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M I L I T A R Y H I S T O R Y

OPERATIONS OF THE 3D PLATOON COMPANY "I" 4TH INFANTRY 3D DIVISION
IN THE CHAMPAGNE-MARNE DEFENSIVE AND AISNE-MARNE OFFENSIVE,
JULY 5-24, 1918

(Personal Experience of Platoon Leader)

CAPTAIN A. R. BOLLING, INFANTRY

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"The Great Crusade". A narrative of the World War, 1927., D. Appleton and Company, New York, London.

A narrative of the actions of the 3d United States Division which was commanded by the author during the Champagne-Marne defensive and the Aisne-Marne offensive. The account seems accurate and detailed but the errors made within the division are not brought out.

Howland, C. R.

"A Military History of The World War". Narrative account of the World War. The General Service Schools Press, Fort Leavenworth, Kansas, 1923.

A chronological account of the more important events in each campaign of the World War. Errors in judgment of commanding officers are brought out in a technical manner. Sound and accurate.

Hemenway, F. V.

"Third Division". A story of the history of the Third United States Division in The World War. Andernach on-the-Rine, February 1, 1919.

General Military account of the formation and actions of the Third Division. In general accurate but in detail this work seems to avoid the actions of the smaller units. Not sufficiently technical in detail to warrant an accurate study of the smaller units.

INTRODUCTION

The 3d Platoon of Company "I" 4th Infantry, on July 5, 1918, was composed of all men who had voluntarily enlisted; some just after war had been declared and others who had been in the service for from one to three enlistments. The platoon leader had been commissioned from the first training camp with practically no previous military experience. This platoon had been formed in December, 1917, and had been trained as a unit. The service of this small command from July 5 to 24 can be divided into three distinct phases, namely:

OUTPOST DUTY: Front line service in a quiet sector.

SUPPORT DUTY: Service while in a support position.

ATTACK: Preparations and advance to the attack.

OUTPOST DUTY

ORIENTATION

It was July 5, 1918. Plans had been made to withstand the German offensive which had been anticipated for many days. (1) Within the 3d Division

sector the plan of defense was an outpost line of resistance along the Paris-Metz Railroad and to the front an outpost line along the Marne River. To the

rear of the outpost line of resistance was the main line of resistance along the aqueduct line and the reserve line along the wood line well to the rear. (2)

The 3d Platoon of Company "I", 4th Infantry had been ordered into the outpost position northwest of Chierry.

TERRAIN

The village of Chierry some 700 yards south of the Marne River had been subjected to heavy shell fire

(1) The Great
Crusade,
p 73

MAP #1

(2) Howland,
Military His-
tory of the
World War
p 299

Map #2

and was periodically shelled daily. About 350 yards northwest of the village was a large house or chateau situated in a clump of trees. From this house to the Marne River was an area of about 350 yards of open field with a gentle slope toward the river. This area was under direct observation of the enemy. The Marne at this point was about 65 yards in width, not fordable and with banks on each side from 3 to 6 yards. A wagon trail paralleled the river on the south side where an embankment had been constructed to protect troops in position on the river bank. On the north side of the river, which was occupied by the enemy, the slope to the north was more abrupt and extended to a patch of woods about 350 yards from the river bank. The village of Brasles was to the north of Chierry on the north side of the river.

SITUATION

About 4:00 PM July 5 the platoon leader of the 3d Platoon of Company "I", 4th Infantry, was directed to take over the outpost position on the river bank northwest of Chierry from a platoon of the 1st Battalion of the same regiment. A guide was to meet the platoon leader at Chierry and direct him to the position to be taken over. ~~It was too late for making any reconnaissance~~ prior to taking over the position. The platoon was moved through the woods to Les Evaux from where it was impossible to make further advance until dark due to the forward area being under direct observation of the enemy. After dark the move was continued, the guide was met and escorted the platoon to the chateau northwest of Chierry. Packs were stacked in the cellar

of the chateau, rifles were loaded and the guide directed the way to the river front. Unaccustomed to night marches together with the number of flares being used by the enemy the movement to the river was slow. Upon arrival at the river bank the platoon leaders relieved man for man over a front of about 250 yards. The orders turned over were to hold the river bank against any attempted crossing and not to fall back to the outpost line of resistance unless so ordered. The turning over of flares to be used for warning the artillery in the event of an attempted crossing and flares for use within the platoon completed the relief. The platoon leader immediately gained contact with a platoon of Company "K" on the right and the French unit on the left. This consumed the remainder of the night and as it was necessary to get the men away from the river before daybreak in view of enemy observation, arrangements were made to take up the day position within the chateau. In the meantime the members of the platoon had been attempting to seek out targets and the fire from both sides had been increased. As no doubt both sides seemed to be expecting a raid the river was kept well lighted with flares during the balance of the night. As dawn was breaking, squad leaders were directed to send men by twos from their squads at intervals of three minutes to the day position. During this period of time on the river front no machine guns had been located in the front line position. When the platoon had assembled at the chateau an observation post was established on the second floor. Each man in the platoon was directed to view the terrain to the front and on the enemy side of the river. The observation post was to

report any activity on the north side of the river so that a surprise crossing could not be made. The remainder of the platoon rested during the day. Another effort on the part of the platoon leader to locate any supporting machine guns was unsuccessful. As darkness fell on the evening of July 6, the platoon took its position on the river bank. Just before leaving the chateau, however, a runner from Battalion Headquarters brought a warning that information had been received that the attempt to cross the river would be made that night. During the early part of the night firing was quite active on the right of the platoon sector. Within the platoon an effort was made to locate the enemy machine-gun emplacements by rolling large stones into the water, hoping that the enemy might fire at the water line and perhaps reveal his firing positions. This was not successful as the enemy merely lighted the river with flares. Loud talking could be heard on the enemy side and this, together with increased firing, seemed to indicate that the warning from Battalion Headquarters was well founded. The fundamental rules of proper fire discipline, control and distribution were all violated. Men were permitted to fire at any target at any time and in any direction. The anxiety to find a target and continually shoot in the general direction of the enemy lines must have been an indication that new and green troops had arrived in the sector. This activity seemed to stimulate the enemy firing as the withdrawal to the day position was made with much difficulty. The evening of the 7th found the platoon in position earlier than the usual time for posting the line. There were two paths leading to the enemy night positions, and as those positions had not

enemy detail moving up to occupy the position

been occupied for that night it was hoped that the detail could offer a good target on these paths. At the first sound from the enemy lines and at a prearranged signal from the platoon leader the entire platoon opened fire, aiming generally toward the point where the detail was thought to be. This sudden activity on what was considered to be a very quiet sector brought a battalion staff officer who advised the platoon leader that his mission was to prevent a crossing of the river and other than that all other firing was uncalled for. At midnight the platoon was relieved by a platoon from Company "C" and returned to the support area in the vicinity of Hill #186. This short period even though on an inactive front, had done more in the training of the platoon than any prior instruction. They seemed to have confidence in their ability to cope with the enemy and were disappointed when informed that they were to be relieved. There were but three casualties during this period and these were caused by shell fire while in the day position.

COMMENT

1. The lack of time available after the issuance of the order to take over the position made a reconnaissance out of the question but the platoon leader might have directed the platoon sergeant to bring the platoon to the chateau and have made all arrangements for the relief by going forward just after he received the order to take over.
2. The mission of the platoon certainly warranted the assigning of machine guns to the area in order to give increased fire power in the event of an attempted crossing.
3. The difficulty of control of troops over

unfamiliar terrain at night where it was necessary to maintain absolute quiet made it apparent that night training should not have been slighted while in the training areas.

4. The absolute disregard of the fundamental rules of fire discipline and control might have proved costly had the enemy attempted a crossing. No instructions having been given by the platoon leader as to firing it would only seem reasonable to believe that the men would fire wherever they thought a target might be.

5. The platoon leader failed to fully appreciate his mission and permitted an increased and unnecessary amount of firing. This must have been an indication to the enemy that these troops were in the lines for the first time, were unseasoned, and that a relief had been made to their front.

SUPPORT DUTY

ORIENTATION

Map #2 A

July 14th. The German Peace Drive had still not materialized. Activities had been quieted along the front lines. The 4th Infantry was distributed as follows: 1st Battalion occupied the river line, the 2d Battalion Aqueduct line and the 3d Battalion (less Company "I") the reserve or wood line. Company "I" (less the 3d Platoon) was in a position in the woods 500 yards southeast of Nesles and the 3d Platoon of that company was in a position in the woods about 400 yards northeast of Nesles.

TERRAIN

The Bois de Nesles east of Nesles afforded excellent cover for troops in a reserve position.

The slope to the river was gradual. The area to the north of Nesles was under observation of the enemy.

SITUATION

On the night of July 14-15 the 2d and 4th Platoons of Company "I" were attached to the 3d Platoon as a working party. The entire detail reported to a lieutenant of the 6th Engineers on the north edge of the Bois de Nesles after dark for the purpose of constructing trenches. Arms were carefully stacked, areas for work were assigned to squad leaders and the work was started. At 11:50 PM friendly artillery opened an intense fire on the enemy lines. At 12:10 AM the enemy artillery opened an equally intensive fire from eighty batteries on the entire division sector. (3) The reserve line seemed to be receiving the heaviest concentration of fire. The working party sought cover in the partially constructed trenches and an effort was made to distribute the rifles that had been stacked. This detail covered an area of nearly 500 yards along the proposed trench system. At the time it was apparent that the long looked for offensive of the enemy was being launched and some effort should be made to assemble the three platoons in a position that afforded more cover. An attempt was made to assemble in a small quarry near the road but the noise and confusion made this impossible by means of verbal commands. The lieutenant of engineers was killed by one of the first shells and casualties were increasing within the platoons. Another attempt to assemble was made by means of instructing each section leader who could be found and squad leaders to assemble their units in the quarry. Gas masks were being worn which added to the difficulty of

(3) The Great
Crusade,
p 82

control but in about thirty minutes what remained of the detail had arrived at the quarry. Wounded and dead were brought into the assembly point. There being no Medical Corps men with the detail first aid applications to the wounded were made by other members of the platoon. A runner had been sent to the company for instructions and litters but as no reply to the message had been received another runner was dispatched. (It was later learned that the first runner had been killed en route.) The location of the Battalion Aid Station was not known and the wounded were required to be held in the quarry until some word could be received from Company Headquarters. While awaiting orders a reorganization of the platoons was made. At about 3:50 AM or over three hours after the enemy shelling had started, instructions were received to return to the company area and further information that the Battalion Aid Station was in Nesles. The wounded were immediately evacuated and the detail moved out up the road in section columns using the gutter along the left side of the road as shelter from the shelling. The demoralizing effect of being subjected to a heavy barrage together with the fact that there had been many casualties brought the morale of the company to a very low ebb. The company commander then issued instructions to prepare for a move to the front. No news of the success of the German offensive had been received but small arms firing could be heard to the right front and seemed to be well this side of the river. At 9:00 AM the 15th, the company was moved into the support position along the aqueduct line. The 2d and 3d Platoons had been consolidated and took the right portion of the sector with a platoon of the 7th Infantry on their right

Map #2A

and the first platoon on their left. As night fell no news had as yet been received as to the advance of the enemy. Patrols were sent to the immediate front in an attempt to contact troops in the forward line and ascertain whether or not they were still in position. Of the three patrols sent out but one returned having only information that there was a company of the 4th Infantry to the left front. The other two patrols were lost, reported in to the 7th Infantry and returned to the command the following day. Little or no information could be gotten as to the enemy activities except that they had crossed the Marne and were moving southwest across the lowlands. The half completed trench system that the platoon was occupying was improved in order to provide some protection from artillery fire and also in the event that the enemy was successful in breaking across the front of the other regiments of the division. The day of the 16th was used to give the men all the rest possible they having had no sleep since the night of the 13th. On the night of the 16th a more systematic method of patrolling was resorted to in conjunction with the 7th Infantry on the right. One patrol advanced to the Marne River and returned with the information that no attempt was being made to cross at that point and that the enemy had met with resistance from the 38th Infantry the extreme right regiment of the division and was not attempting toward a southward movement. At 5:00 AM on the 20th the platoon was relieved. The casualty list within the company to date had been, 10 enlisted men killed, 3 officers and 40 enlisted men wounded--this all in a support position without ever sighting the enemy.

COMMENT

1. The stacking of arms on the night of the 14th and 15th was inexcusable on the part of the platoon leader and caused delay in assembling his command.

2. The demoralizing effect of artillery fire, the difficulty of control in moving a command under heavy shell fire and the added difficulty of moving in strange terrain at night with gas masks was presented for the first time. Had the platoon leader ~~have~~ selected a place of assembly in the event of shell fire which might have been anticipated, knowing that there was a German offensive contemplated, and had the units assemble by sections or even squads to this area casualties would no doubt have been reduced.

3. The fact that the time of the German offensive had been known at higher headquarters in the evening of the 14th (4) and this information had not been transmitted to the smaller units caused unnecessary casualties as shelter would most certainly have been taken in a defiladed area prior to midnight. Instead no such information was received and these three platoons were caught in this barrage on the forward slope of the reserve line on the edge of a woods which was the logical place for enemy artillery to center their fire.

4. The platoon leader should have been familiar with the location of the battalion aid station. The fact that he was not caused delay in the evacuation of the wounded.

5. The lack of night training while in training areas in patrolling and night operations was apparent when patrols were sent out and reported in to another

(4) The Great
Crusade,
p 81

regiment. These patrols brought no information of value and only such information that had been told them by others.

6. The platoon leader should have established an outpost line to the front of his position on the night of the 16th until he was thoroughly convinced that friendly troops were to his direct front.

THE ATTACK

ORIENTATION

July 21st. The Germans had fallen back across the Marne River and were fighting a stubborn withdrawal action in an attempt to delay their pursuers as long as possible so that the withdrawal would not degenerate into a rout. The 4th Infantry had crossed the river at Chierry on the 21st. The 1st Battalion had moved into Mont St. Pere, the 2d Battalion had advanced to the rear and to the left of the 7th Infantry thru the Bois de Barbillon. (4) The 3d Battalion spent the night of the 21st in the Bois de Barbillon. // On the 22d Company "I" moved to a position on the edge of the road just 400 yards north of Mont St. Pere. The field trains had arrived in Mont St. Pere and the company was marched back into the town for a hot meal--the first one for thirty-six hours. The streets of this village were massed with foot troops, artillery, trains, ambulances and staff cars. Prisoners and wounded being carried only added to the confusion. There was no regulation of traffic and it was difficult to get troops through the town. After the meal the company returned to the position that it had previously occupied on the edge of the road north of the town. // On the 23d the platoon leader, while in Mont St. Pere,

(b) History of
the Third
Division,
p 59
Map #3

attempted to get some information as to the progress of the advance of the 1st and 2d Battalions but no one at Battalion Headquarters seemed to know and the general impression was that this was not even known at Regimental Headquarters. // Wire had been run in the general direction of the advance but would not function, no doubt due to the fact that the advance was too rapid to establish any Battalion command post long enough to get through with the wire for telephones. ✓ Having watched the wounded being carried and walking from the front line battalions it was evident that the 3d Battalion would be ordered into the relief of one of them. These orders were received in the early afternoon of the 23d but the battalion was held until the late afternoon before any move forward was made. ✓ About 3:00 PM on the 23d a lieutenant colonel of the regiment and seven men passed the platoon on the edge of the road. This lieutenant colonel with his detail was attempting to locate the advance of the front line battalions and passed through these lines, entered La Tieulerie Farm and was killed by the enemy who still held that position. The remainder of the patrol was dispersed. (S) This was an indication that regimental headquarters was not familiar with the front line positions. # Orders were finally received to advance the 3d Battalion, to pass through the lines of the 1st Battalion and attack in the vicinity of Le Charnel. These orders were transmitted to the platoon leader by the company commander as having been received at battalion headquarters. Company "I" moved out at the head of the column in section columns on each side of the road, with five paces between men. The route was due north on the road that passes Moulin Doly. The strain of the last

J. B. Nalla
✓
(6) History of
the Third
Division,
p 59

nine days was telling on the men. There was no conversation and they went about their tasks as a matter of duty realizing that they were at last arriving on a front line position. After advancing about 1100 yards a machine gun opened fire from the southern edge of the Bois de Mont l'Eveque. The platoon leader who had now moved the 3d Platoon about three hundred yards in advance of the remainder of the battalion to act as ^{advance party} ~~an~~ point realized that this gun would have to be silenced prior to further advance up the road. With two squads the frontal attack was started against this gun but before an advance of one hundred yards could be made a shell landed near the advancing squads stopping any further advance of the group. This gun was later withdrawn due to the advance of another group that took advantage of the cover of the Bois du Chanois. The casualties caused at this point made it necessary for all platoons to be commanded by noncommissioned officers of the further advance as all officers other than the company commander had been casualties. ~~On the morning~~ ^{Late that afternoon} of the 25th the company took Le Charmel in the face of intense artillery and machine-gun fire. (7) This company had been in the front area (either front line, support or reserve) since June 10, had had very little actual front-line service and when the actual attack of enemy position was made only about fifty per cent of the enlisted men remained and only one officer, whereas there had been eight ^{officers} in June.

COMMENT

1. Company "I" might well have held in the village of Mont St. Pere during the 22d and part of the 23d where protection was available from hostile artillery

Indication
✓
?

(7) History of the Third Division, p 61

(23d?)

date. These might be summarized as follows:

1. The reconnoitering of a position before taking over or moving into action is a great aid to intelligent maneuvering.

2. The training of an organization on a garrison parade ground in extended order and for night training is of little value when such training is applied at night in woods, under fire and over unfamiliar terrain.

3. The training of noncommissioned officers to assume command of the next higher unit than the one they are actually commanding should be stressed. The soldier has initiative if permitted to use it but in training areas an opportunity should be given the senior sergeants to take command of platoons realizing that platoon leaders form proportionately the greatest percentage of casualties in action and these sergeants in most cases will have to command the platoon eventually.

4. The maintaining of contact with troops on the right and left is an essential but the occupying of a position without knowing who is to the front or where the troops to the front actually are could result in a surprise attack that would prove most costly. Enemy plans might be anticipated and an effort made to formulate some means of defense against any action the enemy might take.

5. Leadership of a small command is of the utmost importance. The intimate contact with the soldier himself makes the officer an object of study to that soldier. If the soldier feels and is convinced that this officer is at all times working for the benefit of the command that officer will have the soldier's support and confidence. Without this confidence placed in them

fire. This would have permitted the men to have gotten a certain amount of rest.

2. The lack of information furnished from the organizations in the front lines made it impossible for higher headquarters to formulate plans for further advance.

3. Traffic control is an essential that should not have been neglected. Had the enemy have shelled Mont St. Pere during the 22d or 23d the jam in traffic would have caused unnecessary casualties.

4. The sending of a lieutenant colonel as more or less of a patrol leader might seem uncalled for but the fact that the exact position of the front lines was not known made it possible for an officer of his position within the regiment to issue orders if required had he have found the front line organizations. Had a junior officer been sent it would have been necessary for him to have transmitted the information that he had received to the regimental headquarters before any order could have been issued.

5. The attempt to take a machine gun by frontal attack was futile.

6. The supporting battalion was kept entirely too far in rear of the unit it was supporting and thereby lost contact.

LESSONS

In the comments on the narrative an effort has been made to point out the errors made by a platoon commander in three phases of action. There were no tactical situations of great importance that confronted this platoon leader but the lessons that were learned were of great value in another offensive at a later

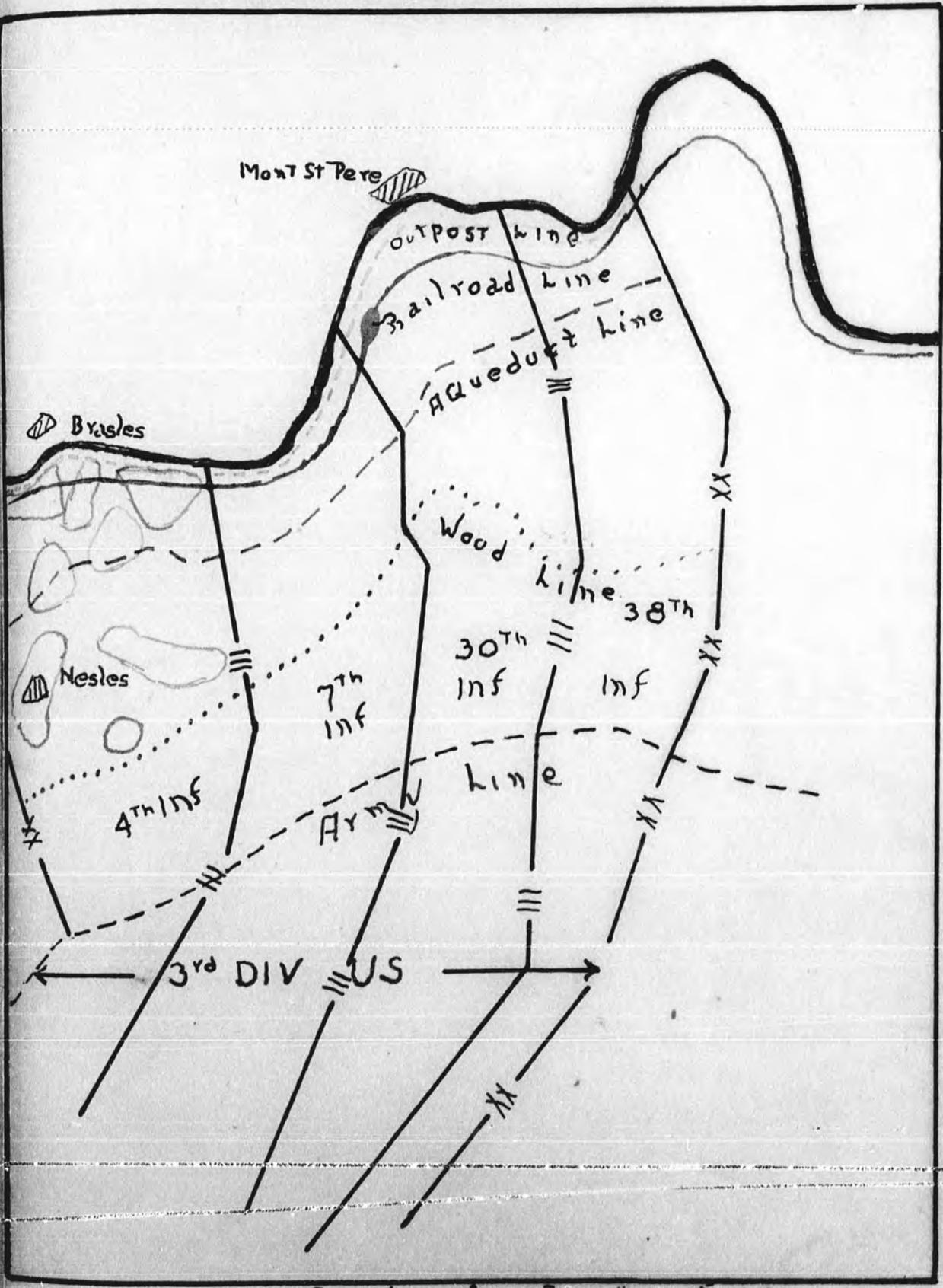
leaders become useless as far as leading a command into action. Leadership is defined as "the art of imposing one's will upon others in such a manner as to command their obedience, their confidence, their respect and their whole-hearted cooperation."

CONCLUSION

During the World War officers with but three months' training were entrusted with commands in action. Their efforts were no doubt of the highest order and in most cases they carried out their missions to a successful conclusion, nevertheless, it is felt that no officer should be sent to command troops in action until he has been given a more thorough schooling in the fundamentals of tactics. It is said that experience is the best teacher but while untrained and inexperienced officers are gaining that experience the success of the command might be vitally effected.

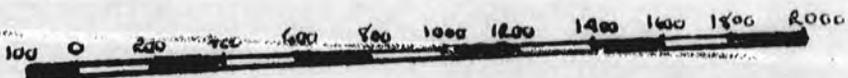
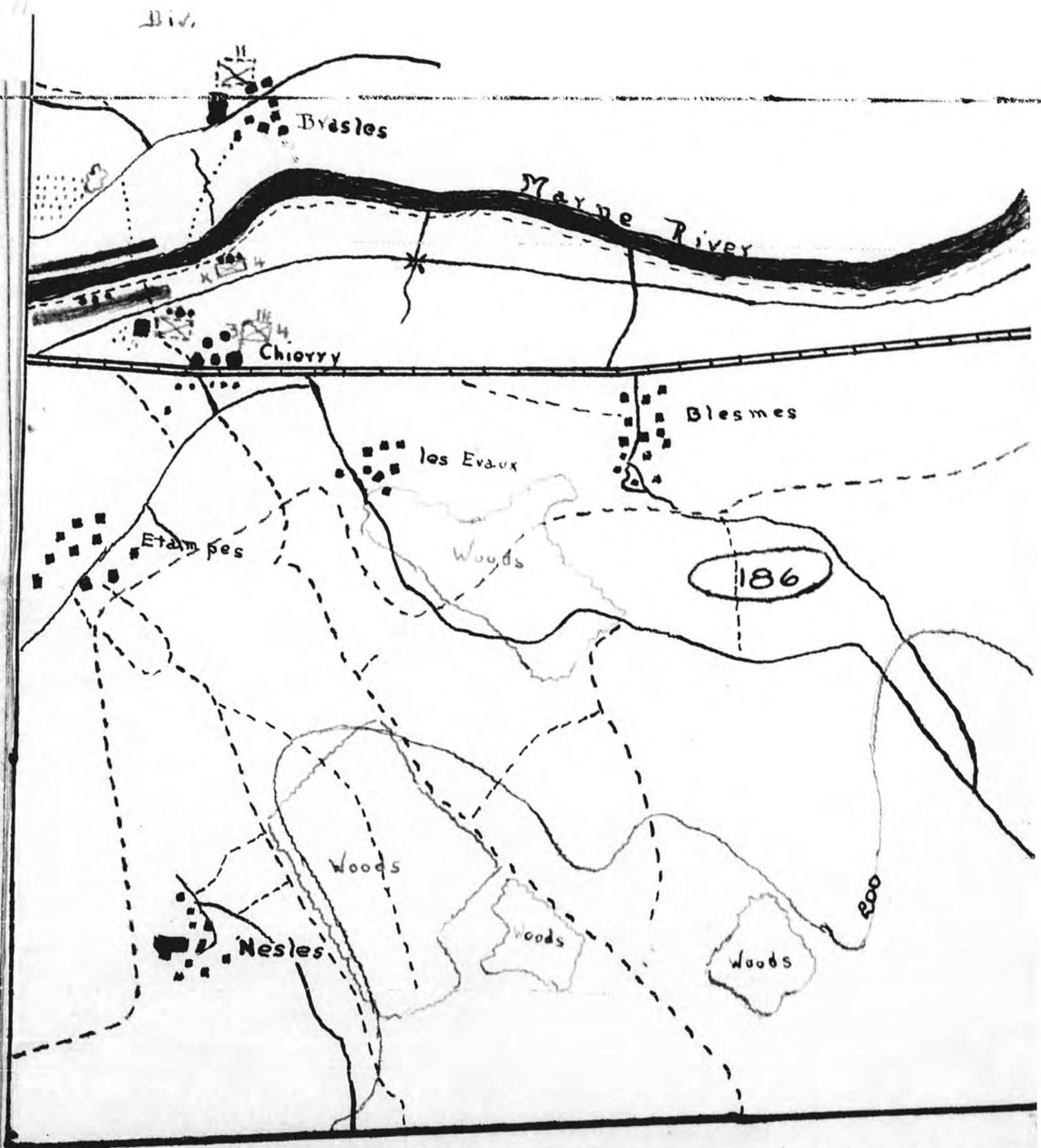
The success of a withdrawal is dependent upon the aggressiveness of the attacking troops. The unfortunate factor in the pursuit of the German forces north of the Marne River might be said to ^{have been} ~~be that~~ lack of aggressiveness which might have turned their orderly withdrawal into a route. The use of support and reserve units to the fullest extent might have changed the entire situation.

3rd DIVISION INFANTRY DISPOSITIONS



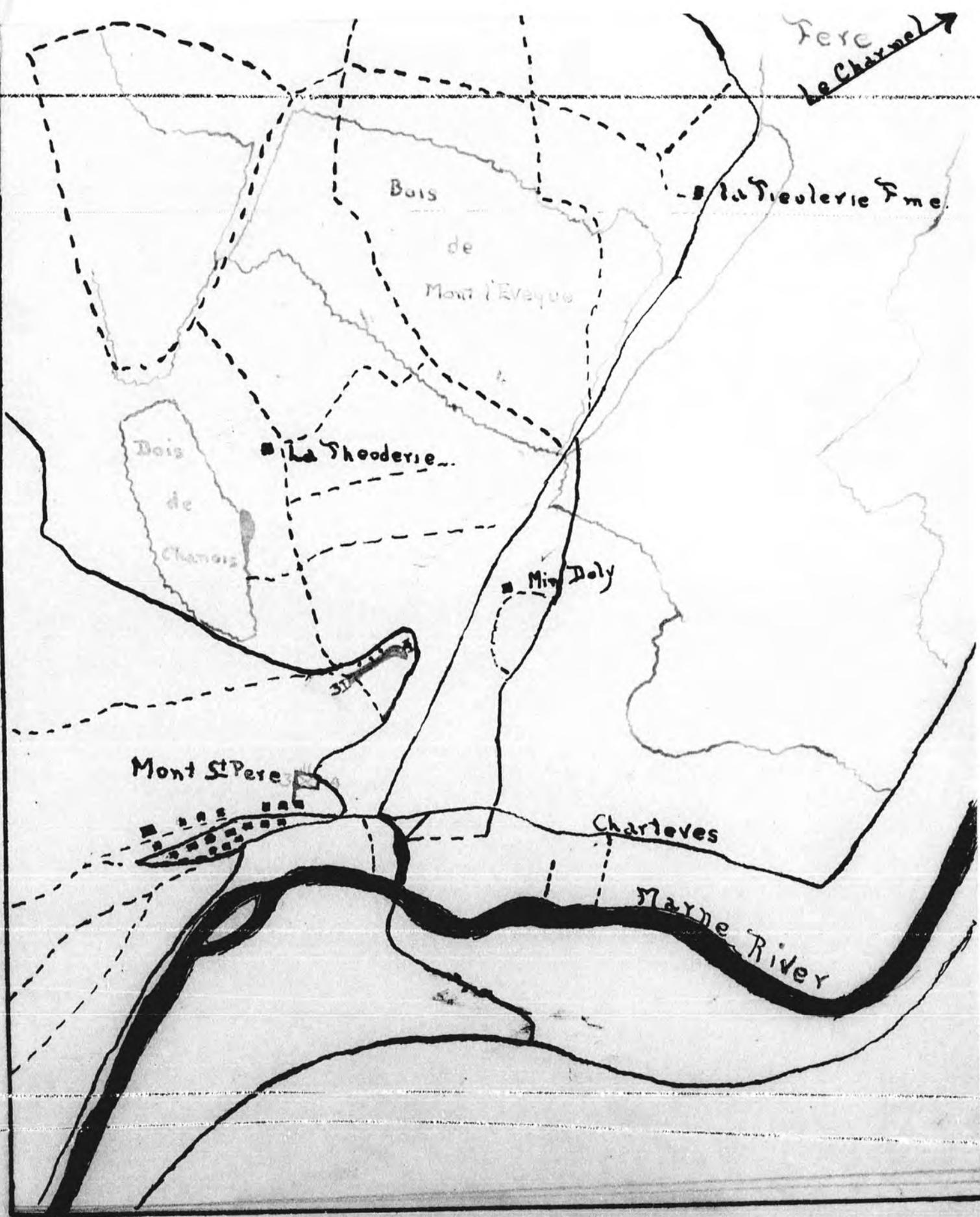
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cap. A. R. Bolling



1:200000

█ Position 3rd Platoon Co I 4th Inf July 5-7 incl.
█ German Position July 5-7 incl.
 Capt. A.R. Bolling



100 0 200 400 600 800 1000 1200 1400 1600 1800 2000

1:20000

Capt. A.R. Bolling

An Attempt at a Positive Classification of Fighting Tanks.

By Lieutenant Colonel J. Perré of the
French Army.

A Translation of the original
article which appeared in the «Revue
Militaire Française» of July 1936.

Publishers: Berger-Levrault et Chapelot
5 rue Auguste-Comte
Paris, France.

Translated by Capt E. J. Bond, Inf. ^{U.S.A.} in
part fulfillment of requirements for completion
of course in Military History at The
Infantry School,
Fort Benning Ga.

January 1937.

Introduction -

For the past several years we have hardly been able to glance through a military magazine without finding in it the photograph or a description, more or less exact, of some new type of tank. We become confused before this array of machines of every conceivable type and tannage and of every shape and design. If, in seeking some sort of guide on the subject, access can be had to the very notable Manual⁽¹⁾ of which Dr Fritz Heigl was the author, it is true that we can readily find for each country, their existing tanks classed as: "baby" tanks, light tanks, medium tanks, and heavy tanks, but, within these categories? what a diversity exists depending upon the period, the nationality or the builder! What is there in common, except perhaps a certain similarity in weight, between our old Schneider and the American medium T 2 of 1930?

- (1) Heigl's Taschenbuch der Tanks revised by
O.H. Hagker, R.J. Icks, O. Merker and
G.P. von Zeschwitz,
(J. F. Lehmann, Editor, Munich.)

It is evident that the "Tank Guidebook"
? - (Dr Heigl) aims to be for tanks what
certain "Naval Manuals" are for ^{warships.} ~~ships.~~
Every year such ^{manuals} ~~manuals~~ appear, are
published in every language. But
it must be admitted, they only
partially fulfill the object for which
they were intended. And yet, their
authors are not in the least responsible
for their lack of success. The fault
lies in the lack of uniformity and
of exactness in our vocabulary.
When we speak to a sailor, for
example, of a battle cruiser, of an
iron-clad; of a torpedo destroyer
of a light cruiser, instantly these
words ^{awaken} ~~awaken~~ in his mind not
only a comparison of tonnage and
of ~~dimensions~~ but, still further, a certain
? idea of the tactical possibilities
of each ^{class.} ~~group.~~ It is not the
same for the quite arbitrary
terms used in Heigl's Manual. And
it is even less so for the expressions
in current use in each national
army. If you speak of the light
tank, the Frenchman who hears
you thinks immediately of an
accompanying weapon more or
less directly descended from
the war-time Renault, while

an Englishman sees in outline
a small, rapid, vehicle, lightly
armored and armed and one
intended for security missions.

It is fortunate though that our
Drumman can't read the thoughts
of the Britisher; otherwise he
would exclaim: "Why that's a
machine-gun-reconnaissance car!"
— which would in no wise clarify
the discussion. ^{And don't} ~~Don't~~ bring
up the subject of the heavy tank!
Our Drumman would see a
^{machine}~~mechanism~~ designed to break
through heavily fortified positions,
while the Englishman would
reply "Independent tank".
Above all don't mention a Cavalry
combat car ~~recommended~~
by the Americans or the Russians!
This would only confuse the
discussion for ~~the whole world~~
everyone.

This confusion in language is
furthermore caused by a great variance
in our conceptions of the use of a
tank, "a diversity which itself,
is readily apparent when we

Variance

read certain military magazines. We cannot even arrive at a ~~fair~~ common understanding by ~~the~~ ^{classifying} ~~classification~~ of tanks according to their basic tactical employment. This ~~is~~ method, besides, would have a certain danger and could hardly avoid being arbitrary. In fact it is rather difficult to determine to what degree such discussion along this line in the press has influenced those in responsible circles and contributed toward shaping the ^{course} ~~course~~ of their research. Besides, the technician is not always capable of furnishing to the High Command the exact mechanism it might require; the possibilities of the one react on the desires of the other, ~~and~~ ^{direct} ~~them~~ ^{them}, check them, or enlarge them. ~~The~~ The tank is born from the compromise that must follow.

Under these conditions, ^{in order to really classify tanks,} a single method has appeared to us wise and possible: the method of observation and comparison employed in the natural sciences. Since tanks so readily suggest monstrous animals, we have, like Buffon, considered those which seemed quite accurately known to us and within the

~~conclusions~~ ~~that~~ ~~the~~ ~~conclusions~~ ~~appeared~~ ~~all~~ ~~the~~ ~~more~~ ~~convincing~~ - especially as we knew them to be free from any particular school of thought or any pre-conceived notions.

is admitted
It ~~does not escape us~~ that our basic data ^{contain} ~~admit~~ certain discrepancies, imprecisions, and unavoidable omissions, but these errors are restricted, by the comparison within the various types, to such limits that they ~~would~~ ^{can} hardly ~~greatly~~ ^{seriously} influence our conclusions in their ~~whole~~ ^{entire} entirety.

Let us add that in order to be more assured of remaining objective we have taken into consideration, at least for the ~~modern~~ period, ~~only~~ tanks of foreign make only. ^{All well-} ~~of~~ informed readers will ~~readily~~ find the place

for the French material in our catalog. In this way we have avoided stirring up any heated controversies - the mere presence of which would ~~have~~ rendered ~~us~~ suspicious the objectivity that we wish to hold unquestioned.

Finally, one would hardly pardon us for terminating this introduction to a work of definition and classification without strictly and

clearly defining the object of our study
itself; the tank; for the term
carries with it at times some
misunderstanding. Let it be understood
then, that when we use the word
"tank" we mean an armor-plated
vehicle, one that is armed, that
operates on its own caterpillar tracks,^{and}
one that is constructed for use in
close combat. This definition excludes
vehicles with multiple driving wheels
and those that operate on wheels and
on caterpillars simultaneously, for, in
general, such vehicles as these
are nothing more than tractors
which are capable of traversing
varied terrain. The definition
also excludes all the prime-movers
and supply vehicles; it does, however,
include convertible tanks, i.e., those
that are designed to operate either
on wheels or on caterpillar tracks.

I. The War Period (1916 - 1921)

This period begins with the initial appearance of the tank and continues well on until after the cessation of hostilities, for the designs and projects under way at that time, were, at least partially, developed and completed after November 1918. We can consider this period as coming to a close, approximately, in 1921.

Two nations ~~the~~ played a determining role in the evolution of the tank: France and England. They were first produced by them simultaneously. Three other nations, which we might call "disciple" countries, deserve to be mentioned: Germany, the United States, and Italy.

In France, as in England, the tank was primarily ~~a~~ ^a machine ~~instrument~~ designed to facilitate, partly by the effect of surprise, the opening of a gap across the enemy trench systems. The machines, ^{though} at the mercy of all the enemy fire, were armed and were ^{supposed to be} capable of crossing the

trench systems and disrupting them. They were to charge into the enemy lines, there engage any and all available targets, and by creating havoc, were to open the way for friendly foot troops.

The tanks which were to meet this conception were:

In France: the Schneiders and the Saint-Chamonds.

In England: the Mark I, II, III (used in the first encounters) and their successor, the Mark IV.

A considerable number of this latter model were produced, and in 1917 they constituted almost the sole tank armament of the English units.

The military characteristics of these tanks are set forth in Table I, though it may be added, their technical features have hardly any more than an historical value.

After the experiences of the first encounters the French conception developed along two opposing lines:

(a) The creation of a tank

as light and as easily controlled as possible; one that could be considered an infantry accompanying weapon, that is, one to be used against the automatic weapons directly opposing the front line troops; and,

(b) the creation of a tank as powerful as possible to accomplish the break-through mission originally conceived for the Schneider and the Saint-Chamond - a task to which these tanks had proven themselves unequal.
(See table 2)

The English tank conception and development also forked in two divergent directions, but of these only one had anything in common with the French idea:

(a) By a series of increases in the strength of the tanks of the MARK model these gradually developed toward the heavy break-through tank; and

(b) an entirely new type of machine was brought out - the Medium Tank. In this model stress was placed on the factors of speed and radius of action. They were primarily intended for missions of exploitation in liaison with the cavalry, after the break-through had been

accomplished by the tanks of the
"Mark" class.

(See table 3)

#

~~All three of~~ The "disciple" countries,
whose tanks ~~did~~ ^{did} not commence to
appear until in 1918, imitated very
closely, all three of them, the
French trend:

The first German model was the
A 7 V. It was the cousin of the French
Schneider and Saint-Chamond but
was more powerful and less easily
controlled. Then they ^{German} attempted to
imitate the English and, by adding to
the weight of the A 7 V, produced
the A 7 V V. It was this latter tank
that the enormous K tank,
under construction at the close of
the war, was to replace. Our
adversaries produced the light
tanks L K I and L K II simultaneously.
These were along the line of the
French Renault ~~but~~ but aimed
at an increase in speed which
made them, in a sense, relatives
of the English Medium Tank.
After the restrictions of the peace
treaty became effective, the L K ~~model~~
family seems to have moved to
Sweden for we can ^{clearly} find its
traces in the Swedish (M 21)

"

The United States adapted the Renault ~~III~~, copied it, and sought, without very effective results, to rear some American brothers in the form of the Ford 1918 and the light 7.5 ton three-seater. In addition they armed their heavy tank units ^{with} the English Mark V type while awaiting the appearance of the tank that was to be the Mark VIII. (about 100 tanks of this make were produced in America by the close of 1919).

Italy followed the pattern of the Renault ~~III~~ in turning out her Fiat 3000. She also produced a heavy break-through tank - the Fiat 2000 (40 tons).
(See table 4)

Thus we see that if we leave the Mark V, V*, V**, in their logical place as intermediate links, we can, without putting any of them in the bed of Procrustes, class all the other tanks of the war period into 4 groups:

(a) The first models (Schneider, Saint-Chamond, Mark I, Mark II, Mark III, Mark IV).

Weights: 13 tons to 30 tons.

Maximum Speed: 6 to 10 kmh.
Motive Power: 3.5 hp to 5 hp per ton.
Radius of Action: 20 to 60 Kms.
Maximum Armor: 10 to 17 mm.
Crews: 6 to 9 men.
Armament: 1 cannon 75 mm or 2
cannons 57 mm and 2, 4, or
6 machine guns. (None of these
weapons capable of all-around
traverse).

(b) Light accompanying tanks (Renault ~~II~~,
LX I and LX II, M 21, Ford, American
~~Ford~~ three-seater, Station type 3000
A and B)

Weights: 3.5 to 10 tons.
Maximum Speed: 10 to 18 kmh.
Motive Power: 5 hp to 12.8 hp per ton.
Radius of action: 60 to 100 Kms.
Maximum Armor: 11 mm to 16 mm.
Crews: 2 to 3 men.
Armament: 1 cannon 57 mm or 37 mm
or 1 machine gun, or a pair of
machine guns mounted, in certain
cases, in a turret of all-around
traverse.

(c) Medium exploitation tanks (Medium
A, B, and C)

Weights: 14 to 22 tons.
Maximum Speed: 12.7 to 14.4 kmh.
Motive Power: 5 hp to 6.7 hp per ton.
Radius of action: 64 to 120 Kms.

Maximum armor: 14 to 15 mm.

Crews: 3 to 5 men.

Armament: 3 or 4 machine guns in a block-house or sponson.

(d) Heavy break-through tanks (Mark VIII, R.E., A7V, A7VU, K, ^{Italian} typo 2000).

Weights: greater than 35 tons.

Maximum speed: 7.5 to 16 km/h.

Motive power: 6 to 9 hp per ton.

Radius of action: 75 to 150 km.

Maximum armor: 16 to 30 mm.

Crews: 8 to 20 men.

Armament: 1 cannon 65 or 75 mm mounted in a turret with all-around traverse or 2 to 4 guns, 57 mm to 77 mm, mounted in side block-houses, and 4 to 7 machine guns mounted with limited fields of fire.

Two specifically French tendencies are to be remarked throughout this international catalog of tanks:

(a) The limitation of the number of weapons and, by consequence, of crews by the employment of an all-around traverse ~~a fully revolving~~ turret; and

(b) The tendency toward an increase in thickness of armor plating.

the world, ~~and~~ not without astonishment, saw England renounce conscription and return to her former principle of the professional soldier. Her armed land forces, after a bloody interlude of five years, again took over their prime mission: the guarding and policing of the Colonial Empire; only very rarely, and even when quite half-heartedly, considering the secondary task ^{that} one day might devolve upon them: to ^{again} cooperate in Europe with a continental ally. The tank designs reflect immediately this state of mind. After the Medium D, a model which still remains fairly mysterious to-day but about which they were telling wonderful things in 1921 (15 tons, amphibian, 43 Km/h, a crew of 4, 8 machine guns), there appeared the family of Medium Vickers which emphasized, above all, speed and radius of action. These were the Vickers I, IA, II and IIA, and constituted, a couple of years ago, the only armament of the units of the Royal Tank Corps.

II

The period of the General Utility (or All-purpose) Bank (1921-1926).

The beginning of this period can be very precisely figured as 1921, although, as is unavoidable, certain projects under ~~trial~~^{test} in the preceding period ~~were~~^{were} finally brought out after this date. But since this refers particularly to "disciple" countries and not to one of the three countries leading in the evolution of the bank at the time (France, England, U.S.A.), we believe that the date 1921 can hardly be considered as artificial. On the other hand, the date of the period under consideration is most difficult to fix; if it is without question that the period which next follows begins about 1926, it is none the less certain that England pursued - even up until 1929 - ~~plans~~^{experiments} and ^{the} production of models directly related to those of the period 1921-1926. We therefore ask that the reader accept the relatively arbitrary division that the date 1926 carries with it.

The war over and the British army back on its island,

The high speeds achieved by these machines were due in part to the adaption of a new track system - one that was relatively light and was hardly ever ~~thus~~ "thrown". The classical track (that of the Renault, for example) is formed by a series of joined ^{links or shoes} ~~plates~~; each one of these ^{shoes} ~~plates or links~~ consists essentially of a plate and a section of rail which is riveted to the interior face. Each plate, moving over in turn to lie flat on the ground, places the rail in position to allow the rollers to rest upon it. The driving of the track is accomplished by means of the engagement of the teeth of the sprocket with the hinge bolt that joins the plates together - the point of linkage being in the rail and not in the shoe itself.

The proper alignment of the track is assured by means of the flanges on the rollers riding in the recess on the rail. The

Vickers track is actuated by a double sprocket, that is, the two sprockets are on the same shaft and engage: one ^{near} ~~at~~ the

interior ~~edge~~ and one near the exterior edge ~~of~~ of the track; the rollers

are in pairs and ride on either side of a long line of projections, ^{or studs} which follow the longitudinal axis of the track. This method of holding the track in position is very efficient.

(See table 5).

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The American Army, once ~~returned~~ ^{returned} ~~back~~ ^{to} in the States, was not called upon by its government to undertake any new and urgent missions; at first, then, its tank research remained in the setting of the European war just completed; in addition it ~~was~~ ^{was} thoroughly indoctrinated with the teachings of the French Army. Initially, therefore, the Americans began ^{initially} investigations along the line of a tank more heavily armed and more powerful than the Renault but one which ~~could~~ ^{would} not exceed the weight of 15 tons; but soon the

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first designs disclosed results so discouraging that they began to think that their future machine ^{could} ~~can~~ likewise ~~be substituted~~ ^{take the place of} ~~the~~ heavy tank. They also ~~had~~ ^{had} visions of an all-purpose tank - but in a ~~same~~ spirit quite different from that of the English. The latter desired an all-purpose tank for use in colonial warfare but one that could eventually be used on the continent; the Americans desired an all purpose tank for any major hostility. The armor and the power of the armament ~~was~~ ^{were} ~~for them~~ the first consideration ^{of the Americans} and ~~this~~ ^{was} remained unchanged throughout the course of their research; as to the speed and radius of action they strove to raise them as high as possible without going too far in the direction of weight. But right from the start they had well exceeded the 15 ton limit. Thus is explained the ~~growth~~ ^{development} of the three models whose characteristics are given in the hereinafter published table.

At the outset there was the effort to increase the mobility of the M 1921 which led to the M 1922 weighing 25 tons; then ^{was} the effort to reduce the weight

During the period from 1921 to 1926 (or 1929) three families of tanks ~~are~~ ^{were} flourishing and in their full prime:

(a) The medium fast tanks (^{British} ~~English~~).

Weight: 12 to 14 tons.

Maximum Speed: 26 to 30 Km/h.

Motiv Power: 7 hp to 9 hp per ton.

Radius of action: 210 kms.

Maximum armor: 15 mm.

Crews: 5 to 6 men.

Armament: 1 Cannon of 47 mm or 57 mm and from 1 to 4 machine guns in a revolving turret plus 2 or 3 machine guns in the driving ^{ers} compartment.

(b) The medium heavy tanks (American).

Weight: 22 to 25 tons.

Maximum speed: 16 to 25 Km/h.

Motiv power: 7 hp to 9 hp per ton.

Radius of action: 80 to 120 kms.

Maximum armor: 25.4 mm.

Crews: 4 men.

Armament: 1 Cannon 57 mm and 2 machine guns in turrets.

(c) The light tanks (derived from the French conception of the accompanying tank).

Weight: 7 to 8 tons.

Maximum speed: 20 to 30 Km/h.

Motiv power: 5.5 to 9.3 hp per ton.

without losing any ^{of the} gains in ~~speed~~ mobility.
~~This~~ ^{This} led to the TIE 2 (1)
(See Table 6)

Note. (1) Although we ~~do not mention~~ ^{are not taking into consideration} the French evolution that was going on at this time, it might be mentioned in passing that it was ~~is~~ following fairly closely the American trend.

In spite of the very clear-^{cut} tendency toward the general utility tank throughout this period, in the armies which had the most to do with the evolution, one can not say that the ~~type~~ species of light accompanying tank had ~~lost~~ lost all its importance. In fact, the Renault remained in service in its native land and ^{even} spread ~~abroad~~ abroad into foreign armies; certain countries ~~tried~~ ^{tried} to modify it and improve it (notably Russia and Poland); others experimented with models which were ^{directly} derived from it (notably Spain, Czechoslovakia, and Russia).

(See Table 7)

To be placed as a note at bottom of typed page.

Radius of action : 100 kms.
Maximum armor : 13 to 20 mm.
Crews : 2 to 3 men.

~~Weapons~~ Armament: 1 cannon 37 mm and
1 machine gun or 1 37 mm
~~cannon~~ or 1 machine gun in
the turret.

In contrast with
~~As a set off to~~ the foregoing the
heavy tank family appears to have been
struck with sterility; it is noted besides
that the remarkable results obtained by
the ^{powerful} medium ~~heavy~~ tanks of around
20 tons ^{appear to} have shifted interest from
the heavies.

One characteristic is common to
all the machines that we have just
enumerated: they all have at least one
turret that can be rotated the full
360°. The placing of the principal
weapons in lateral or axial ~~black-houses~~ ^{3 positions}
(the British tendency) disappeared to
~~be replaced by~~ ~~give room for~~ ~~for imitation of the~~
the turret system of the Renault.

III

The first decade of the period
of Mechanization.
(1926 - 1936)

1925! The firm grip of the Rhineland Occupation relaxed; Germany nibbles little by little at the disarmament clauses of the treaty of Versailles; it becomes evident that she proposes to re-establish herself, at the earliest possible moment, as a great military power. For the British army, participation in a European conflict no longer appears as a theoretical possibility but as a normal eventuality — although the time of its coming is still indefinite. England, however, is less than ever inclined to ^{the} ~~ward~~ ^{adaption} of compulsory military service; therefore it is not along the line of ~~huge~~ ^{huge} battalions that she can attempt the ~~in~~ strengthening of her military power. Under these conditions, it is logical that this country which is:
powerfully industrialized, protected against any direct attack by her "wet ditch"; which is determined never to take part in a continental war except in conjunction with an ally who possesses substantial land forces — it is logical that she be led to wonder

Whether the general adoption of mechanical and armored adjuncts could not give to ^{the} small professional army an offensive power which would be the decisive weight in the balance. From this question is born whole volumes of military literature - ~~writing~~ articles that are full of new and advanced ideas. To outward appearance they are sometimes contradictory but they reveal among their authors a common tendency: to demand of the armored vehicle that it traverse any type of ground, of the land the maximum of service that it is capable of rendering. Thus begins the age of mechanization and, from 1926 on, we are going to see the beginning of experiments with all sorts of new machines.

Then little by little the movement reaches the armies of other lands. There are experiments inspired by varying national conditions; modifications of English tanks, or copies of them, are put under test practically everywhere.

Luckily for the success of our task of classification, the number of ~~original~~ ~~tanks~~, however, remain very ~~small~~, ~~fact~~ This permits us to establish fairly easily the dividing lines between certain large technical families.

Original Builders

confronted by
One will realize that, ~~after~~ this movement which sought to find an armored machine that would render the maximum performance over any type of terrain, it became readily apparent that the hope of an ^{all-purpose} ~~general utility~~ tank was a snare. They searched in all directions; machines of all weights, of every degree of mobility and power were tried. After ten years of research however, a certain stabilization of the types ^{is} ~~or come~~ ⁱⁿ apparent; certain large armies are commencing to construct in quantity new machines of varying models with a view to establishing a ~~system~~ ^{tank plan} just as they have an artillery plan.

Furthermore National Tank policies are being ~~formed~~ ^{formed}, ~~for~~ ^{because} each power models and proportions its ~~own~~ production according to its own means and according to its own strategical situation.

It is by comparing these national policies ^{with} the technical families that we are able to draw the lines of a positive classification of tanks — one that will hold for the contemporary ~~of~~ period.

I. The Technical Families.

(A) A giant; the independent tank and its family.

~~we are not surprised~~
~~One should not be astonished that~~

at first

England had ^{first} conceived the idea of producing a powerful land vessel, a "battle cruiser": the heavy Vickers tank christened "Independent tank".

In spite of the remarkable technical success which this machine represents, as shown by the fact that the Russians were quick to copy it in their heavy M I and M II tanks, it is readily apparent that such a machine:

- is ~~is~~ very costly and could hardly be produced in quantity;
- has its strategical mobility hampered by its very weight (its transport by railroad, as well as the limitations imposed by adequate highway bridge facilities, present ~~the~~ great difficulty).

In addition, the ~~English~~ ^{British} had ~~the~~ the recollection ~~memory~~ of the very satisfactory results given by their experiments with the medium Vickers during the course of the preceding period. With machines ranging from 12 to 14 tons they obtained an armament, a speed, and a radius of action quite comparable to that of the heavy tank; only the armor plating was inferior. But by

would causeing to an increase in weight of ~~3~~ ^{about} 3 ~~or~~ 4 tons, they could probably produce a tank which cost ~~much~~ ^{much} less than the heavy Vickers but, ^{at the same time, would be the} whose tactical possibilities would not be greatly different.

Research and experiments along this line were undertaken and toward 1929, we see the appearance of the Vickers-Armstrong of 16 tons (18 tons with combat load) which transposes, in the medium tank scale, the powerful armor of the heavy tank and combines certain of its technical features with others borrowed from the Vickers Mark C. This increase in armor plate on the medium tank (25.4 mm on the Vickers-Armstrong whereas the Vickers I, IA, II, IIA and C have only 15 mm) is, besides, a very new sign of an evolution in the English conception. The Vickers-Armstrong medium - like its father the Vickers-Armstrong heavy - seems to be a very successful machine. The Russians lost no time in copying that one also, and their tank T 28 was the result.

(See table 8)

(B) The extensive family of the Carden-Loyd single-seater and its legitimate and illegitimate off-spring. Its Cousins,

A few powerful "battle cruisers" like the Vickers heavy tank, or even a greater number of "pocket ~~ships~~^{battle-ships}" like the Vickers-Armstrong medium, do not suffice to carry on land ~~warfare~~^{warfare}. Even on the seas, on the "humid plain which bears neither forests nor ~~the~~ golden harvests" and where the eye meets no obstacle save the curving line of the horizon, the vessels of the line have need of auxiliary ships; all the more ~~is~~ there need for such adjuncts where valleys, woods, fields and villages offer an endless variety of hiding places in which the enemy can secrete himself and from which he must be ferreted out. For this ~~task~~^{task} the British ~~English~~ experimented with ~~have developed~~ very small single-seaters, lightly armored and bearing one automatic weapon. They ~~have~~ considered making this machine a part of their infantry organization, with the view to having it ~~for~~^{furnish} the elements of shock and movement; the foot soldier with his breast bared to the enemy, to fulfill the mission of furnishing fire support.

and occupying captured ground only. In a word, they aimed at nothing less than an armor-plated infantry.

This notion failed for several reasons:

(a) Because it presupposes a number of machines such as no country - no matter how rich - would be capable of constructing, of maintaining abreast of technical progress, or of stocking in time of peace.

(b) Because the tank that is very small has too limited obstacle-crossing capabilities.

(c) Because, as is readily seen, the reduced and incomplete ~~protection offered by the armor plating~~ does not offer adequate protection;

(d) Because one lone man is not practically capable of doing all the things required of him.

But, in spite of the failure of the initial conception, the machine which was born from it, the Carden Loyd single-seater, was to know an unrivalled posterity:

1st. Because the idea of the single-

seater stirred up foreign imaginations;
2d, above all, because the Carden
Lloyd carried a technical novelty
which gave promise of a brilliant
future: its track.

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The Carden Lloyd track is
made up of very short links; it
has only plates and no rail;
the hinges are in the plate-links
themselves; the rollers rest directly
on the track-plates which ~~are~~ are
~~ground perforated~~ recessed
to permit
direct engagement with the
driving sprocket which is
placed in front. The track
is held in position by two
rows of protruding studs
aligned on the internal and external
edges of the track. The rollers
pass between these studs. Thus
a very light track is obtained; it
permits of high speeds and
is relatively quiet.

It was this satisfactory
~~chain~~ ^{Caterpillar track} that saved the Carden Lloyd
from the discard - but ^{only} at the price
of two important modifications.
Soon having become a two-seater
we find it in fact:

- On the one hand, stripped of a
part of its armor and ~~converted~~ ^{converted}
into a light tractor - in which form

it naturally passes from further consideration here;
— On the other hand we find its armor-plating ~~reinforced~~ ^{extended and its} thickness increased here and there ~~also~~ ^{were also increased}. The general dimensions and weight. Then a turret is added and it becomes a light tank of somewhat limited protection and armament but speedy and having a large radius of action.

As it passed through its successive stages of development, it ~~found~~ ^{found} numerous imitators for its popularity ~~became~~ ^{was very} widespread.

(See plate 9).

(C) A migratory family: the light Vickers. The success, which one might almost term phenomenal, of the Carden Loyd was destined to draw the foreign customer toward ^{England} ~~England~~. Farther with the Vickers-Armstrong people began the construction of light tanks. Though these tanks ~~were not placed~~ ^{had no place} in the program of the British High Command, they were soon to find favor among certain foreign armies which lost no time in copying and imitating them.

The outstanding feature of this tank also lies in its track, like

on the Carden-Lloyd, the track plate was short-pitched and was ~~perforated~~ ^{recessed}.

It was propelled by a forward double sprocket and was held in position by a row of ~~studs~~ ^{projecting} lugs running along its longitudinal axis. These ~~studs~~ projections engaged between the double flanges of small rollers and roller supports which were covered with rubber.

It was, in fact, a Carden-Lloyd track, propelled and held in position ^{b.y} ~~the~~ same ^{means} ~~method~~ as that employed on the Vickers Mediums.

(D) A British model of the preceding period works out its evolution in Japan. The substitute for the Vickers medium, Mark C.

The Vickers tank Mark C appears to have been completely abandoned in England; in fact such tanks as were constructed in 1927-1929 were more along the line of the models II and II A, and the latest experiments with a medium machine were directed along an entirely different line; however this machine was favorably received

in Japan and ^{in that country} ~~there~~ was the
fore-runner of at least three
unmistakable descendants.
(See table 11)

(E) The Swedish Landsverk family.
Since 1929 the Swedish Landsverk
factories have been interested in the
production of tanks. Their first ~~tank~~
recognized model, the Landsverk
5, is characteristic of the type in its
form and general details. Besides, its
chassis is perpetuated in later
models. But here, again, ~~it makes use~~
~~of~~ the track of classical design was
employed. Its successor, on the
other hand, the Landsverk 10,
adopted the ^{track system} ~~power train~~ which we
will find on the other models: a
track on the order of the light Vickers,
but actuated by a rear sprocket.
It also employs large diameter rollers
which were evidently copied from
the later models of Carden-Lloyd.
There is one innovation in the Landsverk
10 that really sets it aside as
original: its armor is made of
plates of laminated steel which are
welded together by a process
without doubt analogous to that
inaugurated by the Germans in the
construction of their war ships.

(See table 12).

(F) The American family of light tanks.

From the experiences of the Americans during the preceding period, it was found that a medium tank ~~could be constructed~~ that ~~would~~ possessed ^{very nearly} ~~just about~~ all the good qualities of a heavy tank ~~could be constructed~~, but that it weighed at least 20 tons. As a consequence they could not consider its construction in as great numbers as its work in liaison with the infantry would require. Therefore in 1927, the problem of the light tank again came to the fore in the United States. At the out-set their research was influenced above all by the trend toward speed — the feature already made fashionable by England. They obtained this speed by greatly increasing the percentage of horse-power to the ~~tonnage~~ tonnage and by reducing the weight of the track (the skeleton track of the Medium T1E2 that came

out in 1925 was made even lighter). As a further offset the armor was reduced. This was a very phenomenal departure with the Americans and proved to be only temporary for, from 1929 on, they returned to the more powerful armor protection - without, however, sacrificing speed, thanks to the adaption of a power train copied after that of the English light Vickers.

From these studies with light tanks we see two ~~courses~~ ^{research} opened up for future ~~speculation~~:

- One lying in the direction of speed and the other in the direction of power. The former, by the adaptation of the large rollers of the latest Carden-Loyds to the track of the light Vickers will lead to the Cavalry tank T 5; and the latter, by ^{means of} the mechanical solutions found in the light tank TVE 2 of 1929, will lead to the medium tank T 2 of 1930.

application
1 of the

(See Table 13)

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(G) An original family - The Christies.
At the same time that the ~~officer~~ American Army was
conducting its research with the
Medium Tanks M 21 and M 22, tests
prompted by individual initiative were
being made by an American engineer,
Mr Christie, to produce, not
just another tank, but something
really new - a tank having
~~the same~~ road
wheels and a track that could
be mounted over them. In
fact the other vehicles which
employed successively the two
methods of propulsion (the Vickers
of 1926 with wheels and track, the KH 50,
~~the~~ 60 and 70, the Landsverk
5 and 30) all carried two entirely
distinct ~~power systems~~: one for wheels
and one for ~~the~~ tracks. There had
to be installed alternately when it was
desired to pass from road travel
to travel over varied ground and
the reverse. The Christie had in
reality only one power train - the
track being placed ^{on} over the
wheels ~~which~~ and operated
and supported by them when
travel off the road was desired.
It was thus that in the M 1919, M 1921,
M 1923 the double ^{driving wheels} ~~power~~ and the

Suspension systems

direction ~~control~~

~~steering~~ wheels used in road travel, served as ^{the driving} sprocket and ~~driving~~ ^{the} track support when the track was in use. It should be ~~noted~~, further, added that the Christies which emphasized above all speed and radius of action, also had a very high horse-power to tonnage ratio and a track that was very light.

In 1923 the Christies were rejected by the Army; they had shown themselves capable of considerable speed but were not sufficiently dependable. "One hour of travel - one day of repairs" it was said of them. Also their obstacle-crossing ability was too limited.

Mr Christie was not to be discouraged. In 1928 he turned out a new chassis which corrected in large measure the former difficulties. The track was held up at the two ends by an adjustable pulley and an elevated sprocket. These were situated respectively in front of the double direction wheel and in rear of the driving wheel, which was also double, and which drove the sprocket by means of a Gall chain.

The intermediate wheels, which served at the same time as rollers and roller supports, no longer had to be raised up, as they did in earlier types, to permit road travel. They were fastened on the end of spring-controlled movable arms and it sufficed to compress these springs by tightening up on a bolt in order to make the intermediate wheels literally slide along the ground without in any way interfering with the steering while the vehicle was running along the road.

These technical features were perfected and brought out on the M 1931 which was forthwith copied by the Russians. Other derived types followed and soon, in the United States, the Christie chassis appeared in varying forms which were given designations depending upon the tactical use for which they were intended — among them, a cavalry tank and a medium tank. In these more modified forms the Christie machines appear to have lost some of their sensational speed. They also retained their generic faults which were:

- (a) Failure to hold the track on slippery ground and on slopes.
- (b) Over-heating of the motor.
- (c) Considerable noise made by the tracks.

(d) A very visible glow from the exhaust. Effort was made to keep the motor cooler by opening vents in the armor plating but this only served to decrease the value of the protection. The information given in the table relative to the T3E2 is offered with reservations — as some of it appears to be very improbable.

(See table 14).

(H) The German light tank.

We are dealing here with a new-comer which appeared in Germany on the occasion of the National-Socialist celebrations, 16 March 1935. The international press has published numerous photographs of these tanks but up to the present has given us very scant information concerning them. Nevertheless, an examination of the photograph of one of these tanks permits us to attribute to it approximately the following characteristics:

Weight: ~~hardly over~~ ^{around} 6 tons.

Length: 3.5 m.

Width: 2 m.

Height: 1.75 m.

Maximum speed: 40 to 50 km/h.

Maximum armor: Around 15 mm.

Crew: 2 men.

Armament: 2 machine guns, twins, firing from turret with all-around traverse.

Power train: Carden-Loyd type, ^{with rollers} of large diameter.

The armor plating appears to be of welded plate steel.

In short we can find both in basic concept and in the final form of this machine an evident relationship with certain better known makes (light Landwehr, Carden Loyd, etc); perhaps, even, a better acquaintance with it will permit us to assign it to one of the large technical

families defined above. In any case its appearance on the scene gives no cause to suspect the foundations of the classification that we are attempting to establish.

x

x

x

The trends in technical growth during the decade that we have just considered can be summed up as follows:

(a) The complete establishment of the success of the revolving turret on all classes except the very small machines.

(b) The complete disappearance of tanks ranging from 20 to 30 tons, and over, after the temporary flutter created by the Independent tank and its Russian brothers.

(c) Almost exclusive research along the lines of speed and radius of action at the beginning of the period, then a gradual tapering off into research along the line of increasing the armor plate.

(d) The adoption of recessed tracks, short-pitched links, and self-retaining tracks - all of which had their direct influence on speed and armor plate.

(e) The arrival of the Christie

System into the realm of practical utility and the eclipse, after a short period of favor, of the other wheel and track systems.

(f) The production of a likely amphibian tank but one with limited fighting capabilities, far, in its present stage of technical development, its stream-crossing ability leaves much to be desired.

II.

National Tank Policies.

If we consider the modern machines in service and the more recent types of the technical families in course of development, it is relatively easy to determine toward which tank policy the two great foreign nations which are at the head of the growth, lean. We are speaking here of England and the United States - ~~and~~ and also include their ^{more} ~~most~~ ardent disciples: Russia and Japan.

For Sweden the problem is more difficult to solve, for it cannot be established with certainty to what extent the research of the Landsverk factories is controlled

by the dictates of the ²National High Command as opposed to those of prospective foreign customers.

Finally, two other nations seem to be well on the way toward formulating ^{their} policies regarding modern tanks. But for one of ^{them}, Germany, the press has furnished us with ^{only} photographs of a light tank and with rumors of a medium tank — one of about 18 to 20 tons; for the other, Czechoslovakia, the information is even more scanty. It would therefore be premature to draw any conclusions in so far as these two countries are concerned.

(A) The British Policy.

The British policy admits of three types of machines:

(a) a light tank Mark IA, II or IIA Carden-Loyd (weight: less than 5 tons; maximum speed: 58 KMH; radius of action: 210 Kms; maximum armor: 13 mm; ~~the~~ armament: 1 machine gun turret-mounted for all-around traverse), ^{intended for} ~~adapted~~ to reconnaissance missions, for the early stages of the fight and for its exploitation as well as for use in the colonies;

(b) a medium tank, principal

offensive weapon of the Royal Tank Corps, which is again represented by the Vickers Mark I, IA, II, IIA (weight: 12 to 13 tons; maximum speed: 26 kmh; radius of action: 210 kms; maximum armor: 15 mm; armament: 1 cannon 47 mm and 4 machine guns turret-mounted for all-around traverse, 1 machine gun on each flank), but which could very easily be replaced at a future date by a more powerful and more modern machine of the type of the Vickers Armstrong medium (weight: 18 tons; maximum speed: 30 kmh; radius of action: 185 kms; maximum armor: 25.4 mm; armament: 1 cannon 47 mm and 5 machine guns in an oscillating turret).

(c) A supporting tank which we have not yet mentioned because it does not come under ~~of~~ our definition of the tank, since it consists of a cannon mounted directly on the same ^{type of} chassis as the medium tank and is intended for ~~protecting~~ ^{furnishing protection} ~~against~~ ~~the~~ ~~enemy~~ against anti-tank weapons (the French terminology for it is a cannon on a self-propelled mount).

This policy fits in with the idea of large mechanized formations intended for maneuvers on the flanks and having a road speed of about 10 kmh as well as a

radius of action of about 200 kilometers. The above plan is clearly indicated as the corner stone of the British tank policy.

Lately there has been some talk in England of an accompanying tank but to date, ~~no~~ as far as is known, no model has been produced to give reality to the idea. It is a pity that the idea is crapping up for it shows a very peculiar tendency - considering the theories that have been in favor ^{in England} for the past decade.

(B) The American Policy.

The American policy, now in the making, carries the mark of initial French influences and, at the same time, the necessities imposed by the enormous size of the country. Here we find three types of machines:

(a) A light tank designed to fight with the infantry but also possessing great mobility. This could be the T1E6 or one of its future modifications (weight: 8.9 tons; maximum speed: 37 Km/h; radius of action: about 200 Kms; maximum armor: 16 mm; armament: 1 Cannon
37 mm

paired with 1 machine gun in an all-around traverse turret);

(b) A medium tank which, about 1930, seemed to be solely designed for action deep in the enemy position, ahead of the light tanks, ~~with~~ ^{with} interest ~~centered~~ ^{centering} around ~~around~~ the T 2 (weight: 15 tons; maximum speed: 40 Km/h; radius of action: 145 Km; maximum armor: 22 mm; armament: 1 machine gun paired with 1 cannon 47 mm in an all-around traverse turret, and 1 machine gun in the driving compartment), whereas, now that the medium Christie T 3 E 2 seems to be the watch-word, (weight: 11 tons; maximum speed: 130 Km/h on wheels, 60 Km/h on tracks; radius of action: unknown; maximum armor: 22 mm (?); armament: 1 cannon 37 mm and 3 machine guns in a completely revolving turret) they will, without doubt, require it to work in conjunction with the cavalry tank about which we will speak next;

(c) A cavalry tank intended for action on the flanks, for reconnaissance and for pursuit. In its final form it embraces the characteristics of two prototypes of different origin:

1. The T 5 (derived from the light tank) (weight: 5.44 tons; maximum speed: 71 Km/h; radius of action: 241 Km; maximum armor: 9.5 mm; armament: 2 machine guns placed in two revolving turrets opposite each other; 1 machine gun for dismounted action);

L. The Christie T 4 (weight: 8.6 tons; maximum speed: on wheels, 79 kmh, on tracks 47 kmh; radius of action: unknown; maximum armor: 9.5 mm; armament: 1 machine gun mounted in a turret with all-around traverse, 1 machine gun in the drivers compartment).

(C) The Russian Policy.

For a long time Russia has used French materiel or materiel copied from the French. Considering the enormous size of the country it is not surprising to see her adopt a tank policy almost identical with that of the Americans:

(a) A light tank which operates in immediate support of the infantry - the type at present in service being the T 26 which is copied from the light Vickers A or B, (weight: 8.5 tons; maximum speed: 50 kmh; radius of action: 180 kms; maximum armor: 13 mm; armament: 1 Cannon 37 mm or 47 mm paired with 1 machine gun in an all-around traverse turret, or 2 machine guns in turrets placed opposite each other) although its armor plate seems light for such a mission.

(b) A medium tank intended for action in rear of the enemy position. This is the T 28 and weighs 20 tons. Its capabilities are approximately those

of the medium Vickers-Armstrong of 18 tons, its model.

(c) A cavalry tank intended for flank movements on a wide scale, for reconnaissance and for pursuit. This is the BT, copied from the Christie 1931 (weight: 12 tons; maximum speed: 70 Km/h on wheels, 55 Km/h on track; radius of action: 400 Kms on wheels; maximum armor: 12 mm; armament: 1 cannon 45 mm and one machine gun or a pair of machine guns turret-mounted for all-around traverse).

In addition the Russian army has some tankettes, model T 27 (copied from the Carden Loyd Mark VI) and some amphibian tanks, T 37, (copied from the Carden Loyd amphibians). These are used on missions of local security and, in so far as pertains to the amphibians, on missions involving stream crossings.

(D) The Japanese Policy.

The policy of Japan cannot be defined with the same exactness, for it is still only in its formative state. It appears that one of these days it will include:

(a) A very light tank whose mission is to be that of the English light Mark IA, II, and IIA. It is related to these tanks in its present form and is known as the M 2592 (weight: a little over 3 tons; maximum

Speed: 45 Km/h; radius of action: Not known; maximum armor: 14 mm; Armaments: 1 machine gun or 1 cannon 20mm turret-mounted ~~and being~~ ^{for} all-around traverse).

(b) A medium tank whose mission might well also be of British inspiration, also its construction, for it is patterned after the Vickers Mark C and is represented in its latest form by the M94 (Weight: 14 tons; maximum speed: 45 Km/h; radius of action: 200 Kms; maximum armor: 17 mm; Armament: 1 gun 37mm and 1 machine gun turret-mounted ~~and being~~ ^{with} all-around traverse; and 1 machine gun in the drivers compartment).

(c) A light tank intended for service in conjunction with the front line infantry. In its present form it is technically closely related to the light Vickers, but is ^{somewhat} smaller ~~than the light Vickers~~ and is perhaps more heavily protected. It is their M2593. (Weight: 7 tons; maximum speed: 45 Km/h; radius of action: not known; armament: 1 machine gun turret mounted for all-around traverse and one machine gun in the forward compartment).

Thus we see that in Japan the British influence is very evident but that their policy is rounded out by the adoption of the French idea of a light infantry tank. Such a tank is still,

in England, only in an experimental stage.

(E) The hypothetical Swedish Policy. As we have already said, it is not certain that all the designs of the Landsverk factories are inspired by the Swedish High Command. Nevertheless, if we consider the entire lot of the machines constructed and put under research by this firm, the general ^{outline} ~~outline~~ of a tank policy begins to stand out:

(a) A very light tank probably intended for security missions: the Landsverk 100 (weight: less than 5 tons; maximum speed: 55 Km/h; radius of action: 200 Km; maximum armor: 9 mm; armament: 1 machine gun or 1 gun 20 mm mounted in a turret with all-around traverse).

(b) A light tank whose armament does not permit ~~it to be~~ ^{us} ~~to say~~ ~~that~~ that it is intended for the immediate support of the infantry: the Landsverk 60 (weight 6.8 tons; maximum speed: 48 Km/h; radius of action: 220 Km; maximum armor: 13 mm; armament: 1 gun 20 mm and 1 machine gun dual mounted ~~in~~ in the turret).

(c) A medium tank whose relatively heavy armor emphasizes that it is intended for participation

of a success or in the pursuit; in a word, against light opposing elements or against an enemy surprised in motion or previously disorganized in combat.

III - Proposed positive classification of Contemporary tanks.

After having grouped our tanks into large technical families and outlined the changes undergone by them in conforming to the tactical missions confronting them in certain armies, we are now going to attempt to establish a positive classification which will embrace all the existing types and one that can be universally employed.

Shall our denominations and standards be purely tactical? Certainly not! For such a method, in addition to the risks that we mentioned at the beginning of this article, would carry with it inevitable inaccuracies and an exaggerated grouping. In fact, the army cannot admit into its organization, as can the factory, an absolute specialization of its machinery. For war is the domain of danger and of uncertainty; each piece of apparatus ought to be more particularly adapted to

in decisive engagements: the
Lansverk 10 (weight: 11 tons;
maximum speed: 35 km/h; radius of
action: 150 km; maximum armor:
24 mm; armament: 1 gun of 37 mm or
47 mm and one or two machine
guns mounted in a turret with
all-around traverse).

x
x x

The fleeting view of the various ^{national}
tank policies that we have just outlined
emphasizes the persistence of two
basic tendencies:

(a) ^{the one,} ~~one~~ of French origin, which
stresses strength - armor and
armament -

and aims at creating machines capable
of conducting ~~the~~ the fight in conjunction
with the other arms (particularly the
infantry) and against an enemy which
is abundantly and capably supported
by all weapons; and

(b) the other, ~~of~~ the British idea, which
gives preëminence to speed and radius
of action and leans toward the
creation of large mechanized units
intended to act, in the early stages
of the ~~blitz~~ fight, on a flank
or in a gap, during the exploitation

a certain mission or to a group of missions but it must, in addition, be capable of contributing toward the accomplishment of other tasks. We cannot conceive of a reconnaissance machine which would not be capable of fighting. In addition, the capabilities of a piece of apparatus vary according to the tactical or strategic situation, the nature of the terrain, and the ^{nature and} disposition of the enemy. Take the case of the ~~Star~~ Fiat Ansaldo tank in Ethiopia. If it were acting against an European army well equipped with anti-tank weapons and outside of a mountainous zone, it should certainly limit itself to ~~the~~ reconnaissance duties and gaining contact. But in Abyssinia it filled the ~~role~~ ^{mission} of a powerful machine. The artillery realized this, ^{feature of adaptability} a long time ago. They do not designate the units of 75s, of 155 short, and 155 long under the name of direct support artillery, harassing artillery, or counter-battery artillery. Instead they designate them as light artillery, heavy short range or heavy long range artillery, - letting their material characterize of weight and form, ^{implicitly} carry with them an ~~the~~ indication of ~~a certain~~ their tactical possibilities. We could not do better than to imitate ~~the~~ the artillery-men.

The essential characteristic that is going to permit us to qualify a given tank is manifestly its weight; it is a sort of algebraic sum of all its military features (its armor, armament, and mobility). In addition, it furnishes a guide as to the possibility of the tank making use of certain bridges, railway lines, etc. The military terminology of all countries is already accustomed to taking weight as a standard and it is advisable to continue this practice. But within the limits of a specified weight, armor, armament, and mobility are contradictory; it will therefore at times be necessary to indicate that emphasis has been placed on the one or on the other.

If, now, we class, in the order of their weight, the materiel which is at present of interest, i.e., those tanks which are in service or which are the latest of a series in course of development and ranging in weight between 2 and 9 tons, we find a great many models (nearly 20). All the intermediate tonnages are represented except perhaps, the weights of around

6 and 7 tons. This weight seems to be a sort of "desert zone" about which we will have more to say later. But for the present suffice it to say that we can take 6 tons as marking the limits of a further subdivision that can be made in the light class. From an agreement, nearly unanimous, almost all military or colonies attribute to these ~~light~~ machines the generic name of Light Tanks; and we certainly have no reason for not adopting it.

We do not find any marks in the class ranging from 9 to 11 tons, but between 11 and 20 tons there are seven types which appear quite regularly. They are generally referred to as Medium Tanks and we will do likewise.

The weight of from 20 to 30 tons is completely abandoned; then, in the range greater than 30 tons we find the "Independent Tank" and its two Russian brothers. But elsewhere the production of tanks of this size appears not to be attempted. Are we then, like the ancient geographers, going to leave this space blank or else write in it "Unknown land"? This would be unwise for, in former times, this "region" was populated; and also we have already noticed - even among the conservative British - a tendency

favor an increase in armor plating which cannot fail to create a tide of immigration into that "unpopulated desert". It seems to us, then, quite logical to reserve to these rare present inhabitants of the "unknown lands" and to any future immigrants into the region, the name of "heavy tanks".

Certain subdivisions are necessary in the quite varied group of our 20 light tanks. To accomplish this we are going to let a comparison between strength and mobility be the determining factor.

First of all, what do we find in the class of less than 6 tons that we referred to a while ago? We find machines:

(a) - whose armor varies between 9 and 13 mm, that is, machines which only hope to be bullet-proof against the individual weapons and the usual automatic arms of the infantry;

(b) - whose armament consists of a machine gun or, at the most, a pair of machine guns;

(e) - whose maximum speed varies between 40 and 60 Km/h and whose radius of action reaches well up toward 200 Km; machines which, therefore, can count on having a strategic mobility equal to that of modern trucks (20 Km average road speed, an average of 200 Km on a days run).

There are ^{manifestly} ~~evidently~~ machines designed essentially for missions preceding and following a decisive battle or for the attack against an inferior enemy. In their production, research along the lines of mobility played the primary part. It appears, then, that we can very appropriately give them the name: "light fast tanks".

Considering them further and examining them more closely, we find that a certain number of them - those weighing from 2 to 4 tons - have sacrificed their strength to the limit. In this class their armament has been placed in the driver compartment with the resulting limited field of fire. For the lack of a word of French origin, let us call them "Tauxettes" (The father of tanks, General

Certain ones

Etienne, would surely pardon us the use of the foreign radical in consideration of the diminutive suffix which is so smartly French). ~~Those~~ ~~that~~ weigh between 3 and 6 tons have a turret and can fire in any direction. We have named these "Turret tanks".

Above the 6 ton limit the machines that we find have the following features in common:

(a) - Armor of 13 mm or greater and as a consequence capable of affording protection against certain anti-tank weapons;

(b) - Guns dual mounted (generally a cannon and a machine gun) and capable of all-around traverse;

(c) - Maximum speed varying between 30 and 40 kmh with a radius of action generally less than 200 kms.

It is evident that a consideration of strength has entered here to overshadow mobility. It therefore seems to us that these machines, generally intended for the support of the infantry, would not be mis-named "Light Supporting Tanks" or we could say "light powerful tanks".

A careful study of medium tanks will not bring out the same conflict between strength and mobility;

it even happens, ^{in cases} that with ~~a~~ ^{an increase} ~~superiority~~ in strength there is a corresponding ^{increase} ~~superiority~~ in mobility. It appears that this is due to the fact that in the present state of technical development, the nearer the tonnage is to 20 tons the better the equilibrium between all the technical features. But it is strongly possible that, one of these days, an increase in the armor plating made necessary by the progress in anti-tank weapons will upset this equilibrium and lead us to find among the medium tanks certain ones which will feature strength and others which ^{will} feature mobility.

The reader has undoubtedly noticed that in establishing the foregoing rules, we have neglected the Christies and that the American T5 (with its 71 Km/h) is not included among the light fast tanks. It seems to us that in these we have a particular class - one in which everything is sacrificed to speed. Here it appears that they are striving for the prophesied 100 Km/h and a radius of action of 400 kms. For this

group we feel that the name "Raiding Tanks" is well merited.

With our definitions and rules thus set forth, we are now ready to present our proposed classification to the reader:

I - Light Tanks

A - Light Fast tanks

2 to 6 tons.

20 to 60 Km/h.

~~300~~ 200 kms radius of action.

Armor Plate
9 to 13 mm.

(a) Tankettes.

2 to 4 tons.

1 or 2 machine guns

in ^{the} forward hull.

Carden-Loyd Mark VI and its

Russian, Italian, & Polish imitations.

Italian Fiat-Ansaldo.

(b) Turret Tanks.

3 to 6 tons.

1 or 2 machine guns

with all-around traverse.

Amphibian Vickers-Carden-Loyd

and its Russian imitation.

Patrol tank, Light Mark II

and IA, Vickers, Carden-

Loyd 1933 and 1934.

Japanese M 2592, & handwerk

100. Perhaps the German

light tank.

B - Light Powerful tanks

6 to 10 tons.

30 to 40 Km/h.

less than 200 Km radius of action.

At least 13 mm of armor plate.

Mixed armament, 360° traverse.

Light Vickers-Armstrong types

A and B. Light Russian

tank T 26. Light Japanese

M 2595. handwerk 60.

American TIE 2.

American TIE 6.

Conclusion.

The reader is going to think that, under the guise of developing a few synoptic tables, we have made him travel quite a roundabout course and that we have presented him a complete abridged history of the evolution of the tank. That is true, but how could we have done otherwise? In order to classify one must pass judgment and in order to judge one must know the facts.

Since we have had to make so many detours, during the course of which we have surely learned some lessons— even if these lessons have come from the trees along the road alone— let us not lose sight of them, but rather let us make a brief resumé of them at this point.

On the whole, in spite of the confusion caused by the multiplicity of the types of vehicles, the evolution of the tank is relatively simple. There is:

- (A) The initial basic idea: a machine for forcing a break-through.
- (B) Then, immediately following, two trends:
 - (1) The French, which continues to be dominated by the necessities of the battle, by shock action. This gives birth to the light infantry tank.

II - Medium Tanks.

10 to 20 tons.

30 to 50 Km/h.

150 to 200 Kms radius of action.

More than 20 mm of armor

(Except on Japanese tanks).

Cannon and Machine Guns.

Vickers-Armstrong medium 18 tons.

Russian T 28.

Japanese M 89, M 92, M 94.

Landsverk 10.

III - Heavy Tanks.

Weighing more than 20 tons,

(at present 33 to 36 tons).

30 to 45 Km/h.

200 to 300 Kms radius of action.

Armor: 25 to 35 mm.

Cannon and machine guns.

Vickers-Armstrong heavy,

Russian M 1 and M 2

heavies.

IV - Raiding Tanks.

Weight varying from 5.4

to 12 tons.

70 to 120 Km/h (on wheels,

all the machines - except the T5).

Radius of action around 400 Kms.

9 to 12 mm armor plate.

Cannon and machine guns in some

eases, 2 machine guns in others.

American Cavalry tank T5.

Christie M 1931

American medium T3E2.

Russian B T.

(2) The British trend which presupposes a gap already opened up in the enemy position. It deals with open warfare, exploitation and maneuver. Here is born the medium force tank.

(c) During the period which follows both schools of thought make compromises in an endeavor to find a single all-purpose tank but the initial underlying concept of each country persists:

- The British continue to favor speed and radius of action.
- The Americans, faithful to the French idea, give greatest consideration to shock action.

(D) Finally we arrive at the contemporary period. It is literally teeming with ~~with~~ conflicting ideas and experiments - almost all of which center chiefly around mobility. But gradually the various theories ^{are} taking shape and ideas are becoming crystallized. Tank policies are ^{being} formulated, and here again, in spite of ^{all} these innovations, ~~in spite of these~~ the two basic trends still remain paramount:

- In England there is formed an armored corps with its light

reconnaissance tanks and its medium tanks - vessels of the line - for over-running open territory, for maneuver on the flanks, and for exploitation;

- In America and in Russia, both clearly influenced by the French school of thought, they give first consideration to equipping the fighting forces for the main effort; they build light powerful tanks for supporting the infantry and medium tanks for deep penetration into the enemy position.

At this time the British are showing a tendency to increase their armor plate. They, too, are beginning to talk of an infantry tank. As for the Russians and the Americans, who meanwhile have joined in the production of very fast tanks (Christies and others), ^{we wonder if it does not} ~~it~~ ~~appear~~ as though they are beginning to make concessions to the British idea - only making such modifications as is made necessary by the immensity of their theatres of operation? We come very near to thinking so when we see the appearance of the Christie T 3 E 2 which, if it has all the features they

attributed to it, caused from the
flag ship of an American armored
fleet, of which the T 4 or the
T 5 could be the scout and which
would aim at clearly exceeding
the 20 Kms road speed and the
200 Kms radius of action
aimed at by the British armored
fleet.

Thus, after so many debates and
rejections, we see ourselves into
being an evolution in the final
analysis of which, the two original
main tendencies of mechanization
will, in all probability, no longer
appear as contradictory but as
complementary.

But let us stop, for we are
now on future ground and when
we are talking about mechanization
there is always the tendency to
speculate too boldly. To be sure
we have no intention of belittling
the imagination but it is necessary
at times to check it. To give
a critique on the tactics of
a modern land - one that is
purely hypothetical and not
clearly defined - is not very
sensible and serves no
useful purpose. We have
just defined certain general

types: a light tank, a light powerful tank, and a medium tank; and we have defined their general characteristics. (We won't mention the raiding tank which is hardly adapted to our theatre of operations). Very well! Let it be agreed that when we set about prophesying about future tactics we will admit that the tank-type of each category shall possess within itself all the qualities inherent to its type. This admirable machine doesn't exist yet and it probably won't exist for a long time but by so agreeing it seems that we can fairly well draw the lines of useful speculation and it appears that such an agreement would enhance the clearness of our discussions.

~~State~~ ^{State} a military problem clearly, locate it definitely in time and space, define the terms that ~~that~~ have ^{been} used (if this doesn't give ~~one~~ ^{one} everything it at least gives us a great deal), and the solution is pretty apt to be farth coming. Also it is pretty sure to meet general approbation once it has been reached.

Lieutenant Colonel J. Perre'

Memo to Maj: Bessette,
(Re. Translation)

There are about 6 more
sheets to follow.

Bond.

Tables of Characteristics

To accompany article by Lt. Col. J. Perré entitled:

An Attempt at a Positive Classification
of Fighting Tanks.

Abbreviations used herein:

Hp - Horsepower.

Ht - Height.

Km - Kilometer(s)

Kmh - Kilometers per hour

L - Length

M - Meters

MM - Millimeters

MG - Machine Gun(s)

S - At present in service.

T - Ton(s)

W - Width

Wh - On wheels

Wt - Weight

Models Dates of Construction	Weights and Dimensions	Maximum Speed and Motive Power	Radius of Action	Maxm mum Armor	Crews and armament.
France.	#				
Schneider 1916	Wt: 13.5 T L: 6 m. W: 2 m Ht: 2.4 m.	6 Km h. 70 Hp. 2 Hp per T.	50 Km	17 mm	6 men. 1 75 mm cannon with reduced barrel in drivers compartment 2 MG - one on each flank.
St-Chamond 1917	Wt: 23 T. L: 7.9 m. W: 2.7 m Ht: 2.36 m	10 Km h. 90 Hp. 4 Hp per Ton.	60 Km.	17 mm	9 men 1-75 mm cannon in drivers compartment. 4 machine guns (1 flexible, for dismounted action) 1 in rear, 1 on each flank).
England					
Mark I 1916	Wt: 30-31 T. L: 9.8 m (with tail piece) W: 4.18 m Ht: 2.49 m	6 Km h 105 Hp 3.5 Hp per ton.	19 Km.	10 mm	8 men 2 - 57 mm cannon in lateral positions sponsons. 4 machine guns (male tanks) 6 " " (female tanks) As above.
Mark II and III 1916	Wt: 30-31 Tons. L: 7.95 m W: 4.18 m Ht: 2.49 m	6 Km h 105 Hp 3.4 Hp per T.	30 Km.	10 mm (MK II) 12 mm (MK III)	As above.
Mark IV 1917	Wt: 30-31 T. L: 7.95 m W: 3.2 m 4.11 m Ht: 2.49 m	6 Km h. 125 Hp. 4 Hp per ton.	24 Km	12 mm	As above.

Table I.

Models. Dates of Construction	Weight and Dimensions	Maximum Speed and Motive Power	Radius of Action	Maxi- mum Armor	Crews and armament.
Renault 1917	Wt: 6.5 to 7 Tons L: 5 m W: 2.95 m Ht: 4.05 m	8 Km/h 35 Hp 5 Hp per ton.	60 Km	16 mm (Turret 22 mm)	2 men. 1 - 37 mm cannon or 1 machine gun, turret mounted, all-around traverse.
Tank R © 1921	Wt: 70 tons. L: 10.37 m W: 2.95 m Ht: 4.05 m	12 Km/h 500 Hp 7 Hp per ton.	120 Km	30 mm	12 men 1 - 75 mm cannon in forward turret. All-around traverse. 4 machine guns: 1 in rear turret, all-around traverse. 1 flexible, for dismantled action. 1 on each flank.

Table 2.

Models Dates of Construction	Weight and Dimensions	Maximum speed and Motive Power	Radius of Action (Kms)	Maxi- mum armor (mm)	Crews and armament
Mark V 1918	Wt: 29-31 T L: 8.06 m W: 3.65 m Ht: 3.65 m	7.7 Km/h 150 Hp 15 Hp per Ton	72	15	8 men. 2 - 57 mm cannon in two lateral lockhouses ^{sponsons} and 4 machine Guns (Male tanks), 6 machine guns (in female tanks)
Mark V - 1 Star - 1918	Wt: 32-37 T L: 9.88 m W: 3.32 m Ht: 2.84 m	7.5 Km/h 150 Hp 4 to 4.7 Hp per ton	64	15	same as above.
Mark V - 2 Star - 1918	Wt: 34-35 T L: 9.87 m W: 3.28 m Ht: 2.62 m	8 Km/h 225 Hp 6.4 Hp per ton	100	15	Same as above.
Mark VIII 1918	Wt: 42 T L: 10.44 m W: 3.66 m Ht: 3.14 m	9.6 Km/h 338 Hp 8.5 Hp per ton.	150	16	8 men. 2 - 57 mm cannon in two lateral lockhouses ^{sponsons} and five machine guns.
Whippets. Medium A 1917	Wt: 14 T. L: 6.1 m W: 2.62 m Ht: 2.74 m	13.4 Km/h 90 Hp 6.4 Hp per ton	64	14	3 men 3 machine guns in axial lockhouse sponson.
Medium B 1918	Wt: 20 T L: 6.94 m W: 2.7 m Ht: 2.44 m	12.7 Km/h 100 Hp 5 Hp per ton	100	14	5 men 4 machine guns in axial lockhouse sponson.
Medium C 1919	Wt: 22.4 T. L: 7.92 m W: 3.4 m Ht: 2.9 m	12.7 Km/h 150 Hp 6.7 Hp per ton.	120	15	4 men 3 machine guns in axial lockhouse sponson.

Table 3

[Heading, same as on other sheets]

Germany A7V 1917	Wt: 35 T	16 Km/h	80 Km	30mm of only fair grade	18 to 23 men. 1 57 mm bow gun. 6 Heavy MG's (2 on each side, 2 in rear).
	L: 7 m	300 Hp			
	W: 3.05 m	9.1 Hp per Ton			
	Ht: 2.85 m				
A7V-18	Wt: 44 T	12 Km/h	?	45mm	7 men 2 57 mm guns in 2 lateral Sponsons. 4 MG's.
	L: 8.3 m	300 Hp			
	W: 4.7 m 4.7 m	6.8 Hp per Ton			
	Ht: 3.2 m				
Tank K-18	Wt: 165 T	8 Km/h	?	30mm	22 men. 4 77 mm guns in 2 lateral Sponsons 6 MG's.
	L: 13 m	1200 Hp			
	W: 6.1 m	7.3 Hp per ton			
	Ht: 2.9 m				
LKI-18	Wt: 9.4 T	13.7 Km/h	60 Km	11.4 mm	2 or 3 men 2 MG's in sponson.
	L: 5.05 m	60 Hp.			
	W: 1.95 m	6.4 Hp per ton			
	Ht: 2.51 m				
LKII-18	Wt: 10.2 T	13.7 Km/h	60 Km	11.4 mm	2 or 3 men 1 37 mm gun in sponson.
	L: 5.08 m	60 Hp			
	W: 1.95 m	5.8 Hp per ton			
	Ht: 2.49 m				
Sweden					
MII-21	Wt: 9.5 T	18 Km/h	?	14mm	4 men 1 MG in sponson.
	L: 5.07 m	60 Hp			
	W: 2.05 m	6.32 Hp per ton			
	Ht: 2.52 m				
U.S.A					
Light FORD-18	Wt: 3.5 T	12.5 Km/h	70 Km	12.7 mm	2 men 1 37 mm Gun or 1 MG in Bow.
	L: 4.4 m	45 Hp			
	W: 1.85 m	12.9 Hp per T.			
	Ht: 1.9 m				
3 Seater-18	Wt: 7.5 T	14.3 Km/h	?	12.7 mm	3 men 1 37 mm gun in turret 1 MG in Bow.
	L: 4.93 m	60 Hp			
	W: 1.98 m	8 Hp per ton.			
	Ht: 2.39 m				

Italy

Lt 3000 A 1919	Wt: 5 T	15 Km h	100 Km	16 mm	2 men
	L: 4.2 m	55 Hp			2 MG's dual mounted in turret.
	W: 1.65 m	11 Hp per T			
	Ht: 2.2 m				
Lt. 3000 B 1929 modifi- cation of 3000 A	Wt: 5.6 T	16 Km h	100 Km	16 mm	2 men
	L: 4.29 m	63 Hp			1 37 mm gun or 2 MG's dual mounted in turret.
	W: 1.67 m	11.25 Hp per T.			
	Ht: 2.2 m				
Hvy 2000 1918	Wt: 40 T	7.5 Km h	75 Km	20 mm	10 men
	L: 7.4 m	240 Hp			1 65 mm gun in turret with all-around traverse.
	W: 3.1 m	6 Hp per ton.			7 MG's (2 at corners)
	Ht: 3.8 m				

Table 4

Models. Dates of Construction	Weight & Dimensions	Maximum Speed Speed & Motive Power	Radius of Action	Maximum Armor	Crews and Armament	Technical Characteristics.
Vickers I and I A 1922/'23	Wt: 12 T L: 5.33 m W: 2.74 m Ht: 2.4 m	26 Km/h 90 Hp	210 Km	15 mm	5 men 47 mm gun + MG in movable turret 2 MGs (1 on ea. flank) (In the Mark IA, 1 of the MG's for anti-air use)	Water-cooled, V shape, air cooled. Sliding sleeve transmission. epicyclic gear drive. non-protected suspension system.
Vickers Convertible 1926	Wt: 14 T L: 6.4 m. Track. 5.29m Wheels. W: 2.74 m Ht: 2.90 m 2.69 Track Wheels	45 Km/h, Wt 24", Track. 90 Hp 6.5 Hp per T.	?	15 mm	Same as Mark I A	Same as above but with protected Suspension System.
Vickers MARK C 1926/'27	Wt: 12 T. L: 5.33 m W: 2.54 m Ht: 2.4 m	30 Km/h 110 Hp 9.3 Hp per T.	210 Km	15 mm	6 men. 1 57 mm gun and 1 MG in movable turret, 1 MG in Bow and 1 MG on each flank.	Same as above except that motor is water-cooled.
Vickers II and II A 1927-'29	Wt: 13 T L: 5.26 m 5.33 " W: 2.69 m 2.74 " Ht: 2.67 " 2.72 "	26 Km/h 90 Hp 6.9 Hp per ton.	210 Km	15 m	Same as the Mark IA and the Mark II	Same as mark I and IA except that suspension system is protected.

Table 5.

Models Date of Construction	Weights & Dimensions	Maximum Speed and Horse Power	Radius of Action	Max- imum armor	Crews and Armament	
Medium Tank M 1921 Designated later as T1.	Wt: 22 T L: 6.5 m W: 2.44 m H: 2.97 m	172 Hp with regulator 7.5 Hp per Ton (w/ regulator)	120 Km	25.4 mm	4 men. 1 75 mm gun and 2 M.G. in 2 turrets (1 turret superimposed) 360° traverse. (1 M.G. in upper turret)	Motor: Murray and Tregurtha, Marine type, 6 eyes, air-cooled. Sliding sleeve transmission
Medium Tank M 1922 Designated later as T1E1	Wt: 25 T L: 7.92 m W: 2.44 m Ht: 2.95 m	172 Hp. and greater (172 Hp with regulator) 6.8 hp per Ton (w/ regulator)	120 Km	25.4 mm	As above	Tr. on steel plates. ^{each} with grousers As above except that steering mechanism was operated by compressed air. Track links composed of light wood blocks held in place in articulated steel links by means of spiral springs.
T1E2 Medium 1925	Wt: 22 T L: 6.5 m W: 2.44 m Ht: 2.9 m	22 Km h 200 Hp. 9.1 Hp per ton	120 Km	25.4 mm	As above.	Motor and transmission as above. • Steering by differential. Track: skelton type with grousers.

Table 6

(Same headings as previously.)

Spain

Trubia	Wt: 8.1	50 kmh	100 kmh	20 mm	3 men.
H. Tank	L: 5.2 m	75 HP			1 37 mm gun and
1925	W: 1.8 m	9.3 HP			1 M.G. or 3 M.G.
	Ht: 2.4 m	per ton			movable

Czechoslovakia

KH Tank	Wt: 6.8 to 8 Tons	30 to 35 kmh on wheels,	200 km on wheels	13 mm	2 men.
50, 60, 70.					1 37 mm gun or
1924	L: 4.3 ^m to 4.5 m	12 to 20 kmh on tracks,			1 M.G. in movable turret.
	W: 2.3 m to 2.35 m	50 to 70 HP.			
	Ht: 2.53 m	6.7 to 8.3 HP per T.			
	on wheels,				
	2.38 m on tracks,				

RUSSIA #

H. Tank	Wt: 6.35 to 7.25 Tons.	20 kmh	100 km	15 mm	2 men
MS I, II, III		36 to 40 HP			1 37 mm gun and
1927	L: 4.32 m	5.7 to 5.5 HP per ton.			1 M.G. in movable turret.
	W: 1.75 m				
	Ht: 2.16 m				

(No technical features given in original)

Table 7

Same headings as previously

England.						
Heavy Vickers	Wt:	45 Km	25.4 mm	10 Men.		
Mk I & II 1925/1926 INDEPENDENT TANK	L: 9.3 m W: 3.2 m Ht: 2.75 m	380 Hp 11.3 Hp per ton		1 47 mm gun (Main turret) 4 M.G. in 4 lateral movable sponsons.		Motor: Armstrong-Siddley V shape. Mark I: Wilson automatic trans- mission. gear case . Planetary. Mark II: Hydraulic transmission. Track: Vickers, protected suspension system. Hydraulic steering clutches and brakes on Mark II.
Russian Copys						
Heavy M I (S)	Wt: 33 t L: 7.2 m W: 2.73 m Ht: 2.93 m	45 Km/h 250 Hp 7.6 Hp per ton	200 Km 35 mm	6 men. 1 cannon and 1 M.G. dual mounted in main movable turret, 2 M.G. in 2 lateral movable sponsons.		Motor: 12 Cyls; V shape Wilson automatic transmission. Vickers non-protected suspension system.
Heavy M II (S)	Wt: 36 T L: 9.3 m W: 3.2 m Ht: 2.75 m	30 Km/h 350 Hp. 9.7 Hp per ton	300 Km 15 mm	12 men. 1 75 mm gun (short barrel) in main turret. 1 M.G. in left movable sponson. 1 37 mm gun in right " " 1 M.G. and 1-37 mm gun paired in rear sponson.		Motor: 12 Cyls. V shape Hydraulic transmission. Vickers protected suspension system. Hydraulic steering clutches and brakes.
Medium tanks derived from the above.						
England.						
Med Vickers- Armstrong 1929	Wt: 18 T L: 6.5 m W: 2.65 m Ht: 2.49 m	50 Km/h 200 Hp 11.1 Hp per ton	185 Km 25.4 mm	6 men. 1 47 mm or 57 mm cannon and 1 M.G. dual-mounted in main rotating turret. 2 sets of dual mounted M.Gs (one on each side) in movable turrets.		Motor: Armstrong-Siddley. 12 cyls. V. geared. Wilson automatic transmission. Vickers protected suspension system.
RUSSIA						
Med T 28 (copied from above)	Wt: 20 T L: ? Ht: ? W: ?	40 Km/h	? ?	Characteristics probably identical with above.		Characteristics probably identical with above.

TABLE 8

Same headings as before.

Country	Model	Year	Wt	Speed	Range	Armour	Man	MG	Motor	Suspension
England	Carden-Lloyd Convertible Mark III	1926	1.7 T	30 Km/h (Tracks)		7 mm (partially armored)	1	1 MG under movable mask.	Ford, 4 cyls. Model T. Water cooled	Sprung by coil springs.
England	Carden-Lloyd Convertible Mark V	1926/1927	1.35 T	50 Km/h (W)		"	2 m	1 MG in bow.	Motor and transmission as above.	Small diam. rollers, rubber covered. Suspended by helical springs. Differential brake steering.
England	Carden-Lloyd Mark VI Type A, With armored cupola)	1929	1.7 T	45 Km/h	160 Km	"	2 men	1 MG in bow	As above except with leaf spring suspension.	
England	Carden-Lloyd Mark VII, later called Light Mark I)	1930	5.08 T	50 Km/h	240 Km	12.7 mm	2 men	1 MG in fully revolving turret.	Air-cooled motor. Differential brake steering.	Large diameter rollers, rubber covered. Suspended by helical springs. Sliding sleeve transmission.
France	Renault FT-17	1918	3.1 T	64 Km/h	260 Km	9 mm	as above		Motors Meadows, 6 cyl.	Large diameter rollers, rubber covered. Suspended by leaf springs, Rear pulley forming the guide pulley, Sliding sleeve transmission. Side clutch steering.
England and Spain	Carden-Lloyd Mark I	1918	3.1 T	56 Hp						
England and Spain	Carden-Lloyd Mark II	1918	2.08 m	18 Hp per T.						
England	Carden-Lloyd Mark IA	1931/1932	5.04 T	48 Km/h	260 Km	12.7 mm	as above		As above except with leaf spring suspension.	

TABLE 9

Same heading -

Control Tank Garden Loyd 1932	Wt: 2.8 L: 2.59 m W: 1.75 m Ht: 1.65 m	40 Hp. 14.3 Hp per ton.	13 mm	2 Men	1 MG in turret with all-around track	Motor: Meadows, 6 Cyl. Small diameter suspended by leaf springs; later by inclined helical springs (45°). Differential brake steering.
Mark II d II A 1932 (S)	Wt: less than 5 Tons L: 3.96 M W: 1.83 M Ht: 1.68 M	58 Km/h 75 Hp. 15 Hp per ton	210 Km 13 mm	as above		Motor: Rolls-Royce, 6 Cyl, water and air cooled. Large diameter rollers, rubber covered, suspended by helical springs. Sliding sleeve transmission Side clutch steering
Vickers Garden-Loyd 1933 in Lith- uania	Wt: 3.8 T L: 3.5 m W: 1.85 m Ht: 1.99 m	48 Km/h 56 Hp. 14.7 Hp per ton	180 Km 9 mm	as above		Motor: Meadows, 6 Cyl. Rollers: as next above. Sliding sleeve transmission Side clutch steering.
FOREIGN COPIES						
land. Garden-Loyd TK 3, 1932 copied from Mark VI (S)	Wt: 2:48 T L: 2.58 M W: 1.78 M Ht: 1.31 M	45 Km/h 46.5 Hp 18.7 Hp per ton	200 Km 8 mm (Non- continuous)	2 Men.	1 MG of 13 mm in bow. 1 M.G. for anti-aircraft protection.	Ford Model A. Engine. Small diameter rollers acting against a single elliptical leaf spring. Steering by braking on drive sprocket.
RUSSIA Katte T-27 1931 copied from Mark VI (S)	Wt: 2.5 T L: 2.5 M W: 1.80 M Ht: 1.50 M	40 Km/h 40 Hp 16 Hp per ton	? 10 mm (Non- continuous)	2 Men.	1 M.G. in bow.	Ford Model T Engine, 4 Cyl. Water-cooled. Transmission: Ford planetary with additional low gear Differential brake steering
Amphibian T-37 copied from Garden-Loyd Amphibian (S)	Wt: 3.2 T L: 4 M W: 1.2 M Ht: 1.83 M	45 Km/h 60 Hp 18.7 Hp per ton	180 Km 9 mm	2 Men	1 M.G. in Turret.	Like the English Amphibian, except differential brake steering. Suspension system lengthened by the addition of an idler pulley distinct from the rear roller.

TABLE 9

Same heading as previously.

England							
Vickers - Armstrong Type A 1930	Wt: 8 T L: 4.88 m W: 2.41 m Ht: 2.08 m	88 Hp 12.6 Hp per ton	100 Km	13 mm	3 Men. 2 M.G. in 2 turrets. Turrets placed sid	Motor: Armstrong-Siddeler.	4 0 1 per track,
In service in Siam, Turkey, Bolivia, Poland. Experimental in U.S.A.						rubber covered, leaf springs. Sliding sleeve transmission with additional low gear. Side clutch steering.	
Vickers - Armstrong Type B.	Wt: 8 T L: 4.88 m W: 2.41 m Ht: 2.16 m	88 Hp 11 Hp per ton	160 Km	13 mm	8 Men. 1 - 47 mm cannon and 1 MG dual mounted in 360° Traverse Turret.	As above.	
(In Service as above)							
Russia							
Lt. T-26 1933	Wt: 8.5 T L: 4.62 m W: 2.40 m Ht: 2.20 m	95 Hp 11.8 Hp per ton.	180 Km (6 hrs running)	13 mm	3 men. 1 - 45 mm cannon ^{or} 1 - 37 mm cannon, and 1 MG dual mounted in Turret, <u>or</u> 2 M.G. in 2 opp. turrets.	As above.	
Copied from above A+B							
JAPAN							
Lt. M2593 1933 (Modeled after V-A.)	Wt: 7 T L: 4.48 m W: 1.80 m Ht: 1.83 m	85 Hp 12.1 Hp per ton	?	?	3 men. 2 M.G. (1 in Turret 360° Traverse, 1 in forward compartment	Motor: Mitsubishi, 6 Cyls, air-cooled. Rollers as above, except 6 per track instead of 8.	

TABLE 10.

(Same headings as before)

English Vickers No. 6/1927 known for comparison)	Wt: 11 T L: 5.33 m (Without rear projection) W: 2.54 m Ht: 2.40 m	110 Hp 10.4 Hp per T.	6 men. 1-57mm cannon and 1 MG in all-around traverse turret, plus 3 MG (1 on each flank, in bow)	Motor: Armstrong-Siddley, 8 Cyls, V shape, thermo- siphon belt drive air-cooled clutch steering, Vickers protected suspension system.
JAPAN Type M-89 No. 929 (S)	Wt: 11 T L: 5.33 m (without rear projection) W: 2.54 m Ht: 2.60 m	30 Km h 250 Km 17 mm 5 men. 1-37mm cannon and 1 MG in all-around traverse turret, 1 MG in bow, on right.	Motor: Mitsubishi, air-cooled in Manchuria, water-cooled in Japan. Suspension system as above. (Tracks are too heavy)	
Type M 92 No. 932	Wt: ? L: ? W: ? Ht: ?	? ? ? 17 mm	Same as above Suspension system as above.	
Type M 94 No. 934 (S)	Wt: 14 T L: 6.36 m (With projection) W: 2.54 m Ht: 2.60 m	45 Km h 200 Km 17 mm Same as above except that Bow gun is on left.	Motor: Mitsubishi, Aviation type, air-cooled. Differential brake steering Suspension system as above.	

Table II.

(USUAL HEADINGS)

Handswerk 5 Wheeled and Track 1929	Wt: 5.2 T (Chassis) L: 5.2 m W: 2.45 m H: ?	75 Km h 80 Hp ? Hp per ton	? ?	4 ?		Motor: 6 Cyls, Water-cooled. Steering by forward wheels in travel on wheels; by epicycloid on track.
Handswerk 10 Medium. 1931	Wt: 11 T L: 5.2 m W: 2.15 m H: 2.22 m	35 Km h 150 Hp per T	150 Km	24 mm	4 men. 3-mm cannon and 1 MG or 1-47m cannon and 1 MG dual mounted in all-around traverse turret	Motor: Maybach, 12 Cyls, V shape, water-cooled. Transmission: Epicycloid with additional low speed. Steering: Epicycloid differential. Skeleton track, short-pitched, self-aligning.
Handswerk 30 Medium Convertible 1931	Wt: 11.5 T L: 5.2 m W: 2.45 m H: 2.25 m on Track; 2.5m-WH.	75 Km h (Wheels); 35 Km h (Track) 150 Hp. 13 Hp per ton.	300 Km (Wheels)	14 mm	3 or 4 men. Armament as above	Motor and Transmission: As above. Steering: Like Handswerk 5 Track: As above.
Handswerk 60 Light 1934	Wt: 6.8 T L: 4.6 m W: 2 m H: 1.85 m	48 Km h 160 Hp 23.5 Hp per ton.	220 Km	13 mm	3 men. 1-cannon 20 mm and 1 MG. dual-mounted. 360° Traverse	Motor: 8 Cyls, V shape, water-cooled. Track: As above. Transmission: Silent, synchronized. Steering: Epicycloid differential.
Handswerk 100 Light. 1934	Wt: 4.8 T (Cannon Tank) 4.5 T (MG Tank) L: 4.1 m W: 1.9 m H: 1.8 m	55 Km h 130 Hp 27.1 or 28.8 Hp per ton.	200 Km	9 mm	2 men. 1-20 mm cannon or 1-MG. 360° Traverse	Motor: 6 Cyls, Water-cooled Transmission, Steering, and Track: As above.

(TABLE 12)

(USUAL HEADINGS)

LT. Tank T I 1927	Wt: 7.5 T L: 3.8 m W: 1.79 m Ht: 2.17 m	29 Km/h 106 Hp 14.1 Hp per ton	120 Km	9.53 mm	2 Men. 1-37 mm cannon and 1 MG, dual mounted in turret, 360° Traverse.	Motor: Cunningham, 8 eyes, V shape, Water-cooled. Steering: by controlled differential. Sprockets: on the drive sprockets. Tracks: cast steel, Skeleton type with grousers. Suspension: No springs.
TIE 1 1928	Wt: 7.5 T L: 3.8 m W: 1.79 m Ht: 2.17 m	29 Km/h 106 Hp 14.1 Hp per ton	120 Km	9.53 mm	As above	As above.
TIE 2 1929	Wt: 8.9 T L: 3.87 m W: 1.88 m Ht: 2.3 m	26 Km/h 134 Hp 15 Hp per ton	120 Km	16 mm	As above	As above, except that idler gear is spring controlled.
TIE 3 1930 (Transformation of TIE 1.)	Wt: 8.5 T L: 3.87 m W: 1.79 m Ht: 2.17 m	35 Km/h. 134 Hp 15.8 Hp per ton	120 Km	16 mm	As above.	Like TIE 1 except that suspension system has hydraulic shock absorbers.
TIE 4 1932	Wt: 8.6 T L: 4.6 m W: 2.2 m Ht: 2 m	37 Km/h 150 Hp 17.1 Hp per ton	160 Km	16 mm	As above	Motor and Transmission: As above. Steering: Side clutch operated by steering wheel. Skeleton track, short-pitched links, of Vickers-Armstrong type.
TIE 5 1933 (Experimental)	Wt: 7.5 T L: 3.86 m W: 1.79 m Ht: 2.17 m	29 Km/h 106 Hp 14.1 Hp per ton.	120 Km	9.53 mm	As above	Like TIE 1. Steering by controlled differential.
TIE 6	Wt: 8.9 T L: 4.57 m W: 1.03 m Ht: 1.93 m	37 Km/h 248 Hp (at least) 27.8 Hp per ton	160 Km	16 mm	As above	Like TIE 4 except that it has an American-France Motor 12 eyes, V shape, Water-cooled.

(Table 13 - Cont'd. on next sheet.)

Med T 2 Wt: 15 T 40 Km/h 145 Km 22 mm 4 men.

1930
An experiment
in the direction
of strength.
(Derived from
TIEZ)

L: 4.88 m 318 Hp

W: 2.44 m 21.2 Hp

Ht: 2.77 m per ton

1- 47 mm cannon

1- MG mounted in turret
with MG in bow.
plus 1 MG in bow.

Motor: Libbey

Transmission: as above.

Track: Cast steel, skeleton type
with grouseers.

Steering by operation of vacuum
brakes on drive sprocket.

T 5 Wt: 5.44 T 41 Km/h 241 Km 9.5 mm 2 men.

1934
An experiment
in the direction
of mobility.
Cavalry Tank.

L: 3.66 m 260 Hp

W: 2.08 m 47.9 Hp

Ht: 1.98 m per ton

3 MG (2 in 2 Turrets

placed side by side. 180°

Traverse each. 1 MG

in bow)

Motor: Continental, Radial.

Steering: Cletrac system with

self energizing brakes on

differential. Track of Vickers-

Armstrong type with large diameter

rollers, spiral spring suspension

(Defective).

(Table 13)

(Manual heading)

M 1919	Wt: 14 T	11 Km h (Tracks)	56 Km (Tracks)	11 mm	3 Men. 1-57 mm Cannon in lower turret, 1-MG in upper turret. 360° traverse, both turrets.	Motor: Christy, 6 @yls, water-cooled. Sliding gear transmission. Steering: About 180° on differential. Rollers covered with rubber, un-sprung suspension.
M 1921	Wt: 14 T	11 Km h (Tracks)	96 Km (Tracks)	11 mm	4 men. 1-57 mm Cannon in bow 2 MG in forward corners.	As above except that forward wheels carry spiral springs.
M 23 Amphibian and copies: M 21, 22	Wt: 7 T	48 Km h (Wheels)	30 Km h (Tracks)	6.35 mm	No data given.	As above except that intermediate rollers are in pairs and are suspended by spiral springs.
	L: 5.08 m	2 Km h in water	90 Hp.			
	W: 2.13 m	12.8 Hp per ton.				
	Ht: 2.29 m					
M 1928	Wt: 9.6 T	112 Km (Wh)	185 Km (Wh)	12.7 mm	No data given	Motor: 12 @yls, V shape, Water-cooled. Sliding gear transmission. Steering: Wheels - by control to forward wheels. Track - by braking on differential. Rollers: The 4 pairs of wheels are placed equidistantly and independently suspended. Sprockets and idlers distinct from rollers.
	L: 5.18 m	68 Km (Tr)	120 Km (Tr)	(Not fully protected)		
	W: 2.13 m	343 Hp				
	Ht: 1.83 m	39.9 Hp per T.				
M 1931 (Med. T 3 or Cavalry Combat Car T 1)	Wt: 11 T	113 Km h (Wh)	400 Km (Wh)	16 mm	3 Men. 1-37 mm Cannon and 1 MG dual mounted in turret, 360° Traverse.	As above except that steering is by side clutch and rollers are not equidistantly placed.
	L: 5.44 m	64 Km h (Tr)	272 Km (Tr)			
	W: 2.24 m	343 Hp.				
	Ht: 2.21 m	31.2 Hp per T.				
M 1932	Wt: 5 T	193 Km h (Wh)	?	12.7 mm	No data given.	Motor: Hispano-Suiza, 12 @yls V shape, Water Cooled. Transmission and Control like M 1931. Rollers and boxes like M 1931 except that rollers carry pneumatic tires.
	L: 6.6 m	96 Km h (Tr)				
	W: 2.13 m	760 Hp				
	Ht: 1.73 m	152 Hp per T				

TABLE 14 (Cont'd on next sheet)

(Headings are ...)

M 1933	Wt: 8.5 T	45 Km/h (Wheels) 45 Km/h (Tracks)	200 Km (Wh)	14 mm	No data given.	Motor: ? Sliding gear trans.
	L: 4.32 m	250 Hp.				
	W: 2.13 m	113.6 Hp per T.				
	Ht: 1.82 m					Do not know what controls, forward a ... Wheels: Two pairs of double wheels with pneumatic tires on each side.
Cavalry Tank T2 and T3 1931-33	Wt: 8.5 T	48 Km/h (Wh) 32 Km/h (Tr)	200 Km (Wh) 160 Km (Tr)	12.7 mm	3 or 4 men. 1 MG Cal. 50 in 360° Turret. 1 MG for anti-aircraft fire or use at front of crew compartment.	Motor: Continental, 7 cyl Radial, air-cooled. Sliding gear transmission. Steering: By control to forward wheels when on wheels or by brakes on drive sprockets operated by hydraulic booster when on tracks. Tracks: Forged duralumin. 3 Pairs of double wheels, forward wheels forming the idler in the T3.
	L: 4.49 m	167 Hp.				
	W: 1.9 m	19.6 Hp per Ton				
	Ht: 2.26 m					
Cavalry Tank T4 1934.	Wt: 8.6 T	70 Km/h (Wh) 47 Km/h (Tr)	?	9.5 mm	3 Men. 1 MG in 360° turret, 1 MG in bow.	Motor and Transmission as above. Steering as above Wheels: 4 pairs of double wheels equally spaced.
	L: 4.15 m	268 Hp.				
	W: 2.34 m	31.2 Hp per T.				
	Ht: 1.57 m					
Medium T3-E2 1934	Wt: 11 T	120 Km/h (Wh) 60 Km/h (Tr)	?	22 mm ?	5 Men. 1-37 mm cannon and 1 MG dual mounted plus 2 MG, lateral. All in 360° turret	Motor & Transmission: ? Steering as above. Wheels as above except unequally spaced.
	L: 5.82 m	555 Hp				
	W: 2.44 m	50.5 Hp per Ton				
	Ht: 2.3 m					
Russian Copy of M 1931. BT 1933 (S)	Wt: 12 T	70 Km/h (Wh) 55 Km/h (Tr)	400 Km on wheels.	12 mm	3 men. 1-45 mm cannon and 1 MG (7.62 mm) or 2 MG dual mounted in 360° turret.	Like American M 1931. except that power is delivered directly to sprocket and not through Gall chain.
	L: 5.35 m	350 Hp.				
	W: 2.23 m	29.2 Hp per T.				
	Ht: 2.16 m					

Table 14.

THE INFANTRY SCHOOL
DEPARTMENT OF GENERAL SUBJECTS
MILITARY HISTORY SECTION.
FORT BENNING, GA.

3-29

ADVANCED OFFICERS' COURSE.
1922-1923.

OPERATIONS OF THE 35th DIVISION
in the
FIRST PHASE OF THE MEUSE ARGONNE.

FRANK E. BONNEY

MAJOR 23d INFANTRY.

1

B I B L I O G R A P H Y .

Abbreviation.	Title.	Author.	Publishing House	Address	Date of Publication.
	The American Army in the World War.	G. Waldo Browne	Overseas Book Co.	Manchester N.H.	1921
Von Giehl	Battle of the Meuse-Argonne.	Maj. Herman von Giehl, Chief of Staff, 16th Army Corps, German Army.	Infantry Journal,	Washington, D.C.	Aug. 1921.
	Final Report Commander-in-Chief, A. E. F.	Gen. John J. Pershing	War Department	Washington, D.C.	
Heroes	Heroes of the Argonne.	Charles B. Hoyt	Franklin Hudson Publishing Co.	Kansas City, Mo.	1919.
	History of the A.E.F.	Shipley Thomas	George H. Doran Co.	New York, N.Y.	1920.
	Our Greatest Battle (Meuse-Argonne)	Frederick Palmer	Dodd Mead & Co.	New York, N.Y.	1919.
	Our 110 Days Fighting	Arthur W. Page	Doubleday, Page & Co.	New York, N.Y.	1920.

ORGANIZATION

(1) Mimeograph on the 35th Division by Historical Branch, W.P.D. General Staff, U.S.A.

The 35th Division was organized at Camp Doniphan, Oklahoma late in September, 1917 from units of the National Guard of Missouri and Kansas.(1)

It is unlikely that any division organized during the World War could be said to be more typically American than this one, coming, as it did, largely from the medium sized towns of Kansas and Missouri. In many instances companies had been maintained in the college towns and their personnel largely recruited from these colleges.(2)

(2) Author's observation.

The infantry units were formed by consolidation of National Guard infantry regiments, most of which had back of them records extending over many years of meritorious service, both to their respective states and to the nation. A military unit, such as a regiment may be divided into two or more parts for the purpose of organizing additional regiments, and each part will take with it the spirit of the parent organization. But the consolidation of two old regiments, particularly in this emergency when the nation was in need of every military resource at its command, was, to the personnel of the units making up the division the initial "slap in the face". The necessity of creating an esprit de corps in these newly organized units will be apparent.(2)

Almost immediately following this consolidation was begun the "weeding out" process. Officers ranging in grade from lieutenant to colonel faced the "firing squad" known as the

"B Board". Other field officers were sent to a school from which many never returned. Thus, these citizen soldiers watched and wondered at the return to civil life of officers who had spent years of study that they might be prepared for such service as this. Many of these officers were known to have been successful to a marked degree in civil undertakings of no small magnitude. They were known to be men of character and sufficient qualities of leadership to maintain their various activities in addition to the organizations which largely made up the division. Naturally the many changes in commissioned personnel incident to this "weeding out" process was not conducive to upbuilding of morale within the units.(3)

(3)Author's observation.

T R A I N I N G.

Unfortunately for the division, its commander, Maj. Gen. Wm.M. Wright, and his chief of staff, Col. Robert McCleave, were in France during the early months of its training period. Both these officers were permanently taken from the division shortly after its arrival in France.(3)

General Wright's successor during his temporary absence in Europe, almost immediately following the organization of the division, was a typical example of the old time "hard boiled" school. He practiced and passed on to his subordinates the theory that discipline was best instilled by fear; that the officer who was thoroughly hated by his subordinates was on the high road to success. It is perhaps useless to record the pitiful failure of honest effort in some quarters to carry

out this theory.(4)

The division was given some six months training prior to its departure for France. Most of this training, in so far as the infantry was concerned, was devoted to close order drill and bayonet training.(4)

(4) Author's observation.

A trench area of sufficient magnitude to accommodate a regiment was constructed. Each regiment was trained at least once in occupation of a trench sector at night. Only a few maneuvers, including one at night, by units as large as a regiment were carried out.(4)

A target range was constructed and some time devoted to rifle marksmanship. No record is found of any training in musketry nor combat exercises.(4)

The division left Camp Doniphan the middle of April, 1918. The infantry reached Le Havre May 11. The artillery followed a month later, but did not join the division until the middle of August. Training continued in France until July 1st when the infantry took over their first sector from the French in the Vosges Mountains.(5)

(5) Heroes p 40.✓

The division remained in this area until August 31st, when it was started toward St Mihiel, where it was held in Army Reserve. The Vosges sector was known as a quiet area, and while several raids on both sides served to break the monotony, as compared to the Argonne operation which was to follow, it must be admitted the Vosges trenches were a veritable

(6)Heroes p 53.

rest area.(6)

September 21st the division reached the woods in the Auzeville area, some twenty kilometers in rear of the line then held by the French and from which it was to attack five days later. The artillery and animal transportation had marched from the St Mihiel area while the infantry moved by trucks. On this same day both infantry brigade commanders were relieved.

(7)Heroes p 66.

(7) In the Official Army Register for 1922, the following appears after the name of one of these Brigadier Generals.

"Distinguished grad.Army Sch.of the Line, 09. Grad.Army Staff Coll. 10. Army War Coll. 17." (8) The other Brigadier General relieved had served with distinction as a field officer in the 20th Kansas Volunteers during the Spanish American War, and has recently been appointed a Brigadier General, O.R.C.(9) Three infantry regimental commanders had been replaced within a week.(9)

(8)Official
Army Register,
1922. p 393,
McClure,Nathaniel
F.

(9) Author's
observation.

September 22d the artillery reached their positions and shortly after dark on September 25th the infantry began its march to the front line . The congestion on the road was such that the term "march" should not be used here. Infiltration would very accurately describe this move which brought the troops to the front line barely in time for the "jump off".(9)

S E P T E M B E R 26th.

(10) Report of
Commander in
Chief, A.E.F.
Nov. 20, 1918
p 16.

(11) Field Orders
No. 44, 35th Div.
24, Sept, 1918
5:00 P.M.

(12) Author's
observation.

The 35th Division, as the right element of the 1st Corps, attacked on the morning of September 26th with the 91st Division, 5th Corps, on its right and the 28th Division on its left. (10)(11)

Line of departure, Allied trenches, (6705) to (3800). The attack was made by the 69th Infantry Brigade with one battalion of the 70th Infantry Brigade and one company of 110th Engineers (to cut wires) attached. The attack order provided for one battery of light artillery to be attached to the "first line to be used as forward guns". (11) These guns did not materialize. (12) The plan provided that the attached battalion of the 70th Infantry Brigade would mop up Vauquois Hill and Bois du Rossierot, thereafter rejoining its brigade (the division reserve) which was to follow the leading brigade at not more than two kilometers. (11)

The Division Commander, in issuing his attack order on the afternoon of September 25th, ordered verbally that his Brigade, Regimental and Battalion Commanders LEAD the attack, explaining that he wanted them with the advanced elements of their respective commands. (12)

The attack was made at 5:30 A.M. preceded by a most effective artillery bombardment lasting three hours. At H hour, the artillery placed before the advancing infantry a rolling barrage which moved forward at the rate of 100 meters in four minutes. (11) The 3d Group, 317th Regiment and 219th R.A.C. (French Artillery) were attached and supported the attack. (11) The 344th Tank Battalion (less one company) had been assigned to the division

(13) Field Orders
No. 44, 35th Div.
24, Sept. 1918
5:00 P.M.

(14) Author's
observation.

(15) Statement
of Lt. Col. C. E.
Delaplane, Inf.

and throughout the entire engagement rendered valuable assistance.

(13)(14)(15) The 1st Aero Squadron was attached to the division for all aviation duties. The attack order provided that one plane be kept constantly over the division sector during day-light hours keeping in constant radio communication with the Division P.C. and the artillery battalion assigned for fugitive targets. (13)

The assault brigade was disposed as follows: - Regiments abreast, 138th Infantry on the right, 137th Infantry on the left: Regiments in column of battalions, one company, 129th Machine Gun Battalion attached to each regiment. The Brigade Reserve consisted of two battalions, one from each regiment, plus the 129th Machine Gun Battalion (less two companies). This left each regimental commander two battalions and two machine gun companies. (16) The brigade reserve was to follow the support battalions at about 700 meters. (16)

(16) Field Orders
No. 29, Hq. 69th
Inf. Brigade,
25, Sept. 1918
3:00 A.M.

(17) Von Giehl
Infantry Journal
August, 1921
p 133.

The division covered a front of something over three kilometers. A heavy fog, which did not lift until about 10:00 A.M. covered the area. (14)(17) Some confusion and intermingling of units resulted. (18) Both the Division and Brigade Reserve pushed forward on the heels of the support battalions of the assault regiments. (14) Some few casualties resulted in the reserve units from especially well concealed enemy machine gun nests which had not been located by assault units in the dense fog. (19) On the whole, prior to the lifting of the fog, the advance had been rapid and casualties comparatively light. (14)(15)(18)

(18) War Diary
140th Infantry.

(19) Heroes p 80.

(20) War Diary
140th Infantry.

(21) Author's
observation.

(22) Heroes p 79.

(23) Heroes p 79.

(24) Heroes p 80.

(25) War Diary
140th Infantry.

(26) Heroes p 74.

(27) Author's
observation.

(28) History A.E.F.
Shipley Thomas
p 246.

The first serious resistance was encountered about 11:00 A.M. when the line had reached a position before Cheppy and Varennes.(20)(21)(22)

On the right the 138th Infantry was held up by enemy machine gun fire before Cheppy, but with the assistance of six tanks from the 344th Tank Battalion, succeeded, shortly after noon, in overcoming the resistance, and by 1:00 P.M. were in possession of Cheppy.(20)(22) A portion of the 137th Infantry, part of the Brigade Reserve, had, during the fog, worked over into the zone of the 138th Infantry and assisted in the capture of Cheppy.(23) Even with the assistance of the tanks, casualties suffered by the 138th Infantry and the units of the 137th Infantry in capture of Cheppy had been heavy.(24) The 138th Infantry pushed on through Very under heavy artillery and machine gun fire and at about 4:00 P.M. dug in for the night about one kilometer north of Very.(24)(25)

On the left, as the assault battalion of the 137th Infantry approached Varennes, it was stopped by heavy enemy machine gun fire from buildings in that village, which enfiladed its lines.

(26)(27) The division on the left had not yet taken Varennes.

(27)(28) Individual soldiers crept into the town and with grenades stopped the machine gun fire and captured a considerable number of prisoners.(27) That part of the town lying east of the Aire River was captured about noon.(26) Immediately north of Varennes and on the east side of the Aire River is a horseshoe shaped hill,

wooded and rising abruptly some fifty meters. This hill was studded with enemy machine gun nests and artillery.(29)

(29) Author's observation.

Although several machine gun nests and enemy artillery positions had been located on this "Horseshoe" immediately north of Varennes, artillery fire on these positions was requested, but unfortunately, due to conditions of roads and terrain, the artillery had been unable to advance, and no assistance could be given.(30) Tanks came forward and rendered valuable assistance in cleaning machine gun nests out of low ground about Varennes.(30)(29)

(30)Heroes p 74.

About this time, the Commanding Officer, 139th Infantry (left regiment of the Division Reserve) pushed his regiment forward past the command post of the 137th Infantry and took up a position in the vicinity of the junction of Route Nationale No.46 with the Varennes - Cheppy road and thus placed it approximately between the two assault regiments. This move was made shortly after noon.(29)(30)

(31) Message from Capt.Hudson, 137th Inf.,dated Sept.26,1918 from Heights north of Varennes.

It was not until nearly 4:00 P.M. that the 137th Infantry, advancing in the face of terrific direct fire from machine guns and artillery fire from concrete "pill boxes" and prepared positions succeeded in taking this "Horseshoe Hill".(31)

After the fog of the morning, the enemy, from Hill 263, had

(32)History A.E.F. Shipley Thomas p 246.

used his artillery most effectively on our advancing lines.(32) This hill, in the sector of the division on the left, was not taken until late in the afternoon. The first assaulting waves

(33)History A.E.F. had been practically wiped out.(33) The support battalion, Shipley Thomas p 246. by 4:00 P.M. had become intermingled with the assault

(34) Message from Capt.Hudson, 137th Inf.,dated Sept.26,1918 from Heights north of Varennes. battalion. (34)

About 3:15 P.M. the Commanding Officer, 139th Infantry, seeing the 137th Infantry held up in the low ground before "Horseshoe Hill", advanced along the ridge northeast of Route

(35)Heroes p 77. Nationale No.46 to a position about two kilometers south of

(36)Message from Commanding Officer 139th Infantry dated 7:00 A.M. Sept.27,1918. Charpentry, where the regiment was forced by enemy machine gun and artillery fire from both front and left flank to "dig in". (35)(36)

(37) Author's observation.

On reaching and capturing the high ground north of the "Horseshoe", and observing elements of the 139th Infantry to its right front, the 137th Infantry (less 1st Battalion in Brigade Reserve) reorganized and advanced a short distance north, connecting with the 139th Infantry to its right front.

(37)

Three miles had been the net advance for the day. At Boureilles, Vauquois Hill, Cheppy, Varennes, Very and "Horseshoe Hill" guns, supplies and prisoners were taken.(38)

(38)Heroes p 82.

Prisoners taken were of the 15th Landstrum Battalion and the First Guard Division.(38) Von Giehl, in his Battle of the Meuse Argonné says:- "Their blow (speaking of the Americans) fell chiefly on the First Guards Division, whose position lay east of the Argonne. The 77th and 28th American Divisions in the Argonne did not make a serious attack, and on the day of

the attack, won only an insignificant amount of terrain, which was, for the most part voluntarily ceded by the 2d Landwehr Division. The left flank of the First Guards Division was at first quickly flattened out and the entire division then forced back against the eastern edge of the Argonne. Varennes and Cheppy were lost. During the evening, the enemy pushed through as far as Baulny but was driven out by the 4th Guards Regiment. Eighteen tanks, disabled by fire, remained stranded near Charpentry alone. In the evening the 1st Guards Division, which had suffered extremely heavily, held the line running approximately through Argonne-Charpentry-Epinonville!(39)

(39) Von Giehl
Infantry Journal
August 1921
pp 133, 134.

Page, in Our 110 Days Fighting, states the First Guards Division was the only first class German division in the line on September 26th.(40)

(40) Our 110
Days Fighting
Page
p 90.

Unfortunately, no record of losses by days is available. That losses after the fog raised were extremely heavy in the assault regiments would be evident to any one familiar with the terrain covered and the fighting accomplishments of the 1st German Guards Division. The machine gunners of the 1st Guards Division had a habit of holding their machine gun nests until our scouts were nearly upon them. Then one of the crew would crawl out, put up his hands and --"Kamerad". Thereupon our men would rise and advance. The "Kamerad" boche would then duck back into his pill box and his teammates would again open up on the advancing line. It took our men quite a while to

realize this scheme of things. It was very effective during most of the day. Finally, of course, all of these machine gun crews were captured. The enemy's defensive tactics was the subject of conferences that night in various shell holes and it is a curious fact that after the first day, few prisoners could be seen going toward the rear.(41) Von Giehl says:-

"The 1st Guards Division suffered extremely heavily."(42)

(41) Author's observation.

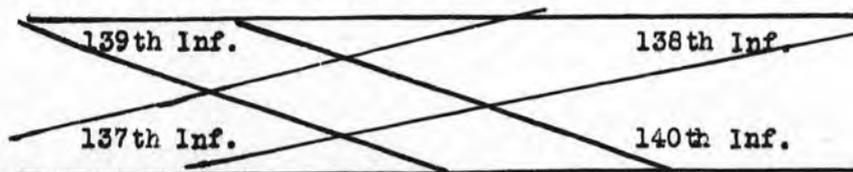
(42) Von Giehl
Infantry Journal
August 1921
p 134.

Beyond the excellent barrage preceding and during the initial stage of the attack, the artillery had been unable to assist in the days work.(43) This was due to the blowing up of the roads by the enemy's mines, the condition of the terrain and the very weakened condition of the animals, of which the division was short some fifteen hundred.(44)

(43) Heroes p 91

(44) Report of
Lt.Col.R.G.Peck,
Inspector, 1st
Army Corps dated
Oct.12,1918.

The Infantry brigades found themselves at the end of the day in a sort of diagonal formation, thus:-



The 138th Infantry had lost its commanding officer as a result of machine gun wound. The 138th Infantry and the 139th Infantry had each lost one major killed. One of the majors of the 137th Infantry had been seriously wounded by a sniper.(45) The 140th Infantry appears to have kept in the relative position assigned it and to have suffered no casualties on this first day.(46)

(45) Author's observation.

(46) War Diary
140th Infantry.

S E P T E M B E R 27th.

(47)Heroes p 83.

After consultation with his artillery brigade commander, and upon the latter's representation that no effective artillery support could be given earlier than 8:30 A.M. the 27th, the Division Commander ordered an attack to begin at that hour.(47) Later during the night 26-27, orders from the 1st Army Corps directed the attack be launched at 5:30 A.M. This necessitated a change in the Division Commander's plan and communication of information as to such changes to all concerned without delay.(47)

-

The new plan included a passage of lines by the 140th Infantry through the 138th Infantry, placing the 70th Infantry Brigade in the front line with two battalions of each regiment in assault echelon.(48)

(48)Heroes p 84.

The order was not received by the 140th Infantry until a half hour before the attack was scheduled. (49) At least one of the infantry regiments did not receive the attack order until after 6:00 A.M. and that consisted of a message directing the attack at 6:30 A.M. and prescribing a combat liaison group of two companies with two platoons of machine guns to connect with the division on the left.(50) This was twice the size of the connecting group used the preceeding day, and would indicate the gap between the two divisions was somewhat greater than had been anticipated, and than could be covered by the original group. (51)

(49)War Diary
140th Infantry.

(50)Message from
C.O.69th Inf.Brig.
to C.O.137th Inf.
dated 6:15 A.M.
27 Sept.1918.

(51)Author's
observation.

(52) War Diary
140th Infantry.

The artillery barrage, as was known would be the case, failed to materialize.(52)

But little progress was made. Several messages asking for artillery support were answered by the Brigade Commander, 70th Infantry Brigade at 10:35, 10:40 and 11:32 A.M. saying he was attempting to get artillery support from the battery west of Cheppy. At 1:50 P.M. the Brigade Commander sent word that the Division Commander had taken up the matter of artillery support and that it could be promised within a short time.(53)(54)

Some tanks came forward and a second attempt realized a slight advance. However, artillery fire was so severe that the tanks withdrew and the infantry, facing a thick wire entanglement and under a storm of machine gun and artillery fire from front and flanks were compelled to take advantage of such cover as the shell holes afforded.(55)

Another order to attack at 5:30 P.M.(55) was received shortly after 5:00 P.M. It was directed in this division order that the attack would follow a barrage moving one hundred meters in four minutes. The artillery fire was negligible.(56)(57)

Despite the inability of the artillery to plow its way through the hub-deep mud to a position in support, the infantry, after its check of the morning, and after withstanding several counter-attacks by the 4th Guards and 20th Infantry Regiments,(58)(59) advanced with the assistance of the tanks, captured Charpentry, Baulny and the high ground north of that village.

It was getting dusk as the 139th Infantry approached Charpentry, which it succeeded in taking before dark. The

(53)War Diary
140th Infantry.

(54)Heroes
pp 85 and 86.

(55)Heroes p 86.

(56)Heroes p 91

(57)Author's
observation.

(58)Von Giehl
Infantry Journal
August 1921
p 134.

(59) Final Report
Gen. John J.
Pershing.
p 46.

137th Infantry, finding the 139th Infantry occupied with Charpentry and a considerable gap left open to its immediate front, advanced on toward Baulny, captured it and occupied the heights about five hundred yards northwest where it reorganized and dug in about midnight. (60) Two companies of machine gun troops belonging to the 139th Infantry, lost from their regiment during the night's advance, reported and were placed on either flank of the assault battalion of the 137th Infantry.

(60) Author's observation.

(60)

On the right, the 140th Infantry had reached a position (3472) to (4274). (61)

(61) War Diary
140th Infantry.

Night found the division two and one half kilometers nearer Germany. The total gain for the two days being seven and one half kilometers. (62)

(62) Heroes p 90.

Again no record of the day's casualties is available. The Executive Officer, 69th Infantry Brigade was killed. One battalion commander and the adjutant, 139th Infantry had become casualties. The Lieutenant Colonel, 137th Infantry had been evacuated early in the morning. The Colonel, 137th Infantry a man well advanced in years, was unable, from exhaustion, to advance with his regiment. The second battalion commander, 137th Infantry was wounded and evacuated. Both the Commanding Officer 137th Infantry and the Commanding Officer 139th Infantry, in their zeal to carry out the Division Commander's verbal orders to LEAD, became separated from their commands during the advance in the late evening, and in case of the Commanding Officer,

(63)Heroes
pp 89 and 90.

139th Infantry, did not return until the 29th of September.(63)

It is surprising to note that during the day the heaviest casualties were suffered by the units of the reserve brigade.

Both these regiments, lying on the high ground north of Cheppy and Varennes with little or no protection, suffered heavily

(64)Heroes p 91.

from enemy artillery fire from front and flank. (64)

The enemy had found it necessary to push in another of his

(65)Von Giehrl
Infantry Journal
August 1921
p 134.

first class divisions, the 5th Guards Division.(65)

The 35th was shooting up one division a day of the enemy's best divisions, entrenched in the elaborate defenses of the Hindenburg line, with their wire entanglements and concrete "pill boxes". But more destructive than all else combined, was the incessant high explosive enfilading artillery fire from the left flank across the river.(66)

(66)Author's
observation.

Von Giehrl says:- "The enemy infantry suffered particularly from the flanking fire of thirteen German field batteries which from their position on the eastern edge of the Argonne, constantly held up the advance. The main attack, supported by tanks was launched on both sides of the valley of the Aire against Montblainville and Charpentry."(65)

S E P T E M B E R 28th.

At 3:30 A.M. September 28 the 140th Infantry received orders to push forward and protect the right flank of troops on their left. The advance was begun at 5:30 as ordered and continued until 8:00 A.M. when machine gun fire from the direction of Apremont, Exermont and Les Fontaine temporarily halted the progress.(67) At 9:45 A.M., preceded at 150 meters by the tanks, a second attack was made in the face of terrific machine gun and artillery fire. The 140th Infantry paid heavily for the ground gained but succeeded in reaching the crest of hill east of Montrebeau Woods at (2996) and held this position during the remainder of the day.(68)

(67)War Diary
140th Infantry.

(68)War Diary
140th Infantry.

(69)Heroes p 92.

(70)Final Report
Gen. John J. Pershing position held by the 137th Infantry and 139th Infantry.(69)
p 46

(71)History A.E.F.
Shipley Thomas
p 253.

(72)Heroes p 93.

(73)Author's
observation.

(74)Verbal reports
of officers with
pursuit at time.

On the left of the line, preceded by a heavy preparatory concentration, the Germans at 6:30 A.M. counterattacked the position held by the 137th Infantry and 139th Infantry.(69)
(70)(71) This was the hour set for the advance of these regiments on this date.(72) The counterattack was successfully repulsed and in the instant pursuit of the enemy, disorganization, already considerable as a result of the previous night's advance, became much greater.(73) It will be noted, however, that while this pursuit resulted in further disorganization of elements of the 35th Division, it also resulted in the complete annihilation of the enemy's counterattacking party.(73)(74)

As the advance continued across the L'Esperance-Chaudron

Farm Road, through the open fields, sloping up to the north and Montrebeau Woods, it was again met with a torrential downpour of enemy machine gun and artillery fire from the direction of Exermont and from the thirteen German field batteries located in the eastern edge of the Argonne.(75)

(75) Von Giehl
Infantry Journal
August 1921
p 135.

From the shelter of Montrebeau Woods, the enemy machine gunners, confident in the advantage of their positions, seemingly covered every foot of space over which our troops must pass.(76) In their stand in Montrebeau Woods, the

(76) Heroes p 94.

enemy made use of defensive tactics similar to those of the early day American Indian. They were behind trees, and in

(77) Heroes p 97.

small ravines. Their pill boxes were in clusters. (77) Our men were able to force them out only by crawling up on them and using grenades and rifles.(77) By evening the woods and heights of Montrebeau had been taken.(78)

(78) Von Giehl
Infantry Journal
August 1921
p 135.

Von Giehl says in his Battle of the Meuse Argonne, describing September 28th: "The American losses were heavier on this day, but the German troops had also suffered severely.

(79) Von Giehl
Infantry Journal
August 1921
p 136.

In the 5th German Division the battalions mustered no more than 50 to 60 men, and the total effectives of the 1st Guards Regiment amounted to scarcely more than 300 men. The 52d Division, however, had not yet taken up its position."(79)

(80) Author's
observation.

As a matter of fact the condition of the infantry of the

(81) Statement of
Lt. Col. C. E. Dela-
plane, Inf. to
author in March
1923.

35th Division on the night of September 28th did not differ greatly from that of the enemy as described by Von Giehl.

(80)(81)

At 3:25 P.M. a reorganization, or rather a reassignment had taken place.(82) It will be remembered that late in the evening of the 27th, the 137th Infantry (then left regiment of reserve brigade) had been obliged to fill a gap in the front line on the extreme left of the division. During the 28th the 138th Infantry had pushed in on the right of the 140th Infantry.(83) Thus the order of battle on the afternoon of the 28th was, right to left:- 138th Infantry (69th Brigade), 140th Infantry (70th Brigade), 139th Infantry (70th Brigade), 137th Infantry (69th Brigade). The Commanding Officer, 69th Infantry Brigade was given the left of the line, while the Commanding Officer, 70th Infantry Brigade was given the right of the line.(83)

The Colonel, 137th Infantry, who from fatigue had been unable to advance the night of the 27th, had pushed forward early in the day and again taken over command of his regiment. The major who had been in command during the greater part of his absence was evacuated. The Lieutenant Colonel of the 138th Infantry, who had been in command since September 26th, when his Colonel was wounded, was killed. The Colonel of the 139th Infantry who had become lost the night of the 27th-28th was still absent. Another colonel, assigned prior to the battle, as a result of removal of brigade commanders at that time, late in reporting, reached Charpentry during the late evening seeking the Commanding Officer, 69th Infantry Brigade, but failed to

(84)Heroes p 98. find him during the night. (84) Excepting the 140th Infantry, commanders had changed so rapidly that, while the units were accustomed to frequent changes to meet the vagaries of those in authority, it was difficult to know who and where the various unit commanders were.(84) It later developed that the Division Chief of Staff and his assistant, G. 2 had been relieved about this time. (85)

(85)Statement of
Maj.Bruce
Magruder, Inf.
to author in
March, 1923.

The Division Commander had made long tours of personal reconnaissance which, under the conditions existing, enabled him to keep well informed on the progress of such small units as he could reach, but naturally prevented any control on his part of his command. (86)

(86)Heroes p 101.

More of the artillery had succeeded in getting forward. One battery of the 129th Field Artillery was near Cheppy, another of the 128th Field Artillery was west of Very. The

(87)Heroes p 93. - 130th Field Artillery (155 mm) was in place at Varennes.(87)

(88)Heroes p 97.

A steady pour of rain had set in at 5:00 P.M.(88) The aid stations of the 137th Infantry, established in German trenches north of Baulny, were literally packed with wounded.

(89)Author's
observation.

It became necessary to lift these wounded men out of the trenches to prevent their drowning, which again exposed them to severe machine gun and artillery fire. This condition was reported to the Division Commander who immediately ordered evacuation of these men.(89)

S E P T E M B E R 29th.

Orders for renewal of the attack at 5:30 A.M. had been issued during the night September 28-29. These orders reached the 140th Infantry at 5:25 A.M.(90) The 138th Infantry was to pass through the 140th Infantry and continue the attack to Exermont.(91) The 138th Infantry did not receive its attack order until 6:45 A.M.(92) The Commanding Officer, 140th Infantry ordered formations in column of battalions with staggered columns, scouts and connecting files to be in front of leading battalion. While the formation was being taken up, peremptory orders were received from the Commanding Officer, left brigade and the officer lately relieved as chief of staff of the division, to advance. At this time the Commanding Officer, 140th Infantry informed his brigade commander (right brigade) that the 138th Infantry was approaching and requested instructions as to whether to proceed as ordered by the Commanding Officer left brigade and the former chief of staff, or allow the 138th Infantry to follow out the division order, and make the attack. The reply was to go ahead. Before deployment of the leading battalion could be accomplished the Commanding Officer, left brigade, or the former chief of staff, ordered the battalion commander to advance without further delay which he did in column.(93) Troops of the 91st Division on the right stated at 9:40 A.M. they had no orders to advance.(94)

(90)War Diary
140th Infantry.

(91)Field Orders
No.48,35th Div.

(92)Message R.I.O.
138th Inf.dated
9:00 A.M.29th
Sept. 1918.

(93)War Diary
140th Infantry.

(94)Message from
C.O.70th Inf.Brig.
9:40 A.M.29th
Sept.1918

The advance, which was made under heavy artillery fire from three directions and machine gun fire from ravines and woods, continued to Exermont where the remnants of the 2d and 3d Battalions, 140th Infantry were consolidated at 9:40 A.M.

(95)War Diary
140th Infantry.

(95) Our troops were to the west but owing to the severity of the action no contact was made. Part of a battalion of the 139th Infantry reached Exermont at 10:00 A.M. and extended the line to the east. This position was maintained under increasingly heavy fire until 1:00 P.M. when an order from the Brigade Commander directed withdrawal.(95) Information was received that a position running northeast from Baulny to Eclisfontaine-Apremont road, to the south and east of Chaudron Farm,was being prepared by the engineers and it was to this line they were ordered to retire. The position was maintained during the remainder of the day. (95)

(96)Operations
report 137th
Infantry.

On the left of the line the Commanding Officer, 137th Infantry received the attack order at 4:20 A.M. (96) Finding many troops of the 139th Infantry intermingled with those of the 137th Infantry, they were formed up together as effectively as was possible in the darkness of Montrebeau Woods.(97)

(97)Heroes p 103

There was no evidence of the promised artillery barrage at 5:30. "The barrage ordered by the division order for this attack appears to have been fired by the 2d Battalion of the 128th Field Artillery precisely at the hour ordered. The barrage started on X coordinate 80.6 and between Y co-

(98) Col. Conrad H. Lanza, F.A. in paper on "The 35th Division on September 29th, 1918."

ordinates 01.5 and 03.0, giving a frontage of 500 meters for each battery.(98)

The advance under heavy fire continued to a point north of Montrebeau Woods overlooking Exermont, where enfilade machine gun fire forced the detachment into cover of a

(99) Heroes p 105.

ravine leading out of Exermont toward the west.(99) Finding his detachment isolated and suffering increasingly heavy casualties, the detachment commander ordered his men to fall back on Montrebeau Woods. An enemy counterattack against Montrebeau Woods was repulsed during the morning. Early in the afternoon a second enemy counterattack in greater strength was launched. With the assistance of the Division Artillery, this second counterattack was beaten off by the remnants still holding Montrebeau Woods. The enemy counterattack from the east had been more successful in that they succeeded in taking

(100) Heroes p 109.

a number of prisoners. Increasing enemy forces appeared in the east.(100) A message from the Brigade Commander directed that the 137th and 139th Infantry fall back on the position being prepared by the engineers on Baulny Ridge.(101)

(101) Heroes p 110.

The 110th Engineer Regiment which, since September 28th had constituted the Division Reserve, worked in the open and under heavy fire prepared a temporary defensive position.(102)

(102) Heroes p 111.

At 12:30 P.M. our artillery had put a barrage on a German counterattack threatening the detachment of the 139th Infantry still holding Exermont. Shortly after this, seeing

(103)Heroes
p 112.

enemy troops in increasing numbers forming to his front and flanks, the officer in command requested reinforcements, but was directed to fall back to the line being prepared.(103) As evening drew on it found the division entrenching along the heights of Baulny Ridge, with small groups still holding Montrebeau Woods.

Let us examine matters from the standpoint of the "Higher Command" that we may get an idea of what was going on and what was its effect upon the infantry soldier in the Exermont neighborhood. "After the battle of September 26th, and attempts to advance on the two succeeding days, which met with but little success, the First Army, at 11:50 P.M. September 28th, issued Field Orders No.27, directing the continuance of the attack by the 111d, Vth and 1st Corps, to be made at hours to be designated by corps commanders, but not to be later than 7:00 A.M. on the 29th. The 1st Corps, in which was the 35th Division, was given the mission to drive the enemy through an east and west line through Apremont. The Army artillery was ordered not to fire south of a line through Dun-sur-Meuse; Bantheville; and Landres-et-St. Georges, except after agreement with corps commanders."

"This army field order was based on information partly from corps and divisions as to the positions of front lines, which information was in part incorrect, and resulted in an erroneous estimate of the situation. It appears to have been the intention to pursue, not to attack, and the pro-

hibition as to the use of the artillery was intended to facilitate the infantry advance by not requiring it to be confined by slow accompanying fires of heavy artillery, leaving necessary artillery support to the corps and divisions. This seems to have been a serious tactical error, as will appear later, explained by accepting as true an incorrect idea that the Germans were retreating."

"That the troops of the 35th Division, in their attack of this date on Exermont, would be exposed to destructive frontal and enfilading fire from the German lines, had been foreseen at Army Artillery Headquarters before the campaign started on September 26th. On the 23d instant a letter of instructions had been sent to the Railway Brigade, directing preparation of fire for use at the proper time, on German positions facing Exermont, and particularly Hill 180, and adjacent heights, which, as long as they remained in hostile hands would permit enfilading fire being brought on American troops east of the Aire River."

"At 1:30 A.M. September 29th Colonels Ward and Watkins, Corps of Engineers, on duty with G3 of the First Army, visited First Army Artillery Headquarters to discuss the necessity of destroying enemy observation stations. These two officers stated that the Commander in Chief had verbally directed the Corps to attack on September 29th without regard to objectives, but that G3 of the First Army had required in the written order

issued, that the 1st Corps attack the Foret d'Argonne, to include the Bois de Chatel. These officers stated that our losses on September 28th from hostile shell fire were over 5000 and that it was imperative to have more artillery assistance."

"Acting upon the message received above, the First Army Artillery at 1:40 A.M. and 1:55 A.M., notified by telephone the Chiefs of artillery of the Vth and 1st Corps to make arrangements for army artillery assistance for attack that same morning, which could not be given them under the written field orders issued unless their corps requested it. The chief of artillery, 1st Corps, replied that he knew nothing of the proposed attack but would start on the work required."

"At 11:00 P.M. on the 28th of September, the 1st Army Corps issued their Field Orders No.60, directing all divisions to advance at 5:30 A.M. on September 29th. Nothing is said as to objectives and in this respect the order corresponds to the verbal directions attributed to the Commander in Chief by Colonels Ward and Watkins. This same order directs the division artillery to support the infantry advance and specifies that two guns will accompany each leading infantry battalion. The corps artillery is directed to concentrate on hostile batteries, and later to advance by echelon. It should be noted that the advance ordered in the corps field order does not correspond with the attack specified in the army field order, which was issued apparently later than the corps order."

"In all, the army had about 95 heavy guns available to support the attack in the general sector of the 35th Division. Due to Army Field Order, they could not be used unless specifically asked for by the corps. The Army chief of artillery offered their use to the corps chief of artillery. There is no record of any request for the use of this artillery being received from the corps until late on the afternoon of the 29th. The battle was fought without the aid of this artillery, due apparently to mistaken belief at army headquarters that its use was not needed." (104)

The day had proven most disastrous. Von Gehrl says:-
"The main blow of the Americans was this time directed at Exermont and the Valley of the Gesnes, running thence eastward. At 10:00 A.M. the enemy, assisted by tanks, had broken through at Exermont and beyond, but was flung back again on to and past Exermont by the entrance into the struggle of the regiments of the 52d Division. The German counterattack was then pushed forward up to Esperance Farm and Montrebeau Woods, and Tronsol Farm was retaken. This attack of the 52d Division, supported on its right and left by the remainder of the Guards Divisions, temporarily, but seriously, shook the American front, until the German attack was stopped by the bringing up of strong American reserves, together with fighting and bombing squadrons. The 28th and 35th American Divisions bore the brunt of the fighting here and suffered exceedingly heavy losses, partly due to flanking fire from artillery in the Argonne (105)

(104) Col. Conrad H. Lanza, F.A. in paper on "The 35th Division on September 29th, 1918."

(105) Von Gehrl
Infantry Journal
August 1921
p 135.

"The orders of the division commander to send forward 75mm guns, and corps orders directing that two guns accompany each leading infantry battalion, were not carried out."(106) "The Germans used accompanying guns on this date as on other occasions with infantry on the defensive. The guns were placed in line previous to the fight, no attempt was made to move them thereafter; and if the attack against them succeeded, they were abandoned. This is quite different from placing them in the attack to advance against similar concealed guns supported by the infantry and machine guns."(106)

(106) Col. Conrad H. Lanza, F.A. in paper on "The 35th Division on September 29th, 1918."

"It would appear from the records of messages sent within the 35th Division that the relations between the division commander and the commanding general of his artillery brigade were of a formal and unsatisfactory nature, and that written communications were exchanged between officers at the same place when apparently verbal conversations would have secured better results, had the officers been on good terms with ^{each other} ~~one another~~."(106)

"In addition to the above correspondence between the division commander and his artillery brigade commander, the division commander appears to have made a report, not found on file, to the corps commander, to which the corps commander replied at 8:40 A.M. on the 29th of September: 'If your artillery brigade commander is not giving full support and is not to you a satisfactory and loyal commander, you are authorized to relieve him.' An examination of the files of the 35th Division for the 29th

(107) Col. Conrad H.
Lanza, F.A. in
paper on "The
35th Division on
September 29th,
1918."

of September does not show any further communications between
the division commander and the artillery commander until 12:00
noon, on the 29th of September, which message is given below.
Apparently confidence between the division commander and his
field artillery commander did not exist, and naturally liaison
was bad."(107) (Note) Message referred to is not available.

S E P T E M B E R 30th.

The flanking fire of the preceeding days was less severe.

(108)Heroes p 114.

Units on the flanks now occupied Apremont and Eclistontaine.(108)

(109)Heroes p 115. The 138th Infantry reported a total strength of 853 men.(109)

The 129th Machine Gun Battalion reported about 150 men and 19

(110)Heroes p 116. guns.(110) Detachments were still holding out in Montrebeau

(111)Heroes p 119. Woods and Chaudron Farm, covering evacuation of the wounded.(111)

Two counterattacks were repulsed without loss of ground

(112) Our Greatest during the day.(112)"A battalion of the 82d Division brought up Battles.

Palmer p 192. to renew the attack on the 30th met a killing barrage which

(113) Our Greatest warned commanders that advancing one fresh battalion was only Battles.

Palmer p 191. throwing more cannon fodder into the ravine." (113)

Late in the afternoon of September 30th orders were re-

ceived that the division was to be relieved the night of Sept-

(114)Heroes pp 119 and 120.

ember 30th- October 1st by the 1st Division, the artillery remaining until the 2d of October and the Sanitary Train two days longer. (114)

The division had advanced twelve and one half kilometers.

(115) American Army in the World War. Browne - p 143.

(115) Its casualties during the battle amounted to thirty-three and 77/100 per cent of its strength. But two American divisions engaged in this battle suffered casualties so heavy,

(116)Our 110 Days Fighting Page - p 275.

and one of these, after being withdrawn, was again sent into the battle.(116)

ANALYSIS AND CRITICISM

The methods of instilling discipline by means of fear and hate, as employed during the early part of the training period may have their place. Certainly they are not effective in handling intelligent young Americans of the anti-conscientious-objector type in time of war. Their respect must be gained by a demonstrated knowledge of the military profession and ability to lead them. Shortcomings cannot be concealed by bluff and bluster. The young men who will make up our future armies, though lacking, as did the 35th Division, much that might be desired in military training, will be men who live under the competitive system -- they are keen observers, judges of men, and they will recognize the bluffer the minute he is so unfortunate as to appear among them, while they will follow the real leader unhesitatingly.

The all too frequent changes, particularly immediately preceding a major engagement, in officers commanding higher units - brigades and regiments - does not tend to increase the efficiency of the force as a whole. The command of two infantry brigades and three infantry regiments was changed within a week preceding the battle. Without exception, the officers relieved had been subject to observation by the Division Commander several months prior to their relief, and if their relief was justified, certainly there is no justification in putting it off until this late date.

The same is true of the general staff officers of the division, two of whom were relieved during the battle.

Further it appears the relief of the artillery brigade commander was contemplated during the battle, due to lack of cooperation with, and loyalty to the division commander. Picture the Division Commander, in the midst of battle, on official terms with his artillery commander, obliged to communicate his wishes in writing and to add the word "imperatively" to his instructions. It was the duty of this artillery commander to render full and complete obedience to, and cooperation with the plans of the Division Commander. In the face of this situation, the Division Commander, feeling as he did, should not have hesitated. He did go so far as to ask permission to relieve his artillery commander, but, having obtained it, did not act.

The Division Commander's verbal order, prior to the battle, that his unit commanders LEAD - that they accompany the advanced elements of their respective commands, made of them squad and platoon commanders, and in some instances, scouts within the enemy's lines, rather than brigade and regimental commanders.

The requirement in the division's initial attack order that the division reserve follow the assault units at not more than two kilometers, should have specified that it follow at not less than one kilometer, thus conserving man power ~~and~~

and really conforming to the principle of formation in depth. Had this provision been included, one of the most disastrous blunders of the engagement, and a large per centage of the losses would have been avoided.

The action of the Commanding Officer of a regiment of the division reserve in committing his command to the engagement without cause, without permission or knowledge of either his Brigade or Division Commander, proves the grave responsibility which our nation assumes when it entrusts the lives of a war strength regiment to an individual, no matter how brilliant or gifted, but whose education in matters military, is limited to a three months course at a training camp. An appreciable number of the casualties in the 139th Infantry on September 26th must be charged to lack of judgment on the part of its commander. The individual should not be criticised, but rather the policy requiring him to accept such a responsibility without preparation. Doubtless this temporary officer, a lawyer by profession, handled this tactical situation as well as a similarly important legal question would be handled by a professional army officer in practice before the supreme court.

It is difficult to conceive what line of reasoning would permit a brigade of infantry, in division reserve, to lie unprotected all day September 27th under heavy shell fire, suffering casualties even greater than the assault brigade, when a sheltered position, occupation of which would have saved

a very large per cent of these casualties, was available. It would seem that the whole theory of the engagement was attack - advance, without regard to losses. This is borne out in the corps attack order for the morning of September 27th when a renewal of the attack was ordered without artillery support. The most charitable construction possible in this instance is the assumption that the corps was ignorant of the situation with respect to the division artillery. This conclusion must carry with it the admission that the corps 'information of our own troops' was at least incomplete, and that possibly a breakdown in liaison in other units than the 35th Division was responsible.

This lack of information both of our own troops and the enemy is admitted by the former chief of staff of our 1st Army to Col. Conrad H. Lanza, Field Artillery, in a statement made in October, 1919, discussing the 1st Army's order for employment of its artillery on the 29th, when this weapon was used to fire on a position seven kilometers north of the position held by the infantry. As late as 1:55 A.M. September 29th, the chief of artillery of the corps stated he knew nothing of the proposed attack for the following morning.

There was a complete breakdown in liaison within the division after the second day. The only explanation is lack of training in this phase.

No opportunity for reorganization was afforded.

Insufficient, at times, no reserve was held out by higher commanders. The critical moment found the Division Commander with his engineer regiment the only troops with which to influence the engagement.

The artillery was unable to advance rapidly due to the shortage of animals and poor condition of the few they had. Colonel Conrad H. Lanza, F.A., U.S.A. says:- "Five hundred meters is too extensive a front for a battery to cover in barrage. It is about four times that allowed for in operations controlled by the 1st Army Artillery. The barrage ordered for the attack of the morning of September 29th was placed 1000 meters north of the starting point of our infantry, and as shown later was beyond the German positions which were actually attacked. An investigation of the attempted use of 75 mm horse artillery ~~was~~ accompanying guns in our 1st Army showed that of the 143 attempts made, in not one single instance had the guns ever accompanied infantry in such a manner as to enable them to fire and assist the infantry during the advance."

L E S S O N S

One of the most important essentials to the success of any military commander is a thorough knowledge of the human element, and the ability to so handle and conserve that most important portion of the fighting machine as to realize the maximum from it. I refer to the policy of a temporary commander of the division during a considerable portion of its training period, and to the continuous changes in officers commanding larger units.

The importance of personal reconnaissance preceding the initial attack. I refer to the advance of the division to the assault line the night preceding the attack, and although the division had been in camp some twenty kilometers from this line several days prior to the attack, only a very few of even the field officers were afforded an opportunity for reconnaissance.

It is impracticable to continue an attack against strong opposition for periods greater than forty-eight hours without an opportunity for reorganization. I refer to the repeated orders:- "The attack will be renewed." Some one should have known that much better results could have been obtained had an opportunity been given for reorganization.

The failure to observe the principle of formation in depth is well illustrated in the heavy casualties result-

ing from crowding of the reserve upon the assault units and later in the lack of penetrating force due to intermingling of reserve units with assault units.

The effectiveness of flanking fire is forcibly illustrated in the results obtained by the thirteen German batteries firing from concealed positions in the Argonne Forest on the left flank of the division, and later by enfilading machine gun fire of the enemy in the vicinity of Exermont.

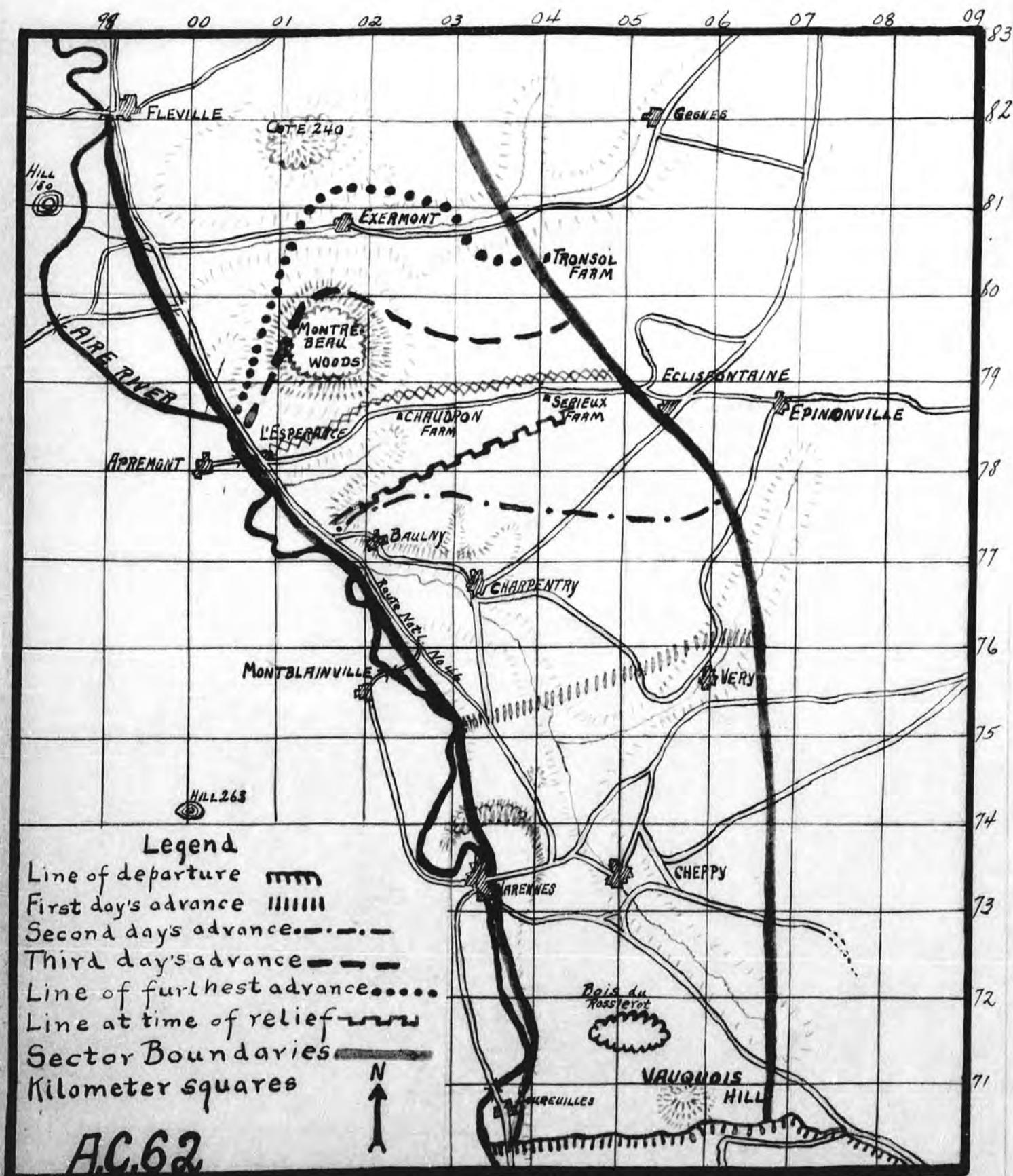
Premature employment of the reserve is brought out in the action of a regimental commander in committing his command to the action during the first day.

The difficulty of exercising control of units, particularly as large as regiments and brigades, from positions in advance of such units. I refer to the Division Commander's verbal order that his higher unit commanders accompany their leading elements.

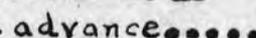
The importance of liaison, and the difficulty of maintaining it in a severe action, cannot be overestimated.

The cost of attacking prepared positions, stubbornly held by an enemy well equipped with artillery and machine guns, without effective artillery support.

Difficulty of neutralizing artillery fire from concealed positions without cooperation from the air service.



Legend

- Line of departure 
- First day's advance 
- Second day's advance 
- Third day's advance 
- Line of furthest advance 
- Line at time of relief 
- Sector Boundaries 
- Kilometer squares 

A.C.62