse before the German spring offensive of 1918 gave Lloyd George his opportunity to secure an Allied Commander in Chief; in March, 1918, Marshall Foch was appointed.

The manpower shortage which Lloyd George imposed on the Western Front remained in effect, however, with important results for the development of tanks. We can see, then, that by December, 1917, Haig and Robertson were

1. Cruttwell, op.cit., p 499.

struggling not only for men and supplies against various kinds of difficulties, but they were also fighting for their professional lives and trying to prepare for the expected German onslaught.

The purpose of all this has been to acquaint the reader with the personality of the British governing and fighting machinery and people, for as we shall see presently, the tank was the very particular child of a very particular environment. The reader should also be aware of some of the reasons why the tank was developed only after the war began. Like the methods and agencies of government produced during the war, it too, was an impromptu creation. The surprise of this war was too great to allow anticipation of the conditions requiring any of these developments. Many factors conspired to cause the relative ignorance and lack of preparation displayed by governments and nations toward the phenomenon which we now call Total War.

PART THREE

The Invention of the Tank  
and its Development

Chapter I. The Birth of an Idea

As we begin the narration of the conception and development of the tank, we should bear in mind that a number of varied developments may be observed. The tank developed as a piece of mechanical engineering in London, and as a tactical weapon in the British armies fighting in France. The engineering development, which passed through its fundamental stages before those of the tactical phase began, was handled mainly by civilians, in the government and in private manufacture. The other phase properly or improperly fell to the soldiers, Generals of high rank on the Western Front; when men of lesser rank tried to get their tactical ideas adopted, they were usually unsuccessful.

We must also bear in mind that what is to be observed is the development of an idea; the various configurations or tactical sorties of the machine itself were merely symbolic of stages in the growth of the idea of a tank. For a time the main thinkers of this idea were engineers; later on the thinking passed into the hands of the Generals. The difficulty of development then arose partly from the difficulty each group had in formulating its ideas, and in the further friction, never overcome, which arose as the soldiers picked up the first tanks in mid 1916 and tried unsuccessfully to transfer this partially developed idea into their world of thought. This transfer was initially rather unsuccessful, and the difficulty lay not with the design, not with designers or generals, but rather in the fact that the designers and Generals constituted a duality, at once a social, professional, and geographic duality. When we combine this influence with that of the overall environment (confused and often subverted command structure, proliferation of deadlocked committees, overweening pressures of manpower and

material shortages, and so on), we will begin to get an appreciation for some of the problems of introducing the tank into the British fighting machinery.

### 1. Early Experiments

The first design for an armored fighting vehicle was submitted to the War Office in 1911 by a Nottingham plumber who dabbled in toymaking. It was immediately pigeonholed, only to be discovered after the war. On it was found the comment: "The man's mad." In 1912 a Mr. de Mole presented a design in many ways superior to the first one produced by official government activities in 1916. The War Office returned the drawings to the originator, but retained sketches. They were not referred to in the course of official developments.<sup>1</sup>

The first wartime inkling of such a vehicle seems to have come to Winston Churchill, in his capacity as First Lord of the Admiralty. He was concerned with the defense of advanced Zeppelin bases near the front and, in August or September 1914, had a considerable armored car contingent in the forward areas for this purpose. The Germans, however, were effectively frustrating these cars by cutting gaps in the roads, and Mr. Churchill's thoughts naturally turned toward a vehicle which would not be bothered by such gaps. By October, however, the trenches of the growing stalemate were presenting similar but more serious frustrations to the British infantry. Since both the orthodox frontal and flanking attacks now appeared ineffective, some method of crossing over the trench obstacle was definitely needed, and to this problem Churchill addressed himself. The form of the idea was: trench-crosser.<sup>2</sup>

Tractor vehicles caught Churchill's eye in November, when he heard of a design for heavy artillery mounted on and pulled by tractors. The designer, Admiral Bacon, produced sketches for a trench crosser which carried its own

1. Liddell Hart, The Remaking of Modern Armies, p 283.

2. Churchill, op.cit., II, p 61.

bridge, but subsequent tests showed it unsuccessful. Though this first idea died, Churchill's interest was rekindled by a paper he received from Colonel Maurice Hankey, Secretary to the CID. Hankey's paper was written in response to suggestions from the official British War Correspondent at the Western Front, Colonel Ernest D. Swinton. This paper gave an accurate analysis of the nature of the stalemate and suggested something similar to Churchill's trench crosser.

On 5 January, 1915, upon reading this paper, Churchill wrote Prime Minister Asquith in support of its idea of designing a trench crossing vehicle heavy enough to crush barbed wire entanglements and armed sufficiently to be a rallying point for offensive infantry action. Thus, with Swinton's help, the idea grew. Asquith then passed the idea along to the Secretary of State for War, Lord Kitchener, who seemed favorable, and who passed it on to the Master General of the Ordnance. There the idea died amid questions as to who might be consulted for technical aid; when no name was forthcoming, the project was dropped.<sup>1</sup> At the same time, however, in another part of the War Office, tests of Holt tractors (see Figure 4, page 38) as supply carriers were being carried out over some kind of obstacle course; these tests they apparently failed, for the War Office people involved reported that no modification of the Holt machine (not the principle, now, but the machine) would enable it to be successful.<sup>2</sup>

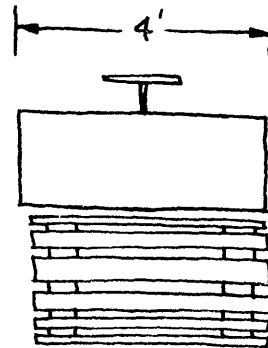
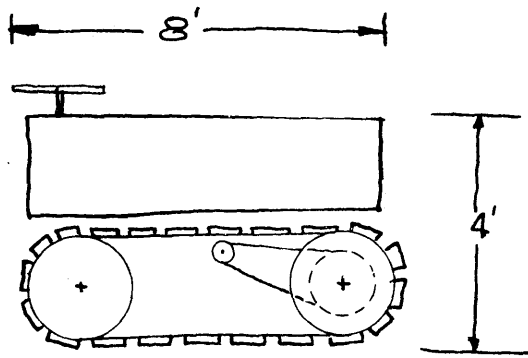
Hearing nothing from the War Office, and expecting the worst, Churchill initiated studies by his Director of Air into steamrollers to smash trenches. Though this idea turned out to be mechanically unfeasible, it sufficed, says Churchill, to get the ball rolling.<sup>3</sup>

Whether it got the ball rolling or not, this idea was rather far afield of the early ideas. In fact, the further studies carried on by the Admiralty

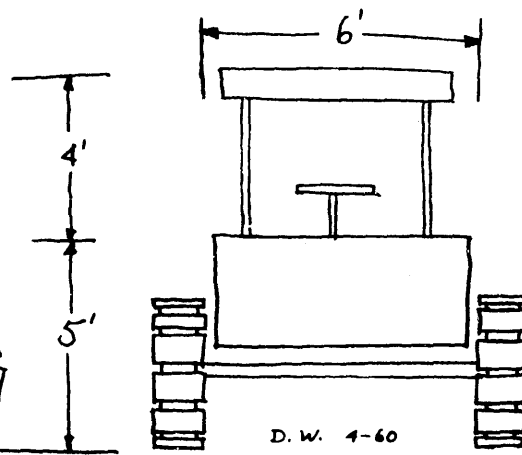
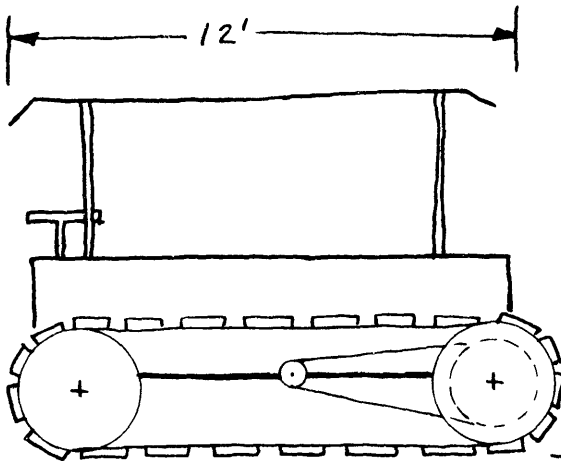
1. Churchill, op.cit., II, pp 62-5.

2. Swinton, op.cit., p 163.

3. Churchill, op. cit., II, p 67.



Pedrail Type



D. W. 4-60

Holt Type

Fig. 4- Two types of agricultural tractors used in Landships Committee experiments.

Fig. 4

all seemed to be dogged by a lack of direction, as if the tactical purpose which was being pursued was not actually very clearly kept in view. An example of such a suggestion is Major Hetherington's, a machine which would cross trenches on the principle of the large diameter wheel, which would not get caught in the gap. The diameter suggested: 40 feet! No tactical maneuverability such as that envisioned at the beginning could be attained by such an unwieldy monster, and yet a one-third scale model had to be built and tested before its unfeasibility was realized.

Yet Churchill was a driver, and was determined to see action on his ideas. On 20 February, 1915, he summoned the Director of Naval Construction, Mr. Bustace Tennyson d'Eyncourt, a very capable engineer and administrator, and directed him to chair a Landships Committee which would secure a solution to the problem. When d'Eyncourt returned a month later with two possible designs, one on the caterpillar (Holt or Pedrail) principle and one using big wheels, Churchill appropriated £70,000 of Admiralty funds to the Landships Committee for its use in development.

The name Landship was chosen partly to pacify any officials who might inquire as to why the Admiralty might be designing land warfare vehicles, especially as Churchill took the money without telling the Treasury, the First Sea Lord, the Board of Admiralty, or the War Office. This last group was kept uninformed until June because he feared that, as they did not seem to like the idea very much, they might try to stop his actions.<sup>1</sup> As Churchill perceived, the earlier ideas submitted to the War Office made no headway largely because their instigators had no executive authority. Being blessed with this power, he was determined to use it to make headway unaided and unhampered by other government agencies. Thus the work proceeded almost in secret: the British Navy, of all groups, was building land warfare vehicles. Despite its appropriation, though, the project was quite small, carrying on in a carriage house in the London suburbs.

1. Churchill, op.cit., II, p 71.

About this time, Churchill obtained a valuable assistant for d'Eyncourt, a banker named Albert G. Stern. Soon to take d'Eyncourt's place as chairman of the Landships Committee, Stern made his influence felt as a powerful organizer who, because he was only a temporary Lieutenant, was not afraid to say just about anything he pleased to just about anyone he pleased. Stern immediately began handling contract arrangements with various civilian manufacturers for the investigation of tractor mechanisms and other related items.<sup>1</sup>

Stern reports in his memoirs that among the ideas floating about the Landships Committee in early spring, 1915, was one for a personnel carrier of either the tractor or big wheel type, designed to carry about 100 men across the trenches. The big wheel type was quickly dropped and when the Committee made its fiscal report in June, it admitted that almost no progress had been made; it had decided, however, that landships would have to be two-tracked, double ended, powered by two engines, and would need a mechanism to cut barbed wire.<sup>2</sup> It appears from these last bits of information as though by this time the Committee had almost completely lost sight of Swinton's and Churchill's original aims as regarded tactics. A machine with big wheels or one to carry 100 men could hardly be a rallying point for offensive infantry action.

The catastrophic failure of the Dardanelles expedition plummeted Churchill from office in May, and naturally his project suffered by association. The appropriation soon became known, and was cut to £20,000, while the new Board of Admiralty proposed dropping the whole project. Only a personal appeal by Churchill to the new First Lord, Arthur Balfour, saved the Committee and allowed it to continue work on one experimental vehicle.<sup>3</sup>

On 8 June, 1915, the Landships Committee, with d'Eyncourt as chairman

1. Stern, Albert G., Tanks, 1914-1918, p 17.
2. Ibid., p 20.
3. Churchill, op.cit., pp 71-2. (vol II)



and Churchill as a sort of honorary chairman, decided that it might be useful to ask the War Office what sort of obstacles a Landship should be designed to surmount. This was the first formal contact the Landships Committee had with the War Office, because Churchill's secrecy ban was now removed.<sup>1</sup> No direct answer to this query was ever received; other events took precedence. At the same time, the Committee asked the War Office about weaponry for the vehicle. To aid in its design deliberations, Stern and d'Eyncourt finally decided to ask the War Office to send a member to sit on the Committee. The War Office responded by taking the whole project in tow and appointing its own chairman. Now, including Churchill, there were three chairmen.

About this time also, the name of the Committee was changed to the Joint Naval and Military Committee on Landships. The Admiralty continued to supply the manpower, which the War Office refused to do, and these men, called Squadron 20 of the Armored Car Division, numbering 50 men at the time, grew to over 600 by the war's end. This group of sailors carried out all experimentation, testing, and shipping of tanks throughout the war.<sup>2</sup> The War Office's refusal to supply men came from the Adjutant General, who also refused to attend any trials of mechanisms by the Committee to which he was invited. No explanation for this seems to be available, except that the AG was overwhelmed with work trying to raise men for the New Armies.

## 2. Colonel Swinton Returns

By July, the Committee knew that all of its early designs were failures. Although Stern makes no mention of it, a list of requirements for the vehicle's maneuvering ability, received on 30 June apparently from the War Office but actually from Colonel Swinton, seems to have helped the Committee realize this fact.<sup>3</sup> Accordingly, it sought out professional help from Mr. William

1. Stern, op.cit., pp 22-4.

2. Ibid., pp 27-8.

3. Swinton, op. cit., p 163. The source, date of delivery and content of this document have been pieced together from Williams-Ellis, The Tank Corps, from Stern, op.cit., Swinton, and the Encyclopedia Britannica.

Tritton of Foster and Company. After a few false starts, Tritton and Lieutenant W.G. Wilson produced a superior design on a modified Holt principle.<sup>1</sup> About this time, July, 1915, the Committee met Colonel Swinton.

Colonel Swinton, in his capacity as War Correspondent, had enjoyed free run of the front line areas since September of 1914, and had had plenty of opportunity to observe the conditions and quantitative elements of the stalemate. His first conception of an armored vehicle occurred on 19 October, 1914, when he recalled the reputed feats of a Holt tractor demonstrated recently in Antwerp. His knowledge of conditions on the front led him to believe that a modified Holt tractor, suitably armored and armed, could break the wire, cross trenches and destroy enemy machine guns.<sup>2</sup>

This idea is far different from Churchill's or any of those subsequently conjured up by the Landships Committee: if specifically was intended to destroy machineguns, which, Swinton was convinced, were at the root of the stalemate. Apparently no one shared Swinton's clarity of conception; only when his list of design parameters reached the Committee the following June could the Committee clear its head and design a workable machine.

Swinton was determined to present his idea at the very top of the Army, Lord Kitchener, knowing that the idea would get respectful treatment if it had the endorsement of the great soldier. Accordingly, Swinton went to London to visit the War Office, but the press of events prevented a personal interview between the two. Swinton lamented the lost chance to make a good first impression where it counted most; we might note, though, that Swinton was bypassing a great line of command in order to make this presentation at the top. As we shall see, there was no lack of official methods: Swinton merely ignored them. At all events, He had to revert to a written report, actually prepared by the Secretary to the CID, Colonel Hankey.

Hankey's memo to Kitchener met with no approval, so Hankey rewrote and

1. Stern, op.cit., p 31.

2. Swinton, op.cit., p 79.

enlarged it; sensing that Kitchener could no longer be approached, he sent it to Asquith and Churchill, among others, on 5 January, 1915, with results described above.<sup>1</sup> See Figure 5a, page 44. This was the "first seed." It was also the first knowledge Churchill had of Army efforts. Swinton was not to learn of Navy efforts until late July.

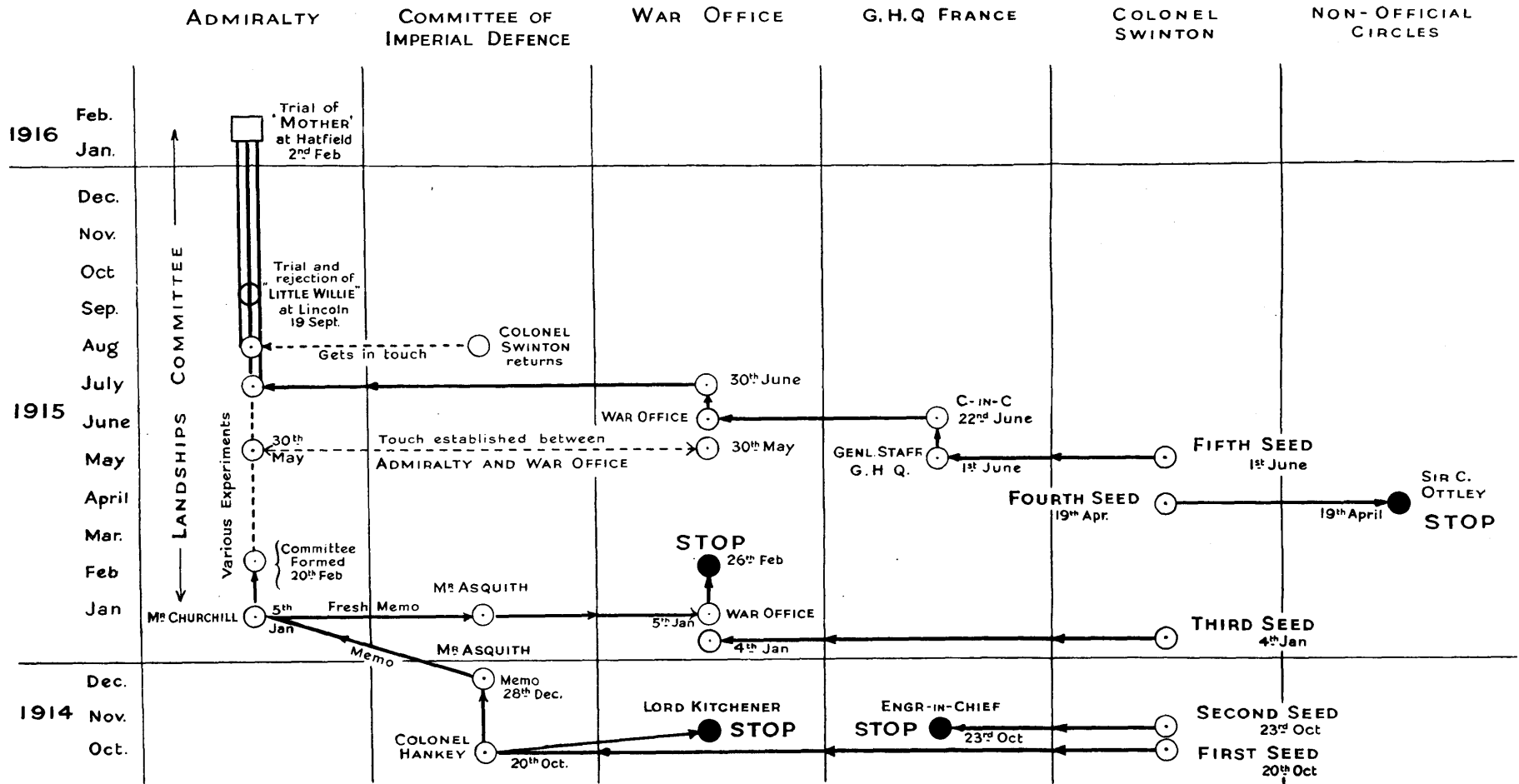
The second seed was sown before the Engineer in Chief, France, who seemed cool on the idea and did little to help it along. So, in February, to accompany Hankey's encirclement of the War Office from above, Swinton attempted to move in from below, approaching the Director of Works and Fortifications at the War Office, General Scott-Moncrieff. He seemed enthusiastic and passed the idea on to his deputy in charge of trench warfare, but the General had his doubts. He explained to Swinton that it was Office policy not to originate weapons or make suggestions to the Army in the field, but rather to investigate projects at the suggestion of GHQ. This policy was obviously part of the Office's theory on supply. (See pages 25-6)

Swinton found out only much later what had happened to his third seed, and his comments reveal a great deal about both his theory of supply and the War Office's. The seed apparently caused the technical people at the Office to test some Holt tractors; they rejected them without telling the IGS.<sup>2</sup> This was a considerable blunder, and when it was discovered some months later, the Office contacted the Admiralty and joint action soon followed. But the blunder raised comment from some quarters that the technical branches had not "been put in their place" before the war and did not understand their prerogatives; they had to refer all questions of broad policy to the IGS, and at this time they were forcibly reminded of "their place."

Swinton was told this by General Callwell, an influential member of the IGS, and Swinton comments that Callwell was overemphasizing the ability of the IGS to make such broad decisions when they involved technical problems.

1. Swinton, *op.cit.*, pp 94-5.

2. This may have been the test referred to on page 37. The data are very unclear about dates of such tests and the exact people who performed them.



N.B. The word 'STOP' shews where the Seed died

Fig. 5a. From Swinton, *Eyewitness*, Appdx.

The Staff always admitted that expert opinion was necessary, but in fact experts were considered narrow and often did not receive a hearing. Thus the Staff often operated without sufficient information.<sup>1</sup>

We see, then, that in theory the War Office technical people could not act on a suggestion if it affected broad policy (how could they judge this?) without IGS approval (how could they judge?) or directive from GHQ, France; if they attempted to do so, they were definitely stepping out of line. Swinton, on the other hand, felt that the Staff might regularly discount suggestions from experts, and since the technical people could make none of their own, none might be made at all. The exact order in which the design process should be carried out was obviously in dispute, for when the Ministry of Munitions was formed a few months later, it was given the prerogative to make concrete suggestions of this very nature. See page 26.

By April, when Swinton had heard nothing of his third seed, he despaired of any progress and was even moved to contact a private individual, who expressed sympathy but could offer no help. By June, Swinton was so desperate that he played his last card, "which turned out to be a trump."<sup>2</sup> This was a memorandum to the current Commander in Chief, Sir John French, entitled "The Necessity for Machine Gun Destroyers." In it Swinton described the nature of the defenses which the Germans had built so carefully, and stated: "The chief feature is the number of machine guns employed, and is also the only novel feature: it has allowed them much economy of men while enabling them to stop every British attack." The attack could be reinstated, he said, by 1) sufficient high explosive artillery or, 2) a new means for destroying machine guns. Since power for the first alternative was currently lacking, he expanded on the second. He suggested petrol tractors of the Holt type, with a speed of four miles per hour over flat, open country, ability to cross a trench four feet wide, protection against armor-piercing

1. Swinton, op.cit., pp 140-1.

2. Ibid., pp 129ff.

bullets, and armament of two machine guns and two light cannon. With such a configuration, they could be employed on a large scale in a surprise attack, having been brought up to the front on railroad cars. In the attack, they would be spaced, say, at about 100 yard intervals over a three mile front. A brief night bombardment would destroy any wire and at dawn they would move on the German trenches, crush machine gun emplacements, cross the trenches and lead the infantry through. Even if they turned out to have little offensive power, they would draw much fire away from the unprotected men, thereby projecting the attack and saving casualties. A significant amount of unity between design and tactical employment was implied in this memo, as we shall soon see. Note also that the memo constituted Swinton's first attempt to approach the problem of convincing the hierarchy through normal command channels, and the first which met with any success. The fact that both correct and incorrect methods of getting things through the hierarchy shared success and failure equally during the tank's development testifies to the procedural confusion which prevailed.

Sir John French showed the memo to his Engineer in Chief, who evidenced his lack of understanding of Swinton's ideas by commenting as follows: "Caterpillars [which I have seen] could go only at the rate of one and one half miles per hour on roads, were very slow in turning, and nearly every bridge in the country would require strengthening to carry them... It is necessary to descend from the realms of imagination to solid fact."<sup>1</sup> These objections Swinton answered in a series of memos strung across the month of June, with the result that the idea was sent to the Inventions Committee of GHQ, among whose members were certain friends of Swinton's with whom he had discussed his idea many times.

The Inventions Committee approved the idea for a machine gun destroyer along with Swinton's specifications and passed the whole thing back to French with their blessing. He, in turn, wrote to the War Office and (following

1. Williams-Ellis, Clough, The Tank Corps, p 38.

the method approved by policy) directed it to investigate and ask civilian manufacturers to ascertain design parameters for weight, shape, size, and the possibility of construction. Swinton thought that his was going at the matter backwards (see previous remarks on method, page 45) for in France the needs were known and, being an engineer, he knew that the design could be fitted to the needs if only the War Office knew them. This the current designers did not, as the actions of the Landships Committee clearly show. As a result of Swinton's remonstrance, he was sent to the War Office to explain his memo in person.

At this point it should be emphasized that Swinton's objection to French's letter was quite fundamental. Swinton felt that a design could be worked out to meet any reasonable request. The nature of this request was not mechanical, however, but tactical: GHQ should properly ascertain its tactical problem, describe the physical conformation of the trench systems, and ask for a tractor, or other vehicle, to surmount them. Design engineers would then produce a machine which would perform mechanically such that it would succeed in the tactical task which had been outlined for it by GHQ. Thus some tactical theory, even the most rudimentary, had to exist before the engineers could begin. Swinton's memo contained such a theory, which he later expanded.

Further, once the engineers had the tactical assignment, they were in the best position to produce the machine and no further mechanical suggestions from GHQ would be very useful until a report on the first design's success should be communicated to the engineers, enabling them to produce an improved design. All of this was implied in Swinton's objection to the letter.

Yet there was this further implication, most fundamental to our understanding of the development of the tank: the machine thus produced could be expected to perform adequately and according to expectation ONLY that tactical task originally assigned, and ONLY under those physical conditions

as were stated in the requirements. This is simply in the nature of machinery: it is good where it is supposed to be good, and terrible everywhere else. And yet this most fundamental point was not grasped by the Generals at the front, who seem to have forgotten the tactical task which they gave to the engineers through Swinton's memo. Further, it does not seem from our knowledge of conflicting ideas on the design process discussed above that Swinton's implications were widely appreciated in the War Office either. His thoughts on the order of the process also disagreed with those of the Ministry of Munitions, and a solution to the dilemma, a carefully executed iteration process carried on between the engineers in the back areas and the generals at the front, was probably never achieved during the war.

Under this ideal solution, proper communication would enable a machine to be built which embodied tactical principles which had been agreed to by all concerned, and yet would exploit all the technical possibilities which might be suggested independently by the engineers. Actually, when the tank was delivered to the front, the Generals ignored the tactical principles of the memo and the search for tactical policy was begun after it should have been over, since a very definite tactical policy had already been built into every tank. It is likely, that, though "GHQ" officially approved the memo, few if any of its members actually read it. This great information failure was to have far reaching effects.

So Swinton returned to the War Office. As the post of War Correspondent was soon abolished, he was made assistant secretary to the CID, an easy job which gave him plenty of time to follow down his idea and also gained him access to the highest places in the Government. He prodded his design requirements through the War Office with the aid of Sir John French's signature, and saw them approved.

One can see that the precision of these requirements must have been a great help to the wandering Landships Committee: 1) The machine must be



proof against rifle and machine gun fire, but not artillery, 2), must carry one small cannon and at least two machine guns, 3) carry a crew of 6 (not 100), 4) be able to traverse craters twelve feet wide and six feet deep and cross a trench four feet wide, 5) have a maximum speed of two and one half miles per hour over broken ground and fuel for six hours' action, and 6), travel by means of a track mechanism of either the Holt or Pedrail variety, whichever proved best for marshy ground.<sup>1</sup> For the time, this was the final stage of the idea.

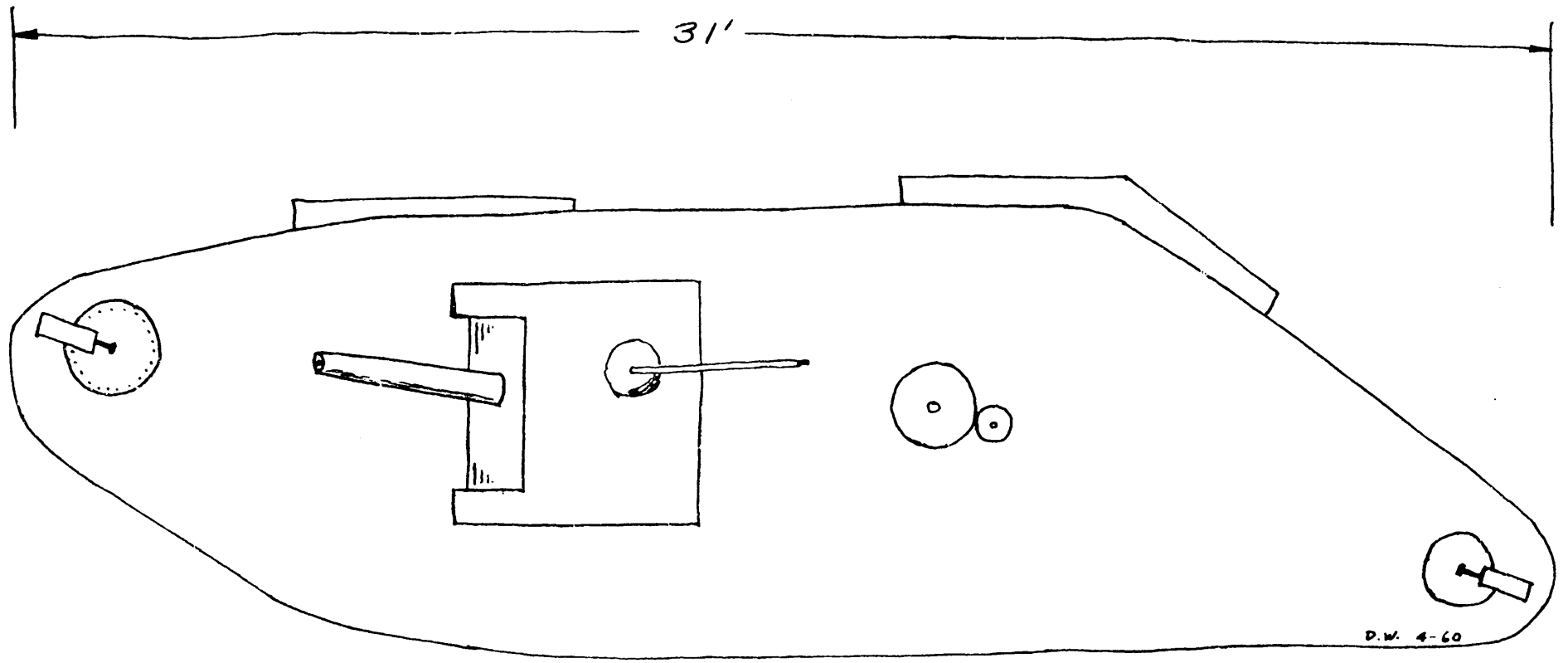
On 30 July, Swinton visited d'Eyncourt at the Landships Committee, and for the first time personal contact was made between the source of the Army effort and the essentially Navy effort of the Committee. A few hours later he met Stern and remarked, "Lieutenant Stern, this is the most extraordinary thing I have ever seen. The Director of Naval Construction appears to be making land battleships for the Army who have never asked for them and are doing nothing to help. You have nothing but Naval ratings doing all your work."<sup>2</sup> The situation, from the origins of its ideas to the personnel carrying them out, must have appeared truly ridiculous. From this time on, however, with the help of Swinton's design parameters and his personal expediting around London, the engineering side of the development proceeded somewhat more easily than before.

### 3. The Birth of Mother

The new design of Tritton and Wilson (see pages 41-2) was produced according to Swinton's requirements with the exception that the obstacle was changed to include a parapet four feet six inches high just in front of the trench, a recent innovation of the Germans'. This design was at first called Big Willie and then Mother, and was the prototype for the Mark I series of tanks. See Figure 5, page 50. The most serious obstacle was designing a suitable track, and once this was overcome in September, 1915,

1. Encyclopedia Britannica, XXI, pp 787-8.

2. Stern, op.cit., p 41.



-50-

Fig. 5- Profile of British Tank

Fig. 5

progress on the pilot model proceeded.<sup>1</sup> This was not an effortless time for Stern, however. He had recently succeeded to the chair of the Committee, and was having difficulty obtaining contractors. Manufacturers were reluctant to involve themselves with his work which, being experimental, was necessarily subject to constant changes and cancellations. In general, however, relations between the Committee and the world of manufacturers and designers was a honeymoon compared to the tussle going on within the halls of the War Office.

The formation of the new Ministry of Munitions was just effected at this time (June-July, 1915) and according to its mission, it attempted to take the guidance of the Landships Committee away from the War Office. It proceeded only part way, however, and Stern reports that its influence was slight, although the resulting confusion was great. For Stern was now involved with three slightly more than nominal chairmen of his Committee and also had to deal in undefined ways with three departments in the government. Such were the fruits of the fast growth of both the tank idea and the form of the government.

By August, the War Office, Admiralty and Ministry of Munitions were so tangled up in the affairs of the Landships Committee that Swinton recommended to Asquith that he call an interdepartmental meeting of the heads of these groups to try to assign tasks, apportion responsibility, and generally clear the air. As a result of this meeting, on 28 August, the Admiralty was given responsibility for experiment and design, allowing d'Eyncourt and Squadron 20 of the Armored Car Division to work as before; the War Office took charge of promulgating design requirements; when most of the experimenting was over, the Ministry of Munitions was to take charge of manufacturing and further design development. This last changeover occurred in October, 1915, and the Ministry took this charge quite strictly and forcibly.<sup>2</sup> Here we see

1. Stern, pp 31-3.

2. Swinton, op.cit., p 169.

an excellent example of the work of the expediter in the bureaucratic system, without whom no action might have been taken to clarify matters perhaps for weeks or months. Only a man in Swinton's position could go directly to the Prime Minister and request such a convocation. We may also note that the system as constituted actually required an expediter in some cases to prevent the multiplication of confusion,

As experimentation continued, a machine from the days before Swinton's memo was tried against that paper's requirements and its failure was duly noted. In the meantime, a wooden mockup of Mother had been built. There was some dissatisfaction in the War Office, though, born of an everpresent impatience, that things were not going fast enough. Poor Stern put the steam onto Tritton and Wilson, hoping to produce Mother a little sooner.<sup>1</sup>

About 20 October, as the Landships Committee was being assimilated into the Ministry of Munitions, it was suggested that the name be changed for security reasons. d'Eyncourt suggested that since Mother appeared like a large container, she should be called a water carrier, and the committee named the Water Carrier Committee. Stern objected to this, observing that since government committees were invariably called by their initials, this title was "totally unsuitable." As a synonym, they chose the word tank, and so the name came into existence.<sup>2</sup> From then on, the committee was called the Tank Supply (TS) Committee.

On 3 December, 1915, Mother made her maiden voyage across the yard at Foster and Company. At this time her armament was determined as two Naval six pounder cannon and two Hotchkiss machine guns, after much trial and rejection of other types. A trial of the six pounder showed the TS Committee that its current testing ground was much too small, and Lord Salisbury was persuaded to donate part of his park at Hatfield, near London, where all the official demonstrations were subsequently held. The only serious difficulty

1. Stern, op.cit., p 44.

2. Ibid., p 39. Swinton claims, without refuting Stern, that he originated the term himself some two months later.

which Stern ran into came from the Master General of the Ordnance, who thought ill of an organization which would ask him to supply weapons without consulting him as to their pattern. He seemed "somewhat annoyed," remarked Stern.<sup>1</sup> Apparently the autonomy of the new Ministry of Munitions was getting on his nerves.

Stern was finally able to report in mid December (just before Haig replaced French as Commander in Chief) that he had a working model which would fulfill the requirements set down by the War Office in Swinton's memo. As a result, an interdepartmental conference of the CID, also arranged by Expediter Swinton, met to decide the next step on 24 December, 1915. At this meeting it was recommended that, after suitable trials of the prototype, if the Army Council decided that the Army could actually use tanks, then a new, small Tank Supply Committee should be set up with power to administer the project of manufacturing tanks, to place orders with civilian contractors, and to correspond with any government departments concerned; this committee would reside in the Ministry of Munitions, its auxiliary personnel would continue as at the current time, and the War Office would supply men to fight in the machines. The Admiralty agreed by lending d'Eyncourt, transferring Squadron 20 to the Army, and promising to supply a number of six pounder cannon.<sup>2</sup> Thus the tank effort continued to be part of three government departments,

According to Swinton, it was near midnight after this meeting had broken up that he produced the name tank. He said that for the last two months previous the Committee had been called the Director of Naval Construction's Committee.<sup>3</sup> No matter who invented the name tank, the uncertainty between these two authorities attests to the confusion which apparently still remained hanging about the Committee's very rapid growth.

1. Stern, op.cit., p 44.
2. Ibid., pp 47-8.
3. Swinton, op.cit., pp 186-7.

#### 4. Colonel Stern's Triumph

Mother was completed in every detail on 26 January, 1916 and the tests authorized by the CID were held soon after, the first trial being a practice run over a specially prepared obstacle course and witnessed only by TS Committee people and employees of Foster and Company. A few days later, 2 February, the big day arrived for the tank. Among the guests were Lord Kitchener, Lloyd George, Sir William Robertson, and the new Commander in Chief's Deputy Chief of Staff from France, General Butler.

The presence of Butler makes an interesting and informative episode for it tells how Sir Douglas Haig first learned about tanks. Winston Churchill, having been literally dumped out of the Government in June, 1915, hung around in a sinecure post until December. By that time he was so bored that he resumed his commission as a Lieutenant Colonel and went to France to see some action. He took with him what he called "a good gift," a solution to the current deadlock, embodied in a paper entitled "Variants of the Offensive," which he delivered to the current but short-lived Commander, Sir John French. Even the title suggests that the paper was designed to hint that current offensive methods could bear re-examination, to say the least.

His suggestions were based on the fact that men needed some physical protection while crossing the 100 or 200 yards of no man's land between the trench lines. This, he remarked, "ought not to present insuperable difficulties." He therefore suggested shields to be carried or pushed along the ground, or armed caterpillars, which would cut barbed wire and dominate the trench area. He noted that numbers of the latter were currently being built (not true) and that any action with them should be reserved until there were a great many available. Action by small groups should be avoided, he stated, for two reasons, one, because they were being designed to operate in large groups and two, because he seems to have felt that they would be

a one-shot device, or at least would lose most of their effect after their initial use and consequent exposure to the enemy. Such crashing surprise could never again be attained, and Churchill, perhaps as well as anyone in those times, appreciated the importance of surprise and saw how thoroughly the long artillery bombardments eliminated it. Caterpillars, on the other hand, would eliminate artillery bombardments. It was all so simple.<sup>1</sup>

Very shortly after French received this paper, he was removed from his post and Haig took over. The lack of continuity between the two commands is evidenced by the fact that, although he was very near the top of French's command, Haig knew nothing of tanks until he read Churchill's paper a few days later. On a note clipped to this paper he wrote the following rather pathetic question: "Is anything known about the Caterpillar referred to in para. 4, p. 3?"<sup>2</sup> And so General Butler was sent to London to find something out about the caterpillar.

It seems as though this discontinuity may have played its part in keeping Haig and his new Staff from ever seeing Swinton's original memo. Although little information is available, this may be the explanation for the apparent forgetfulness of the Generals at the front regarding the initial tactical premises upon which the tank called Mother was produced. Further tactical papers, moreover, rather than indicating that tactical theory had pre-dated and determined the design, would instead make it appear as though, since tanks would soon arrive, it was time to start forming tactical policy. Thus Haig would have no way of knowing that tactical premises had been so fundamental at the outset, or what those premises were. He would also be unaware that new tactical policies could not be formed after this stage of design had been passed. However, the information is scanty and this remains pure speculation.

1. Churchill, op.cit., II, pp 78-83.

2. Williams-Ellis, op.cit., p 41.

The formal trial of Mother was held at Hatfield Park on 2 February, 1916, and was attended by some 44 officials in all. The tank was described as being 31 feet long, eight feet high, and thirteen feet wide. It carried a crew of eight, weighed slightly under 30 tons, was armed with two six pounders, three machine guns able to fire about 300 rounds per minute, and was shielded to withstand German armor piercing ammunition.<sup>1</sup> After the tank had traversed the obstacle course (see Figure 6, page 57.) with "complete success" according to d'Eyncourt,<sup>2</sup> Stern remembers that Robertson seemed "well satisfied", and that Butler asked how soon some could be delivered to the front. Lord Kitchener seems to have been less impressed, for his well known reaction was, "It is a pretty mechanical toy, but it will not win the war." Although tanks were ultimately ordered in quantity by the Army, the real attitude among the top command seems well stated by Kitchener's remark. At all events, the Generals of the Army Council and GHQ went home to deliberate and the engineers sat about and kept their fingers crossed.

One thing we must emphasize at this point is the significance of this test for the engineers and for the soldiers. Both groups agreed that the tank had "passed" the test, but passage meant different things to each. To the Generals, it meant that a machine had been designed which could move over a certain obstacle course which looked similar to enemy trenches except that there was no enemy. It was in a sense something like a trained animal act, as far as the Generals were concerned.

To the engineers, however, it was a point of supreme success, for they saw a weapon of certain tactical capability demonstrating a great part of that capability with apparent effortless. To these men, the tank was practically as good as proved in battle. Each group, obviously, was exaggerating its point of view, but the difference in point of view is what is important; this difference, it seems, proceeds from the fact that the engineers

1. Stern, op.cit., pp 51-2.

2. Ibid., p 57.



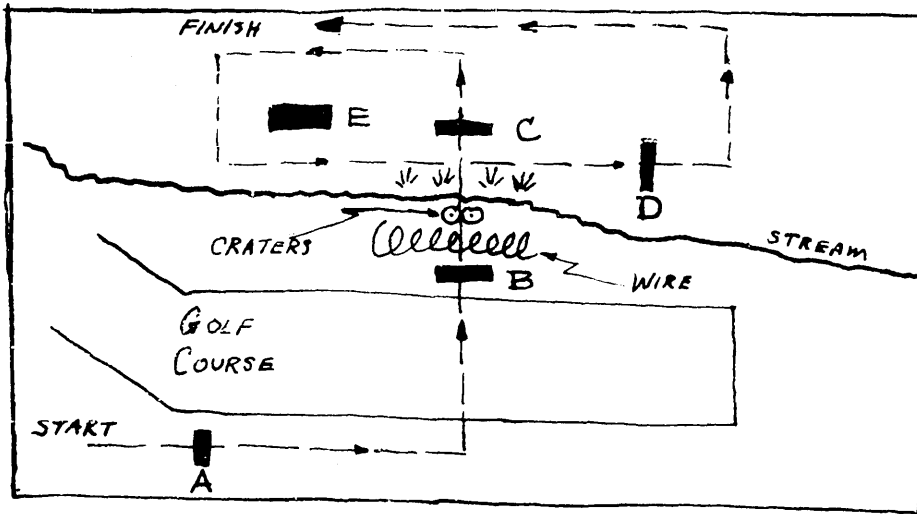
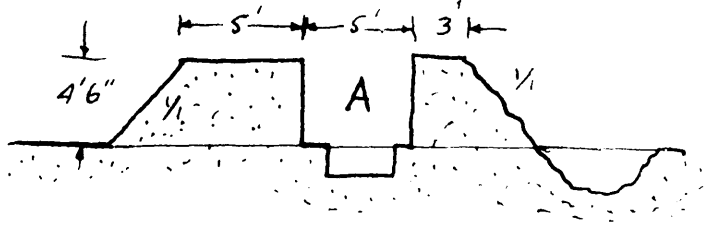


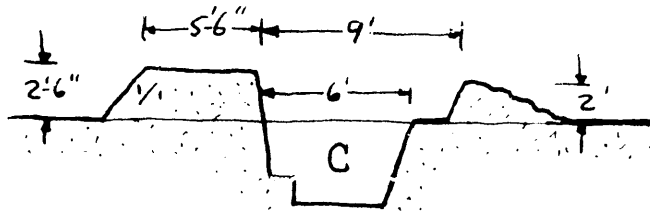
Fig. 6 Obstacle course for 2 Feb., 1916 tank tests. Based on a diagram in Stern, p 298.

A: The War Office Requirement Obstacle

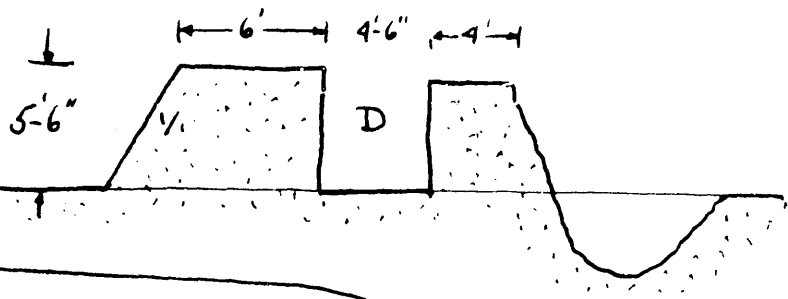


B: British Defenses, reduced in size. (no figure)

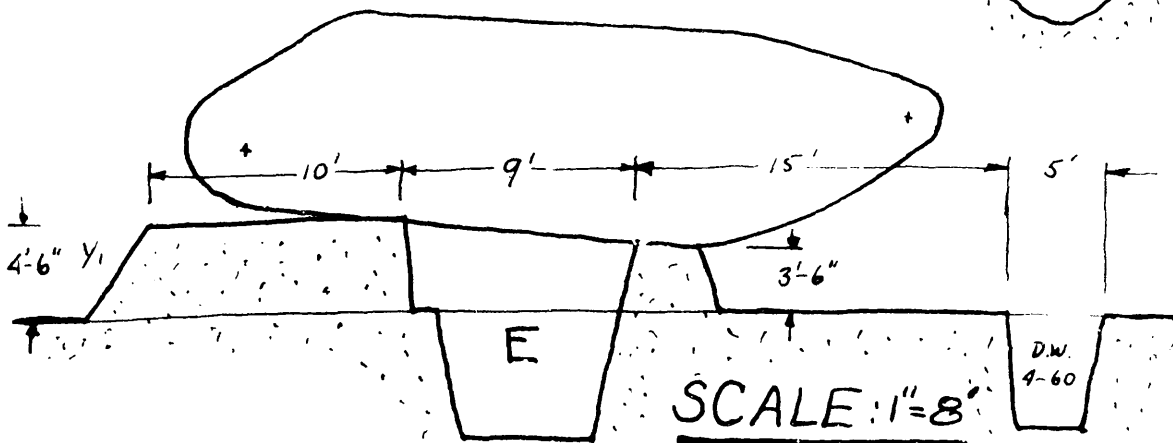
C: German Defenses



D: Double Fortification



E: Special Super Obstacle (optional demonstration)



kept more surely in view the relationship between design and tactical premises.

Although d'Eyncourt assured the Generals that the tank was capable of great development,<sup>1</sup> he recommended their ordering some right away because it would take some time before they would be ready. And so, on 11 February, 1916, GHQ cautiously placed an order through the War Office for 40 tanks. Swinton immediately asked that this be raised to 100, since (another example of the dependence of tactics on design, and of Swinton's implications) 40 was entirely too few to employ in the fashion which he had anticipated. Large numbers of tanks could protect each other's sides in a way which small groups could not do. Thus the order stood at 100.<sup>2</sup>

Soon after the order had been placed, the Army Council sent a note to the TS Committee, d'Eyncourt and the Admiralty, thanking them for "evolving a machine for the use of the Army."<sup>3</sup> Although it was momentarily unclear as to who would fill this order, Stern's experimental committee quickly recast itself as a manufacturing committee and applied to Lloyd George, the Minister of Munitions, for a charter to begin its operations, as per the CID recommendations of 24 December, 1915. This very rapid shift, hardly typical of bureaucracies, was characteristic of the energetic Stern.

After seeing the tests, Swinton revised his memo of the previous June. In this new paper, he described more fully his idea of the mass attack. The entire tactical plan was ultimately employed at the tank's triumphal battle, Cambrai, nearly two years later, and yet the planners of that battle did not see his paper until two months after the battle.<sup>4</sup> The plan employed apparently evolved from trial and error, from conversation with Swinton, and from the same sorts of intuitive insights which came to Swinton many months before.

So, in February, 1916, everybody seemed happy: they thanked and con-

1. This point, too, the Generals failed to appreciate during the war.

2. Swinton, op.cit., p 214.

3. Stern, op.cit., p 60.

4. Another example of poor communications in the system.

gratulated each other, and awaited the arrival of the tank on the battlefields of the anticipated glorious and war-ending offensive of the coming summer. Times were to change drastically, however, and with those changes would come bitter months for the tank people.

Chapter II. The Rise and Impending Fall of the House of Stern

1. Tank Production and Battles in 1916

The new power which came to Stern as he pocketed his order for 100 tanks was increased when both Kitchener and Lloyd George asked him to bring his committee to their Departments. Kitchener's invitation completely ignored the CID division of powers set down in August and reiterated in December, and when Lloyd George pointed this out to Stern, the committee came to the Ministry of Munitions.

Stern felt enough oats at this time to demand that certain conditions be fulfilled and certain powers be accorded his group before he would come. These he set down in a charter which Lloyd George signed, officially creating the Tank Supply Department of the Ministry, while eliciting the counter-promise that the order would be filled within six months. The charter, signed the day after the order came through, placed the Department directly under Lloyd George, granted it Squadron 20 and d'Eyncourt, and accorded it all powers to place orders, incur expenses and have final decision in all matters connected with manufacture. It also granted the Department control over the design and development facilities of Mr. Tritton and Foster and Company.<sup>1</sup> It was obviously a powerful group. Within days, contracts and orders were written and work began.

Swinton had in the meantime been directed to command the tank force, which was initially called the Heavy Branch of the Machine Gun Corps for security reasons. His main responsibilities were to raise and train the first contingents of the unit. As commander, he also had to communicate with GHQ on matters of scheduling and shipping, and especially the very important question of when the tanks would be delivered. GHQ, apparently rather ignorant of mass production problems, requested delivery by June, only four months away. Not only would this be next to impossible mechanically but

1. Stern, op.cit., pp 63-6.

also from the standpoint of training the unit and preparing all of its train of repair facilities. So Swinton had to write Butler and inform him that the first tanks and crews would not be ready before 1 August, a piece of news which Swinton thought was "not what you would have liked to hear, but shows the real situation."<sup>1</sup> GHQ's anxiety for tanks at this time seems a well established fact. But their wishes were not to be fulfilled, for Stern had many difficulties, mostly mechanical or manufacturing bugs which were ultimately ironed out, but which seriously delayed arrival at Swinton's training ground of new tanks.

Swinton's training program was a true bootstrap cycle, an iteration process starting from complete ignorance. Beginning by letting the men drive the machines until they became familiar with them, the program then made these first pupils into driving instructors to teach the next group. Tactical doctrine was, of course, non-existent, except for Swinton's theoretical papers; early doctrine was perforce inclined to be mostly educated guess, intuition and to a great extent, application of what were known to be the machine's designed abilities. Training was thus very slow work and methods were constantly changed.<sup>2</sup> It became less haphazard after the first battles had been fought and tankmen returned from France with new ideas.

Stern began to get his first taste of difficulty with the Army in June when he tried to get his tank order raised substantially. GHQ put the stop on this, saying that they could not order more until they had seen 20 or so in at least a simulated action and judged whether they were satisfied with the design. Swinton's answer to the GHQ letter which expressed these views admitted indirectly that tank orders had already overrun the supply of engines, guns and ammunition. It appears as though Stern may have been trying to feather his nest, although it is undoubtedly true that certain sectors of the project would have withered without a greater flow of manufacturing going through. This problem became aggravated as the manpower shortage got worse:

1. Stern, op.cit., pp 76-7.

2. Williams-Ellis, op.cit., pp 77-8.

workers laid off a lagging tank program were snapped up by the Army, never to build another tank. Swinton also told GHQ in this letter that he was running out of men for the auxiliary units of his corps.<sup>1</sup> Since a unit of this kind had never before been formed, Swinton had to feel his way, adding billets as their necessity became known.

By mid summer, the TS Department was firmly entrenched in the Ministry of Munitions, having grown its painful way from a tiny experimental group. It had three functions: tank design, tank supply (materials and workmen), and factory inspection and testing.<sup>2</sup> However, Stern soon came to the conclusion that it was "very difficult to work with a committee, some of whom wished every point to be referred to them." He wanted to run the show himself and so he asked the committee to turn itself into an advisory group (i.e., commit executive suicide), which it did, allowing him to take all of the committee's responsibility. Upon obtaining approval of the Minister, Stern became Director of Tank Supply.<sup>3</sup>

When we recall that Stern rarely stopped to consider during his conversations with Generals that he was only a junior officer, that he continually pushed for increased tank orders all through his tenure at the Ministry, and that he dissolved his committee and took over himself, we can perhaps get a glimpse of why the War Office would soon tire of this man. We get an unmistakable impression that Stern was a bit of a Little Caesar and that he, too, did not quite realize all of the problems of mass production.

He did not, however, doubt the general efficacy of committees any more than anyone else: when he announced that a new design for an artillery gun-carrying tank had been evolved, a new committee was formed (while the old one still existed) to supervise its construction. This committee had the same chairman and nearly the same membership as the currently existing TS Committee.<sup>4</sup>

1. Stern, op.cit., p 83.

2. Williams-Ellis, op.cit., p 44.

3. Stern, p 85.

4. Ibid., p 81.

GHQ's impatience for tanks continued to rise through the spring, and Stern, Swinton and Churchill, anticipating that GHQ might try to jump the gun, all wrote repeatedly to Haig reminding him that the tanks should be saved until large numbers were available. Swinton finally got Haig's promise on this, but the arrival of the summer and the Somme campaign changed not only attitudes toward the tank, but towards the entire war.

On 1 July, the great attack was launched, and by dusk the British Army had completed the most disastrous day in its history, receiving 57,000 casualties. Offensive power had risen greatly in the Army in the past two years, but the German defensive capabilities had risen even more. The two week artillery preparation churned the ground ahead of the attacking forces, and the result was a nearly impregnable defense.

As the weeks of July wore on, GHQ became concerned and then frantic about its offensive; finally they informed Swinton that the first 20 tanks delivered would be thrown into the fight as soon as they arrived. The War Office announced its intention to deliver some toward the end of August, although Swinton, Stern, Lloyd George and many others warned that 20 was too few to make the full available effect of the weapon felt; training was also far from complete. Churchill warned that the great surprise would be squandered on a miniature effort, an utter waste of a great advantage.

None of these appeals had any official stamp, and GHQ opinion prevailed on the argument that if the faltering British morale could be raised by using tanks, then tanks would be used.<sup>1</sup> However, when Swinton investigated to determine how GHQ was planning to use 20 tanks (according to him, such a small number did not exist tactically: even 40 was too few), he learned that in fact GHQ had no tactical policy on tanks at all.<sup>2</sup> Rather than employ tanks as Swinton suggested, they very likely desired to see a few in action first, and then decide if many would be worth the cost and effort.

This was a backwards and fatal approach, as we shall see. Swinton, however,

1. Swinton, op.cit., p 260.

2. Ibid., p 272.

wrote no more memos; apparently he felt that he could do no more.

The first half company of tanks with their half trained crews went off to France in Mid August. Some crews had driven their tanks while firing guns simultaneously only once before going onto battle. When they first arrived they were regarded by officers and men alike as some new kind of toy, and they were the object of a great deal of light headed joking. Instead of being taken seriously, they were thought of as a circus coming to town, and many high ranking officers, having never seen any of Swinton's memos, got no other impression of tanks.

One of the officers thus introduced to tanks was Colonel JFC Fuller, At the time, he was an engineer, but he was soon to join the Heavy Branch and become its foremost tactical theorist, since Swinton was soon removed from his post in London and sent on to greater tasks. The day was 20 August, 1916. Fuller had also just read GHQ's first instruction memo on the tactical use of tanks, which Fuller thought made "common-sense reading", except that we can see that GHQ had not prepared this memo in anticipation of using only 20 tanks. Thus it really made very little sense at all, for it specified four uses for tanks, advancing in line in large numbers, attacking many selected objectives in pairs or groups, or simply as supply or mobile artillery vehicles.<sup>1</sup> Since 20 tanks employed on a wide front could advance only in groups of two or three, tactical efficiency was reduced almost to zero; further, groups which had been trained together were broken up, lowering morale and creating organizational confusion. This multiple difficulty was to dog the tankmen in France throughout most of the war.

On 15 September, these 20 tanks were thrown into the fight along the Somme. The fact that so few were thought to be useful in the slightest way testifies to the fact that they were actually being tossed into a failing offensive in an attempt to resuscitate it. They were sent forth in dribblets on a wide front over ground not suited to their characteristics. The com-  
1. Fuller, JFC, Memoirs of an Unconventional Soldier, p 80.



bination of poor conditions and incomplete training led to what has been called a disappointing failure, for only a third of the tanks got as far as no man's land.<sup>1</sup>

In places, however, they did valuable work and at some levels of command, made a decent, if not great, impression. The intelligence officer at GHQ, General Charteris, reported in his diary for 16 September: "The tanks have been a very great success. I do not know if they would have accomplished so much against infantry that was not at a low point as regards morale... they have contributed very freely to our success in this fight." Later on, though, on 20 September, he observed: "A good deal of the enemy's fall in morale is no doubt due to the tanks, but not all... Actually, the tanks, though good, have several marked defects and are vulnerable to direct artillery fire. Several broke down mechanically, but that was to be expected..."<sup>2</sup>

Although this is a slightly confused commentary, it is far from unfavorable. Haig himself, in his diary for 15 September, remarks, "Certainly some of the tanks have done marvels and have enabled our attack to progress at a surprisingly fast pace."<sup>3</sup> Yet, despite these agreeable reports, there is good evidence that the tanks were not considered a crucial or war-winning weapon, at this time or at any other until very near the end of the war. Stern and Swinton visited Haig on 17 September and both report that Haig said in effect, "We have had the greatest victory since the Marne... This is due to the tanks. Go home and build as many tanks as you can, subject to not interfering with the output of aircraft, and of railway cars and locomotives, of which we are in great need."<sup>4</sup>

This conversation reminds one of The Kingfish's famous comment on life insurance: the big print gives it to you and the little print takes it away. The tanks were given an inferior position on the priority list at this date

1. Sheppard, op.cit., pp 19-20.

2. Charteris, op.cit., pp 164-5.

3. Blake, op.cit., p 167.

4. Stern, op.cit., p 96, and Swinton, op.cit., p 292.

and never rose above it for the remainder of the war. Haig repeatedly reiterated it, and it prevented large numbers of tanks from being built in time to participate in the war.

Haig definitely measured military strength in terms of men and artillery, as several other entries in his diary indicate. When the crisis of 1917 hit the Western Front, he wrote to Robertson as follows: "There is only one sound plan to follow, viz., without delay to send to France every available man, every available airplane, and every available gun."<sup>1</sup> Every available tank? No. Toward the end of 1917, when British strength had to be sent to Italy to prevent a catastrophe, Haig thought again in terms of men and artillery guns.

It appears as though Haig thought that tanks were useful and nice, but never so important as to disrupt the production of vital machinery. No serious, official attempt to change his opinion seems to have been made. Indeed, it appears as though the British system of government and strategy formation made this impossible. Other men could be approached, but not the Commander in Chief; he could only be removed from his post, and that not very easily.

Yet GHQ was sufficiently impressed with tanks to order 1000 to be built for the coming year. This could not be initiated right away because improvements in design were being suggested from both the TS Department and from France, and much deliberation began. To tide the factories over and keep the workmen busy, Stern had to order 100 more of the original design, Mark I. While the deliberation continued, Sir William Robertson, acting on a report from one of Haig's Army commanders, did an extraordinary thing: he cancelled the order for 1000 tanks, without telling GHQ or the Secretary of State for War, Lloyd George. This was a fatal move in the history of Lloyd George-Robertson relations. Stern, feeling still bolder with his new order,

1. Blake, op.cit., p 236.

went directly to Lloyd George, another extraordinary move, and demanded reinstatement of the order, which he received.<sup>1</sup> Amid wild uncoordination and ignorance of normal command lines, the tank program inched its way forward.

## 2. Internal War Over Tanks

Stern's position was further fortified when the Minister of Munitions, Mr. Montagu, created for him the title Director General of the Mechanical Warfare Supply Department, and secured his promotion to temporary Colonel. At the same time, the Heavy Branch got a new commander to handle training and relations with the War Office, General Anley (replacing Swinton), and a commander of the fighting detachment in France, Lieutenant Colonel Hugh Elles. Colonel Swinton returned to the CID.<sup>2</sup>

This duality of command structure was soon to have interesting results, especially as Stern was in fact the most powerful person in it. See Figures 7 and 8 below. He was continually pressing for larger and larger tank orders, and though he now had an order which was far too big ever to be filled, as it turned out, he asked Montagu if it was really big enough. In addition, the design deliberations were not helped as Stern tried to push production ahead and roll over the suggested changes offered by the Heavy Branch people in France. As late as December, 1916, Fuller recalls, as he joined Colonel Elles' staff, a great argument was proceeding between Stern and Elles' technical people over the position of the machine guns on the side of the tank.<sup>3</sup>

Late in the year, a series of high level meetings between Haig or Butler and Stern finally fixed the apportionments of designs in the total order of 1000. The delay, however, forced many of the new deliveries to be of the unimproved variety. At the last of these fall meetings, a list of desirable

1. Stern, op.cit., p 106.

2. Ibid., p 111.

3. Fuller, op.cit., p 95.

achievements was written and approved: 1) tanks were required in as large numbers as possible; 2) larger numbers must be delivered by May, if possible; 3) it was judged important to consider and adopt improvements in design from time to time, but almost any design was better than no tank at all, especially with the 1917 season fast approaching; 4) "It is highly desirable that no other supply be interfered with", and in emergencies, interference was to be attempted only with GHQ approval.<sup>1</sup>

A more self-contradictory and confused set of goals could hardly be imagined. It was thought desirable to build, and build fast, but to go slowly and allow improvements as well. It was desirable to build large numbers, but not to interfere with any other supply. In case emergencies arose, the Ministry of Munitions was NOT to be allowed to exercise its prerogative to apportion resources, but was to defer to GHQ. Thus both the Ministry's charter and that of the Mechanical Warfare Supply Department, plus all divisions of power and responsibility previously agreed to were swept aside and a new confusion set in.

Stern's production forecast for 1917, which was never achieved, read as follows: January, 50 tanks; February, 50; March, 120; April, 120; May, 140; June, 200; July, 240; August, ~~260~~; September, 280, and steady thereafter at 280. After March, 80% were to be of the improved version, called Mark IV, and by August or September, ~~some~~ even better Mark IV's were promised. Actually, the first Mark IV did not arrive until 22 April, and the first Mark V on 23 March, 1918. In December, 1917, there seem to have been no more than 500 tanks in France.

The failure of this ambitious program stemmed from several sources. The low priority rating of tanks caused shortages in key components, mainly in engines, which delayed construction. Manpower for construction was also lacking, and would grow scarcer as the terrible campaign of 1917

1. Stern, op.cit., p 119.

used up Britain's armies. When times became really crucial over the winter of 1917-18, the cry for manpower was so great that the tank detachment was practically wiped out, in the factories and in the field. Small but time-consuming design changes also seem to have cropped up throughout the year halting production and forcing tooling changes.<sup>1</sup>

Other difficulties arose from the Ministry of Munitions' reluctance to build special tank building facilities, since the end of the war was expected, according to Haig, rather shortly. Even this new and supposedly revolutionary Ministry had fallen into the normal bureaucratic swing which it was intended to counteract. Stern also had trouble gathering the executive authority for his subordinates which was needed to put them in a position to deal with Generals and other high officials. The War Office simply refused to grant commissions to his civilian assistants or promotions to many of his higher level people. His immediate assistants remained Lieutenants or less throughout the war, although he was a Colonel himself.<sup>2</sup>

Yet Stern remained a very powerful individual at the coordinating center of a vast interlaced conglomeration of committees and departments. Among the groups directly involved were the following:

From the War Office- Ordnance Department, General Staff, later the Tank Department (1918).

From GHQ- overall command capacity, the Experiments Committee, the Heavy Branch.

From the Admiralty- Landships Committee (dead by 1916), Squadron 20.

From the Ministry of Munitions- Trench Warfare Department, Inventions Department, Mechanical Warfare Department.

Successive joint committees: Joint Naval and Military Committee, TS Committee, later two executive Tank Committees.

In addition to the main actors, a grand chorus of Directors General, Interdepartmental Conferences, manufacturers and workshop personnel.

1. Williams-Ellis, op.cit., pp 82-4.

2. Stern, op.cit., pp 117-8.

When Elles took over as field commander late in the fall, he found the following organization in effect (see Figures 7 and 8, pages 70 and 71.): there were two commanders, one in France, one in England. The former had responsibility for commanding all operations, handling advanced training, and arranging tactical employment in cooperation with the Commander in Chief. The home branch was supposed to administer the tank effort as a whole, provide men, supplies and preliminary training, and attend to maintenance of personnel and machines. An early commentator remarked that an experienced reader could perceive in this "system of dual control a very promising sowing of dragons' teeth."<sup>1</sup>

By the beginning of 1917 the situation had grown intolerable, for Elles realized, and reported thus to the War Office, that in fact there was no central control of the tank effort at all, except perhaps for a "very energetic" temporary officer in the Ministry of Munitions. "The fighting unit," he reported, "is under a junior officer who, faute de mieux, has become responsible for initiating all important questions of policy, design, organization and personnel through GHQ and thence through five War Office branches. The administrative and training organization is located 130 miles from the War Office, with a junior staff officer in London to deal with the five above mentioned branches." There was no one, he maintained, who had both his own knowledge and Stern's executive authority who was in a position to guide the affair; he therefore suggested an executive Tank Committee, composed of representatives from all major tank groups, to handle the problem.

With Haig's help, this was done, except that the people in France were not represented.<sup>2</sup> The membership, according to Stern, who was not chairman, was far too inexperienced and bothered with other commitments to give full and useful control. So when it met for the first time in March, 1917, Stern

1. Williams-Ellis, op.cit., pp 80-1.

2. Ibid., pp 85-7.

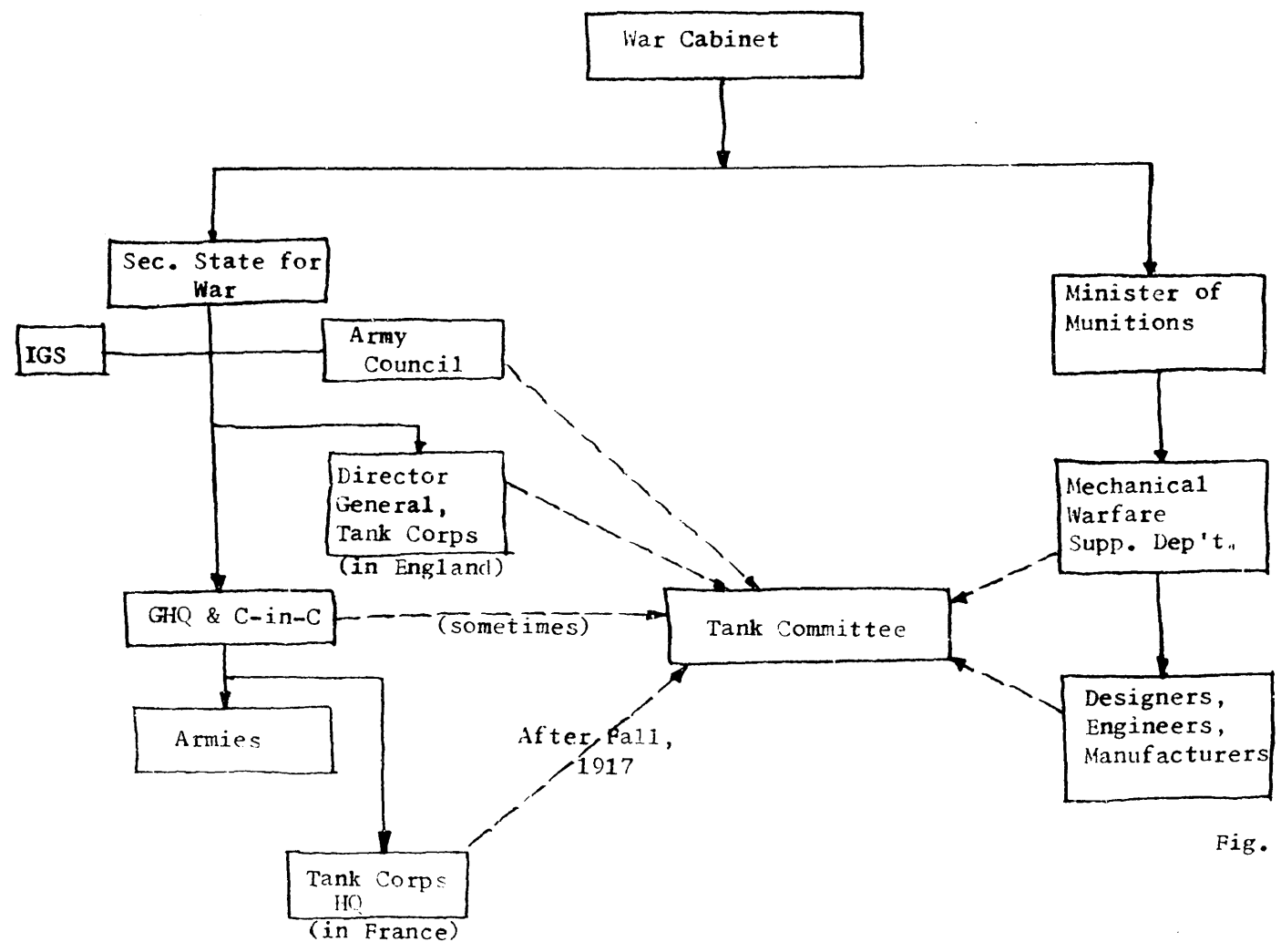


Fig. 7- Relation of Tank Commands, Government Dep'ts & Committees

—————> Official Command Line  
 - - - - -> Members of Tank Committee

Fig. 7

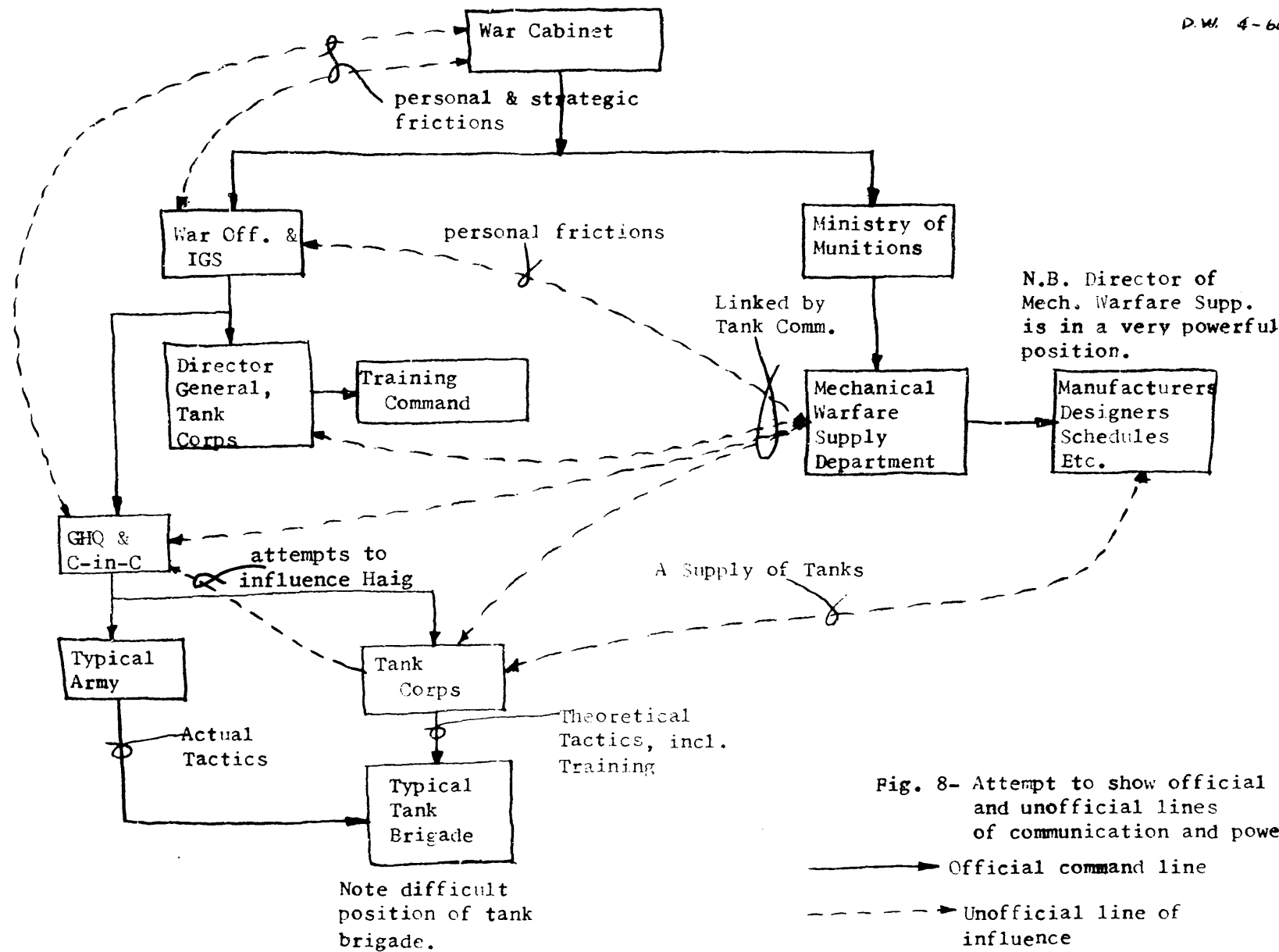


Fig. 8- Attempt to show official and unofficial lines of communication and power.

Fig. 8



tried to convince this group, like his last one, to surrender its powers to him.<sup>1</sup> This it would not do. Stern and d'Eyncourt, gnawed by a growing fear that the new Committee would "strangle" tank development, appealed directly to the Minister of Munitions for an independent executive group like the old TS Committee, made of experts who had "grown up with the project." To support his call for independence, Stern quoted to the Minister all of the occasions since 1916 on which the War Office had altered his group's recommendations on allocations of materials, details of design, and other points, only to find that the "experts" had been right all the time.

As the weeks of the summer went by and the existing committee, composed of three War Office Generals and Stern and d'Eyncourt from the Ministry of Munitions, was continually deadlocked, Stern pressed harder for a new Committee with greater powers and more balanced representation, since he and d'Eyncourt were usually outvoted. When Stern wrote up his demands as a memo in July and distributed copies around the Cabinet, the higher Generals at the War Office were so enraged that they demanded its withdrawal, promising improvements.<sup>2</sup> This he did, but when improvements were not forthcoming, Stern produced another memo, including his own summary of the tactical developments of the war thus far, and demanding the extinction of the present Committee. This memo he presented directly to the Prime Minister, Lloyd George.

When no help appeared, he and d'Eyncourt began boycotting meetings of the Tank Committee. This was mid July. When Churchill became Minister of Munitions a few days later, Stern again pressed his demands, calling the present Committee incompetent and conducive to complete chaos, but was unable to get what he wanted. At this time, he also suggested interesting the Americans in tank building, since the British obviously would never build enough. Churchill remained sympathetic, but by this time a war almost as

1. Stern, op.cit., p 145.

2. Ibid., pp 147-55.

great as that between the British and the Germans was being waged between the War Office and the Ministry of Munitions.<sup>1</sup>

1. Stern, op.cit., pp 156-65.

### Chapter III. Through Mud and Blood

#### 1. Tanks Are Machines

The main characteristic of the tank which the engineers in London perceived most clearly and the Generals in France most imperfectly was that the tank was a machine. The engineers knew intimately, as we have seen, that they could build to any set of specifications, and had actually built to one very particular set. The subtlety of their insight is that they knew how valid was the truism that their creation could function properly only under the tactical and physical conditions which they had provided for in their design: they had built the tank so that it would function well under some conditions and consequently poorly under others. The Generals never realized that, as a machine, the tank was actually dumb, mute, stupid. It could do only what it was told to do, and only if it was told certain things. It could not be ordered to keep a stiff upper track in the face of operations in mud; its morale could not be raised; it could be depended upon to fail unless used properly.

The Generals never realized how Proper "properly" had to be, and apparently no one knew how properly to impress this onto them. Striking off on their own, as we have seen and will see again, they tried to think out for themselves a set of proper conditions and employments for tanks. There was nothing wrong with the ideas produced, except that the tank had been designed to carry out other ideas.

When the Generals quite naturally failed to hit the right combination, they soured on the whole thing, feeling, as if they had tried out a boxer in the ring and seen him knocked out, that the tank had been given a fair trial and found to be no good. Once their method had rung up a zero and much bigger problems began to press them, it was almost impossible to get the concept of proper conditions into their heads; not that they denied the

existence of these, for in fact they did, but rather that they never realized how crucial was the fact that there actually could be conditions under which tanks would operate better than under any others. This fact does not apply to human beings, for example. Humans can be encouraged to great feats under seemingly prohibitive conditions.

A great part of the difficulty in getting tanks used properly was due, as we can see many years after, not to a case of marbleheadedness as has so often been charged, but rather to a case of being unfamiliar with the essence of machines. This stemmed from a deficiency in the Generals' education and adaptation to their environment, which had been largely machineless during the greater part of their lives. In a way, the Generals never had, as Stern said, "grown up with the idea;" Stern, of course, meant something slightly different, but definitely analogous. Those who were able to see through the situation were either educated in engineering or were gifted with a rare insight.

The Ministry of Munitions, which took a great, even forceful, initiative in creating the tank, actually did little to acquaint the Generals in an official way with the tactical and mechanical nature of their creation. Angry memos and unofficial statements from low level personnel, composed without the participation of GHQ, were simply insufficient to make up the Generals' educational, technical and geographic disenfranchisement from the center of tank development. The tank people in France also tried writing memos to the Generals, but these, too, seemed to be coming from the wrong place.

## 2. The Tanks' First Action

The events in France in the summer and fall of 1917 earned the British command most of its malodorous reputation, and most of the reputed problems of introducing the tank are said to have arisen at this time. The campaign in Flanders, fought mostly in mud created by artillery bombardments, cost over 300,000 casualties and many dozens of tanks while gaining little or

no ground. At the end of the year, neither tanks nor Generals nor prospects of victory stood in any high regard.

By January, 1917, the Heavy Branch had acquired something of a personality of its own. Its arrival in France has already been depicted as similar to a circus coming to town. Its men and officers were a rough and ready crew, almost soldiers of fortune. Like the bombers of World War II, their tanks had names painted boldly on their sides, like Picadilly Lily, Creme de Menthe, and so on. The commander, Colonel Hugh Elles, was young, enthusiastic and elastic. He had a nice sense of the dramatic, and often led tank attacks himself, like a latterday but miniature Nelson, in a tank named Hilda. The personnel had a fierce pride in their unit and were known to be much more vociferous in their allegiance to it and to their weapon than most of the run of infantry units or the like.

One of Elles' staff officers was Lieutenant Colonel JFC Fuller, who planned all operations and, in the vociferous spirit of the unit, exuded a constant stream of written memos, papers and instructions to his superiors and subordinates alike on the subjects of tank employment and tactics, and also on strategy and tactics of the war in general. To this day he remains a strict and brilliant commentator who spares few people and minces few words.<sup>1</sup>

Very shortly before Fuller saw his first tank in August, 1916, a friend of his had described the strategic situation on the Western Front as a fortification 500 miles in length and five miles in depth, a mere pencil line on a map, in which 80% of the German forces were stationed. A breakthrough of greater than five miles depth at several points would precipitate an advance which the enemy could never stop. Fuller combined this concept with the fact of the tank and concluded that this was the tank's mission.<sup>2</sup> From this time onward he pressed this concept onto higher command circles,

1. Wilson, G.M., ed., Fighting Tanks, An Account, chapter 1.  
2. Fuller, op.cit., p 79.

that the tank could effect the long sought breakthrough, and for most of the war he was ignored.

We can see, however, how great a jump this concept was from the most advanced ideas of Colonel Swinton. The tank had been built to fulfill Swinton's requirements, and even these were rarely if ever appreciated. Fuller seems to have been far ahead of the Generals and most engineers for most of the war. While current tank problems were far from solved, he was creating new challenges. Like Stern, he was "forcing the pace," as Lord Milner was to remark later, and like Stern, he soon incurred the displeasure of his superiors at GHQ.

He did not ignore the immediate problems by any means. The Heavy Branch's main tactical doctrine came from a paper of his written over the 1916-17 winter. It showed how tanks would operate in close packed line abreast against trench systems. It emphasized that most tank operations were likely to be surprise affairs, because the tank would be able to perform the artillery's functions of wire cutting and trench cleaning. Thus the paper recommended a 48 hour preliminary bombardment for an attack, which he later decided was just 48 hours too long.

Copies of this memo were circulated to all armies and corps, to GHQ and to the Heavy Branch. When GHQ read the heresy about short artillery bombardments, says Fuller, they ordered the paper removed from circulation; though it remained with the Heavy Branch, the rest of the British Army remained essentially ignorant of the concepts of tank tactics.<sup>1</sup>

The first large battle fought with tanks was the Battle of Arras, in April, 1917. An attempt was made by the artillery commander of the Army which made up the major infantry force in this battle to employ a 48 hour

1. Fuller, op.cit., pp 97-8. Fuller blames this on the corporate entity "GHQ," and we must remember that the blame actually must fall on a single individual. Historically he cannot be identified, so far as I can find out. According to doctrine, however, he is, by definition, the Commander in Chief.

bombardment. GHQ strongly objected, and when he persisted, he was removed from his post and replaced by another who agreed to a bombardment of 21 days. The Generals were not quite ready to entrust the entire impetus of an attack to tanks alone. Not only did doctrinal difficulties dog the planning stages but Fuller also reports that tanks were in very short supply. Those available seem to have been left over Mark I8s from the previous summer, while improved Mark IV's were not to arrive until after the battle was nearly over.<sup>1</sup>

The battle itself, stretched across the month of April, involved only 60 tanks spread about a long front area. Their task was to make uniform penetration easier by dealing with strong points. Generally they were used in the tactically non-existent group size of four or five. All 60 never saw action together in a unified attack. No thought of using tanks to exploit a breakthrough was contemplated.<sup>2</sup> Far from being Fuller-tanks, they had yet to prove themselves conclusively as Swinton-tanks.

Yet Fuller, observing this battle, picked out an example in which eleven tanks somehow found each other and advanced in line abreast on a trench area. They accomplished their Swinton-task so well in this miniature action that Fuller was all set to go on and give them Fuller-tasks.<sup>3</sup> Tanks had fought but one battle and already he thought that they were going to win the war. He thus broke pace with the development in its early stages and began to "bombard" (his own word) GHQ with theoretical papers on the subject of Tank Warfare, a concept of his own.<sup>4</sup> That GHQ should not have had time to read and digest these very advanced ideas in the midst of the press of events seems a foregone conclusion; yet Fuller was as persistent as

1. Fuller, op.cit., p 100. See Stern's production schedule, page 68.

2. Cruttwell, op.cit., p 407.

3. Fuller, p 109.

4. This paper storm lasted roughly a year and a quick count of references in his memoirs shows that he sent at least 30 such papers, of which over half were classified as "long," meaning over 40 pages.

he was vociferous, and eventually he and his ideas acquired a rather unsavory name around GHQ.

The points which Fuller was trying to push were that 1) tanks would do well if only there were enough of them, if they had good ground to operate on, and if artillery bombardments were kept at a minimum, and 2) tanks under these conditions would do so well that it was worth while altering some basic strategic and tactical concepts to achieve these conditions; i.e., Fuller must have thought that tanks would win the war.

The tank's defects, however, were more widely appreciated than its potentialities and, as we now know, these defects were substantial. They were so substantial that Generals were loath to trust tanks, much less alter strategic principles in their favor. Conditions therefore remained bad and consequently so did tank performance. Thus Fuller was arguing for a weapon which was almost never in a position to live up to his claims and this did not help his or the tank's reputation.

We might observe at this point that as late as October-November, 1917, two Americans realized the substance of these defects. Majors JA Drain and IN Alden had been assigned by the Ordnance Department of the United States Army to investigate the feasibility of American entry into tank production and tactical methods. While investigating, they had spoken to Elles, Stern, d'Eyncourt and many others, and made these very revealing comments on current tank designs:

"It is hopeless to build a tank to withstand heavy artillery fire, and results indicate that this is not required, because tanks are rarely hit by direct artillery fire until they have first gone out of action due to their own failure in one of the four essential design elements: length, power, flexibility, flotation."<sup>1</sup> Flotation involves the pressure which the tracks exert on the ground: if the tank's weight is not distributed, it will sink

1. Drain and Alden, Report of Investigation, p 9.



until it reaches equilibrium. Flexibility means flexibility of control, and is maximum when one man can drive the tank. "On October 26, 1917,... drove up beyond Ypres and spent 5 hours on foot studying the nature of the ground over which tanks in this theater of the war must operate (Flanders)... The four fundamentals of tank construction were forcibly demonstrated here... On all these points the Mark IV is insufficient. Mark V will be satisfactory as to flexibility, somewhat improved as to power, but still inadequate as to length and flotation."<sup>1</sup>

Of all the Englishmen throwing memos about, only Churchill seems to have admitted these design drawbacks.<sup>2</sup> The drawbacks indicate that even the most advanced tank available for 1918 was insufficient in vital design considerations. I have found no British statement on tanks as thoroughly clearheaded as this American report. Perhaps Fuller, Stern and the rest were naive. Perhaps they felt that, with official approval, design improvements could come faster, if only tanks could have official approval. Thus these men played up the vital necessity of tanks and played down their weaknesses.

When these weaknesses continued to plague tank operations in strategic areas, the Generals undoubtedly were initially disappointed and later annoyed as glowing promises and large-scale demands continued to pour in. The Heavy Branch's persistent demands for approval on the one hand and the Generals' persistent demands for results on the other set these two groups into two sharply divided camps which failed to communicate effectively with each other for some time. Each group steadfastly distrusted the other's opinion of tanks.

### 3. Passchendaele

Apparently the tanks, though they had done nothing brilliant at Arras, must have made some favorable impressions, for the Heavy Branch began to

1. Drain and Alden, op.cit., pp 20-21.

2. This admission came in the Munitions Budget for the coming year 1918, a secret document seen only by the Cabinet. Churchill, op.cit., IV, p 31.

be expanded to receive Stern's increasing shipments of tanks. Elles was made a Brigadier General, and many facilities and services were added to the unit's complement. However, attempts from within the Branch in France to expand the unit very greatly, from 9000 men to 18,000, met with some difficulty. When the proposal reached the War Office, it was returned to GHQ with the remark that the extra men would come from infantry-bound recruits.

As the summer was wearing on and manpower growing scarcer, this was a most unwelcome bit of news for GHQ. Haig consequently wrote in reply what came to be the last official statement of tanks' priority rating (20 August, 1917): No men were to be given to the Heavy Branch from infantry, and tank production was not to be increased to the detriment of airplanes, guns and ammunition, transport vehicles or locomotives. Only at the end of the year, after the tank success at Cambrai, was this expansion approved. By that time, even a 100% increase was too small.<sup>1</sup>

In August the great campaign for the summer began for the British. Fought in Flanders, it has been called the Third Battle of Ypres, Passchendaele, and many names unprintable. It was launched to maintain a stable front while the French Army was suffering from widespread mutiny, and also to strike at the Belgian and Dutch channel ports, from which submarines were able to sortie.<sup>2</sup> Admiral Jellicoe had very recently dropped the "bombshell" (Haig's word) that submarines would have to be stopped before the end of the year or else the British would simply lose the war.

So Haig suggested a frontal artillery-infantry assault similar to that employed during the previous summer. The War Cabinet was really very ill disposed toward the prospect of so many casualties, but had little choice. Lloyd George may well have harbored an inner resolution to make this Haig's last chance, for soon after this campaign failed, he began his various man-

1. Fuller, op.cit., p 114-6.

2. Cruttwell, op.cit., p 436.

euevers described above, to remove Haig and his greatest supporter, Robertson.

There is also some indication that dissatisfaction with Haig's methods came from other places besides ignorant civilians and vociferous tank people: Haig's intelligence officer, General Charteris, remarked in his diary for 29 April, 1917, that he had just read one of Haig's appreciations of the entire situation. "The general line of his paper," wrote Charteris, "is the same old story-- go back to the first principles of war [which means Clausewitz]; wear down the enemy's powers of resistance to such a state of weakness that he will not be able to stand a decisive blow, and then deliver that blow. D.H. does not think that the time has yet come for the decisive blow, and that this is the cause of the recent French failure. We have now to go back to the wearing down process [which means artillery], the duration of which cannot be calculated. It all leads to the same conclusion; to keep up our present pressure continuously all summer and then perhaps find Lord Kitchener's forecast fulfilled, that someday the enemy will not be there..."<sup>1</sup>

Yet we must not forget that our hero, the tank, had yet to be present in sufficient numbers, had yet to be technically adequate, had yet to win Generals' confidence such that it could be entrusted with the responsibility of leading the major British campaign of the summer. Conditions, however, could have been more propitious. The Heavy Branch made every effort to inform GHQ of the difficulties which would be encountered once a heavy artillery attack was launched on the Flanders soil. It was only a thin topsoil, and under it was a thick layer of clay. Local drainage systems were artificial and sometimes undependable; not only the tank people but also native Belgians gave GHQ repeated warnings that artillery would make the ground a complete morass of mud, impassible by tanks or infantry. Mud, said Fuller, was never fully appreciated by GHQ as an aid to the defense.<sup>2</sup>

Yet GHQ was not unaware. Charteris told his diary on 4 August, just

1. Charteris, op.cit., pp 219-20. Italics original.
2. Fuller, op.cit., p 132.

after the big battle began, "I went up to the front this morning. Every brook is swollen and the ground is a quagmire. If it were not that all rainfall records of previous years had given us fair warning, it would seem as if Providence had declared against us." On the 9th, "The front area now baffles description... It is just a sea of mud, churned up by shell fire."<sup>1</sup>

The Heavy Branch began at this time to send daily "mud maps" to GHQ, showing the front line areas and delineating the oceans of mud and the continents of reasonably solid ground. Across the month of August the mud areas spread, and finally GHQ ordered Tank HQ to stop sending the maps. The official opinion on artillery had been delivered back on 17 June, 1917, by a man known to have had some influence on Haig,<sup>2</sup> General Hubert Gough. Gough was a young cavalry officer in command of the British 5th Army, which he had run into a fatal mudbog in the fall of 1916. He seems not to have paid much careful attention to the details of his job and had to be removed from his post in March, 1918.

At this point, though, he was delivering official word, and what it boiled down to was that artillery had been "conclusively proved" able to stun the enemy sufficiently that an attack could break any defense sufficiently bombarded. Initiative by the lowest command levels would then be able to exploit the advantage (we have heard this idea before.) until artillery should be needed again. These are the tactics of the Somme era; many who heard them were appalled, but they prevailed at Passchendaele.<sup>3</sup>

The resulting battle was a nightmare. Men and tanks sank uselessly into mud that was sometimes two feet deep. Casualties ran so high that by the end of the year the British had very few reserves left. This was to have great influence on the tank battle at Cambrai and on the following spring's defense against the Germans' last major offensive.

1. Charteris, op.cit., p 241.

2. Cruttwell, op.cit., p 275.

3. Fuller, op.cit., p 135.

An example of how tanks were distributed during the summer is the Battle at St. Julien. The Tank Corps, a new name since August, contributed 180 tanks to a fight which involved three corps of infantry. One corps had 36 tanks, the other two 72 each. Tactical groups were rarely larger than two or three. At one point a single tank captured several hundred of the enemy, a preview of 1918 tank successes, but generally Elles had to admit that because of the mud, only one tank in ten could be expected to reach the battle area from the launch site.<sup>1</sup> Tanks were designed to negotiate rough, broken ground, but the name Landship did not mean, as Swinton observed, that tanks were meant to be able to swim. Churchill remarked that another adverse influence on tank progress was the fact that they were used again and again in the same sectors of the front, allowing the enemy to get used to them while receiving only small doses. As before, Churchill was surprise-conscious.<sup>2</sup>

#### 4. Cambrai: The First Large Scale Tank Success.

So, as the Battle of Passchendaele sank slowly in the mud, Fuller created a plan for a prestige-raising battle, something which the British needed, which just incidentally was to involve over 400 tanks, virtually all the tanks available to the British.<sup>3</sup> Yet, because of the strain of the current battle, Fuller could not get approval to launch his battle until after the main campaign of the year was over, which meant fighting practically in mid-winter.<sup>4</sup> However, permission was finally granted and a date set at 20 November.

Crucial to the plan was the location of the attack: the area was near Cambrai, in the 3rd Army's sector, not Gough's 5th; the country was south of Passchendaele and consequently dry and unshelled; it had never seen a tank. It was agreed that there would be no artillery bombardment at all,

1. Williams-Ellis, op.cit., pp 151-2.
2. Churchill, op.cit., II, pp 82-3.
3. Fuller, op.cit., p 170.
4. Williams-Ellis, p 161.

and this may have caused enough jitters amid corps commanders that they called every tank into the initial thrust. Thus there were not only few infantry reserves but almost no tank reserves either.

The reader will immediately see the tank strength upon which this battle rested when he is told that one corps alone had 216 tanks assigned to it with 34 in mechanical reserve. Each division, of which there were three or four per corps, got about 80 tanks; each brigade, of which there were three to five per division, got about 35. Altogether, 474 tanks participated. Compare this with preparations for St. Julien, page 85.<sup>1</sup>

On the first day of the battle, the formidable German defensive barrier known as the Hindenburg Line was pierced and captured in an amazingly short time. The trench and wire system was easily breached and the infantry, aided also by the utter surprise of an artillery-free attack on a quiet sector, advanced easily. In 24 hours, a penetration of 10,000 yards had been achieved, as much as had been gained at Passchendaele with 50 times the casualties in three months. The battle died shortly thereafter, however, as the Germans regained their composure and counterattacked. Due to the fatigue of the tank crews and the lack of reserves, the gains were lost again by 30 November; this did its part to decrease GHQ's opinion of tanks and Lloyd George's opinion of GHQ.<sup>2</sup>

Despite the final outcome of the battle, the initial success won for tanks several supporters who would stand them in good stead during the following spring. It was only by making more such gradual inroads in the middle hierarchy that tanks were finally employed properly during the 1918 campaign.

#### 5. The Sudden Fall of Colonel Stern and the Gradual Rise of "General Tank"

GHQ was gripped in a near panic over the manpower shortage which followed the 1917 fighting season. Lloyd George was determined never to let Haig launch another offensive: Britain would wait a year before attempting an

1. Fuller, op.cit., p 186.

2. Ibid., p 207.

offensive, and Haig would not command it. To implement this aim, Lloyd George practically cut off the flow of human reinforcements to the Western Front. The quick collapses of Russia and Italy had recently released many hundreds of thousands of German troops who were expected to launch a great attack in the coming spring. In the panic and realizing how Passchendaele had decimated the Army, GHQ tried to get men anywhere it could, following Haig's equation which identified numbers of men and guns with military strength. One place they tried was the Tank Corps.

In the meantime, in London, Colonel Stern had been having his troubles getting big enough orders for 1918 tank production. His fight for a more efficient organization was also being blocked. Soon after the Battle of Passchendaele but before Cambrai, General Gough had reported to the War Office that in his opinion tanks were quite worthless; they could not operate over ground as rough as battleground was bound to be, assuming standard artillery methods (his favorite) were used.<sup>1</sup> This report, coming from Haig's protege, carried weight at the War Office, which announced on 11 October, 1917, that the entire tank effort had been a waste; there was no evidence of progress or results.<sup>2</sup>

When Stern got wind of this he literally blew his top. Churchill had recently reconstituted the Tank Committee to operate more smoothly, ensuring more effective and equitable representation, but this War Office report appeared to be a major threat. As a result of it, tank orders were to be limited to 1350 for the coming year and the Tank Corps held down to 18,500 men, the limit set by Haig.<sup>3</sup>

On the day Stern received these pieces of news, he forcibly vented his views not only to Churchill, but also to Robertson. Within a few hours Churchill informed Stern that the War Office was demanding his removal from

1. Williams-Ellis, op.cit., p 145.

2. Icks, R.J., Tanks and Armored Vehicles, p 98.

3. Stern, op.cit., p 168.

office, and that Churchill, in order to establish peace and ensure domestic tranquillity, was going to conform to the demand. Stern thereupon vanished from the British tank effort, turning to the task of interesting the Americans. His efforts soon produced a treaty, unique in history, for producing tanks by joint effort of Britain, France and the United States.

But in the meantime the British tank effort was visibly aided by the removal of this overforceful man. The advance of tanks over their many obstacles was eased by the more relaxed pace, apparent to all, which prevailed under his successor, Admiral Moore. By December, the manufacturing sector of the effort was moving much more smoothly.<sup>1</sup>

Churchill was nonetheless convinced that not enough tanks were being built for the coming year. He therefore tried the more legal and executive methods at his command as Minister of Munitions to secure for tanks a more favorable place in the Munitions Budget which he was writing and would soon present to the Cabinet.<sup>2</sup> In a memo, Churchill emphasized the economy of tank operations, showing that many more square miles of ground could be captured with a given number of men if tanks assisted in large numbers. With the impending manpower shortage, he urged that this man-saving method not be overlooked.<sup>3</sup>

However, due to the Gough report, the general impression of tank sinkings at Passchendaele, and the final outcome at Cambrai, the future of mechanical warfare was very much in doubt over the 1917-18 winter. The high command in France could not see taking men from the desperately needed infantry to crew the almost useless tanks, and even contemplated abolishing the Tank Corps altogether. The tank people were generally making themselves obnoxious by demanding what appeared to be more than their share of the acutely short supplies of money, labor and steel.<sup>4</sup>

1. Williams-Ellis, op.cit., p 191.

2. Churchill, op.cit., IV, p 31.

3. Ibid., IV, pp 98-9. He did not overrate tanks. See page 81, n.

4. Sheppard, op.cit., p 26.



Fuller, as usual, led the Tank Corps' fight. He carried it to the highest places in the government during the winter, completely ignoring his position in the chain of command. Not only did he visit Churchill constantly, but also interviewed Sir Henry Wilson. Wilson was Britain's representative on the Supreme War Council at Versailles, and was soon to replace Robertson. Fuller was stumping for the formation of an Inter-Allied Tank Committee, quite frankly to circumvent GHQ's efforts to hold back tank development.<sup>1</sup>

In January, 1918, this group was set up, gaining high approval easily since it fitted snugly into Lloyd George's plans to clip Haig's wings. By the middle of March these grandiose plans saw their completion as Marshall Foch became Supreme Commander and Wilson replaced Robertson as CIGS. At this point, Wilson, who was Lloyd George's special nominee, came squarely under the Prime Minister's thumb; one result of this was that tank production, long a favorite of the ex-Minister of Munitions, was increased greatly.

From this time on, Fuller and Churchill worked together to embarrass GHQ by flooding France with tanks.<sup>2</sup> This, too, was rather easily accomplished, since Foch, who thought rather highly of tanks at this time, was currently requesting reports from GHQ on the state of the Tank Corps. Since GHQ could hardly report that its London cousin had just placed an order for 4000 tanks (8 March, 1918), while it was attempting to reduce the size of the Corps, the tank effort in France was saved from being bled off into infantry. (None of these 4000 and few of the original 1350 ever reached France, due to the war's sudden end.)

Yet it appears that even at this time Haig did not realize what tanks were good for. Soon after this order was placed and just before the great German onslaught began, he told his diary, "19 March, 1918: Mr. Churchill came to lunch... He stated that, with the Approval of the Cabinet, he was proceeding with the manufacture of a large number of tanks (4000). This

1. Fuller, *op.cit.*, p 233.

2. *Ibid.*, p 239.

is done without any consideration of the manpower situation and the crews likely to be available to put into them."<sup>1</sup> Haig felt, as did many of the top soldiers, that the tanks would create a new manpower problem. Actually, they would soon ease the old one.

It is interesting to observe that, while questions of who should determine the quantity of supplies usually hurt the tank effort, in this case the confusion aided the effort. Further, we might notice that the arrival of the fifth season of fighting had not seen a solution to this problem. No solution would be effective unless it included changes in GHQ organization as well as changes in London. Personnel shakeups and organizational creations seemed to have some effect in London, where they involved only civil servants; changes in military structure were usually much more difficult to effect for many reasons cited above: conservatism, personalities, the weak position of ministers vis-a-vis Generals, and so on. Only after the war could such sweeping changes be made.

#### 6. The 1918 Campaign and Tanks' Final Triumph.

The last phases in the arrival of the tank into the realm of adulthood and general acceptance came in May, June and July, 1918. In May, a design was produced for a tank which would have an average speed of 20 miles per hour. Here again was a quantum jump in the nature of the idea of the tank, a jump so large that Fuller, not without good reason, felt that GHQ would never appreciate it.

Instead, he felt that a separate Tank Department should be set up at the War Office, which would control the fate of tanks surely enough to keep GHQ from ruining the effort for lack of understanding. At this point, his ability to communicate with GHQ was about gone. He must have realized that he had shot his charge, so to speak, in his many theoretical papers, prom-

1. Blake, op.cit., p 294.

ising to win the war with a weapon which had only barely proven its short range worth.

So Fuller again went directly to the War Office, to deal with the "farsighted" CIGS, Henry Wilson. With him he took a tactical and strategic plan to be implemented by the new tank.<sup>1</sup> He was immediately asked to come to work at the Office, reorganizing the tank effort from top to bottom and producing for the Office's use an item which Fuller was satisfied had never existed above the command level of the Tank Corps itself: a tactical doctrine for tanks. The organization scheme, soon put into effect, produced direct and short lines of communication between the IGS, the Tank Corps, and the Headquarters of Armies which were using tanks. GHQ did not appear in this setup.<sup>2</sup>

The other big step in the tank's coming of age was the Battle of Hamel, 3 July, 1918. This was a small battle, but it convinced Sir Henry Rawlinson, commanding the 4th Army, of the tank's value. Only 60 tanks and two and one half brigades of infantry were used, but all of the day's objectives were taken within two hours, a phenomenal result. Tanks became heroes over night, and they also gained something they never had before: they now had a spokesman who was agreeable to large numbers of influential people; Stern had been obnoxious, Churchill politically suspect, Fuller too persistent and far too quick-witted, and others too busy to make an effective effort.

But Rawlinson had friends at GHQ and on the IGS, and after Hamel it was natural that he should take the tanks into his Army lock, stock and barrel, and continue to use them in groups of 100 or more. His greatest turn was the Battle of Amiens, 8 August, 1918. Here 688 tanks were thrown at the retreating Germans; by the end of the day a penetration of over 14,000 yards had been effected and by the end of the week 22,000 prisoners had been taken.<sup>3</sup>

1. Though the war ended before this tank was completed, the plan was carefully studied by the Germans; with the addition of the airplane, it became the Blitz.

2. Fuller, op.cit., pp 283-6.

3. Ibid., pp 297-317.

Haig now fell into the swing of the strategy which Foch was putting into effect. Tank attacks were thrown at the enemy at several places up and down the line in quick succession, making use of the tank's ability to be put on a train and run 100 miles north during a night, unloaded and tossed in somewhere else. These tactics soon cost the Germans prisoners at a rate they could not bear, and this factor they freely admitted to be primary in forcing their decision to ask for peace.<sup>1</sup> At the end of the War, Haig, Foch, Ludendorf, and many lesser lights were praising the tank's prowess and saying that it had contributed strongly to the Allied victory, which before had been awaited vainly and now came with unexpected suddenness.

Yet even here we might observe in passing that the Generals, having held out so long against giving the tank any credit, were now ready to give it really too much. We must not forget that in 1918 the Germans were a broken and weary nation and army. Surrenders to tanks were very likely caused by a will to surrender, the tank being a convenient excuse. The ability of an enemy who kept his head to defeat tanks was shown on the second day of the Battle of Cambrai; in years following, it has been learned that even an otherwise unarmed civilian can destroy a tank with a coke bottle of gasoline.

#### 7. Summary and Concluding Remarks.

At this point it is worthwhile summarizing briefly what might be learned from this investigation. The main point is that the legend of marbleheaded Generals is an insufficient historical explanation for the troubles which tank development met. We have seen many instances in which command relationships were confused, ambiguous and ignored. Swinton's first four seeds, the dual Heavy Branch commanders, and Fuller's trips to London are all examples. Pure, unadulterated bureaucracy made many seemingly easy tasks almost impossible: red tape, draft codes, deadlocked committees and bloated

1. Sheppard, op.cit., p 43.

ministries were all results of the unprepared nation's efforts to rise to an unexpected challenge; the characteristic solution was impromptu, ad hoc. The lack of firm central control of policy formation allowed the tank effort to drift on several occasions. In the absence of official policy, unofficial memos tried to do the job, but did not succeed.

Often the difficulty came from the people themselves: many were pressed by jealousies, antipathies and the impact of events. Many were simply in no position to understand what was wrong with current tactics or what the tank was all about. Understanding, however, did not break down as often as communication. Important memos failed to get broad circulation. Certain terminology and theories became taboo. Two impatient and sometimes rough-tongued individuals rendered themselves virtually incommunicado with the powers of government and military command. Their ideas had to be taken up by more politic individuals before they gained the support which they no doubt deserved.

This last piece of knowledge indicates that, inasmuch as these two men in particular blame the Generals for not understanding tanks, considerable blame must fall on these two for not understanding the Generals. Of course, we must not neglect the very real shortages of materials, money and men which would not have been overcome in the large no matter how well anyone understood the nature of tanks, the nature of war, or the nature of democratic society.

What we must look for in the totality of this story is the narration of a typical problem, that of developing something really new (either in a time of crisis or not) amid a mixture of democratic and authoritarian atmospheres. This problem will always dog a democratic society which means to keep abreast of its powerful authoritarian neighbors without having to resort to its neighbors' methods. It must choose between the rather doubtful efficiency of the mixed civilian-military, mixed democratic-authoritarian method, and the more efficient but perhaps less original and creative full authoritarian method.

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