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THE RELATIONSHIP OF BATTLE DAMAGE TO UNIT COMBAT PERFORMANCE

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Leonard Wainstein

April 1986

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TO UNIT COMBAT PERFORMANCE**

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INSTITUTE FOR DEFENSE ANALYSES

IDA Independent Research Program

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PREFACE

This study was conducted as part of the Independent Research Program of the Institute for Defense Analyses, under which significant issues of general interest to the defense research community are investigated.



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SUMMARY

The purpose of this study is to investigate the historical basis for the assumption that a military formation will cease to be effective after having lost a certain pre-ordained percentage of its strength. Battles from the First World War to the 1982 Falklands War have been reviewed for insight into the validity of this assumption. The battle cases cited run from army level to battalion level, from single day engagements to those lasting several months.

The title of this study was deliberately chosen to avoid use of the terms "casualties" and "unit effectiveness." The historical examples discussed should make the reason obvious. The word "casualties" must comprehend much more than a simple body count of killed, wounded, and missing. I have chosen to use the term "combat performance" rather than effectiveness because it is looser and does not pretend to precision. Robert Best in his ORO Report uses the term "operability" that expresses better the points that have been illustrated in this paper. A unit remains operable so long as its surviving personnel continue to fight, and while it is still operable it may or may not be able to achieve any specific objective.

Some 54 actions are mentioned in this report, these being cases where data were available both on losses or initial attrited strength and results of the action. These data are given in Chapter VI. Of the 54 actions, only 11 represent cases where a formation collapsed, surrendered, was repulsed, was stalemated, or had to be taken out of the line after suffering some degree of damage. The losses incurred by these formations covered a spectrum from virtually none to 56 percent, the heaviest being suffered by a unit that was moving ahead when it was relieved. The 11 cases were divided equally between defending and attacking forces. However, there is no discernible pattern here.

The other 43 cases represent formations that continued to attack or defend despite losses of some degree of severity, from heavy to appalling. Eleven of these formations were in defense, 33 in attack, but this ratio probably does not represent a pattern but rather choice of actions. In fact, it is likely that more examples can be found of decimated units

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successfully defending than attacking, since the advantages of the defense can compensate to some extent for reduced strength.

There are five elements the loss of which can "put a unit out of action:"

1. Loss of personnel;
2. Loss of equipment, combat and support, through destruction by the enemy or by maintenance failure;
3. Failure of supply--POL and ammunition;
4. Collapse of the command structure--death of commanders, loss of communications;
5. Loss of morale.

The "operability" of a formation is a function of the interrelationship of these elements. Of the five the last would seem to be the most important. Only the morale factor can explain the not uncommon pattern of heavily attrited units continuing to display good combat performance.

Where morale has been high, even very heavy losses will not put a formation out of action. On the other hand, failure of morale can lead to panic or resignation in which defeat can occur with little accompanying battle damage. That morale is composed of many complex elements and is affected by an equal range, from simple lack of sleep to the way battle damage is suffered.

Victory in battle is dependent upon the possession of two capabilities in greater degree than the enemy, namely, the ability to endure and the ability to injure. The former is primarily a function of morale and of the imponderables of leadership, training and fighting style and capacity. There are, to be sure, material factors like replacement flow, logistic supply, and medical services, but above all else is morale. If one's morale is superior to that of the enemy, it may not be necessary to injure him badly. He may collapse after small or moderate losses. There is no shortage of such cases in history.

Colonel Trevor N. Dupuy, in describing the 1973 Middle East War, has written, "The human element has always been important in war, and despite the technology available to both sides, the human element was undoubtedly the most significant feature in this war." The same comment could obviously be made about all the actions described in this paper.

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Personnel losses will reduce the number of men able to fire their weapons, but if the remaining troops continue to fight, they can and have been able to achieve their objective. Just because a unit is at full strength does not mean it is "effective" nor can full strength guarantee good combat performance.

Several points are evident even from a cursory review of battle experience. For one thing, heavy casualties (30 percent is not unusual) tend to be normal among the cutting edge of the fighting troops. Historically an artificial measure such as 25 percent was not generally considered enough to destroy the combat performance of a unit. There is no agreement among national armies, combat commanders, military historians or defense analysts as to the point when battle damage renders a formation impotent.

The impact of those casualties on the cutting edge--the rifle companies, tank crews, assault engineers--has clearly grown with time as the number of men in the cutting edge shrank and support echelons expanded. The capacity of the armies of the First World War to absorb tremendous losses and yet continue to function was due in part to the larger proportion of fighting men in the total.

The overall loss rates of larger formations may tend to mask severe loss rates for the cutting edge elements, the rifle companies and tank units, rates that could have a serious impact upon their battle performance. However, the effect of heavy battle damage has been variable and essentially unpredictable. Some formations were crippled and had to be withdrawn from action; others, suffering just as heavy losses, would continue to attack or defend.

The impact of battle damage is also a function of the replacement supply available to back up the formations in battle. However, we have seen that replacements only imperfectly fulfill the job of restoring a formation. The loss of the original and presumably better trained troops cannot be made up and surviving original officers and NCOs will be lost at a greater rate leading green troops. Yet this historically has been the way of war and it should probably be accepted as a given that a formation will usually be something less than optimal after its first heavy action. The term "veteran unit" is in a sense a misnomer since the longer a unit is in action, the fewer true veterans it will contain.

A case might even be made that by maintaining a formation's personnel strength with infusions of raw troops one is actually reducing its combat capability. The survivors

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of the original unit will have developed along with experience the teamwork so crucial to effective operation. Filling the ranks with inexperienced men reduces the effectiveness of the teamwork, and it is possible that experienced men, especially officers and NCOs, will become casualties at a faster rate in the course of working with the replacements than would have been the case if the unit had not been replenished. This is probably the theory behind the practice of unit rather than individual replacement. What, in short, could happen would be a virtual flooding of the market with replacements, a mass dilution of quality and experience, so that a unit that has lost, say, 30 percent casualties but remained effective becomes less effective if those losses are replaced in a short period of time. Nor does there seem to be any direct relationship between a flow of replacements and the maintenance or restoration of morale.

Much, of course, depends upon the original quality of the troops in a formation. Poor troops may become ineffective after relatively light losses just because they were not very effective to begin with. The Italian Army in the Second World War and the Argentines in the Falklands are cases in point. Yet quality and performance can be affected in surprising ways by circumstances. The poor performance of the British forces in Malaya against the Japanese is an example. On the basis of historical record the British would have been expected to do better, especially in view of the low casualty rate they suffered.

We have seen that experience is no guarantee of combat performance, since experienced formations have been as cautious as inexperienced ones. On the other hand new formations have attacked persistently in the face of terrible losses, new British regiments on the Somme being a classic case in point.

There may be a tighter but still ambiguous damage/performance relationship in the case of armored formations. Battle damage for them must be considered in terms both of fighting vehicles and crews, casualties in one automatically putting the other out of action. The power of an armored formation is concentrated. Once the armored fighting vehicles are out of action, the remainder of the division has relatively little striking power, unlike the foot infantry division where in desperate situations cooks and clerks could be put into the firing line to support the basic infantry units. On the other hand we have also seen that many tank casualties are quickly repairable. Other tanks that go out of action because of

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breakdown or lack of fuel are even more rapidly restored to action, so that the impact of casualties can be limited in terms of time. To be sure, the crews are less rapidly repairable.

Thus, while the cutting edge of an armored formation is even smaller than that of an infantry formation, it can be even harder to establish a relationship between damage and performance, just because a very sizable proportion of tank casualties are fairly rapidly repairable. Many vehicle casualties will not involve any crew losses, because the vehicle loss will not be the result of enemy weapon action. Furthermore, because of the nature of armored warfare, each tank is an independent fighting entity that can continue to fight until it is knocked out, breaks down, or runs out of fuel. The self-contained character of the individual tank permits it to function at full effectiveness even when its parent formation has been decimated. Furthermore the effect of casualties in an armored formation is less immediately damaging to the morale of surviving crews since being insulated in their vehicles, they do not experience as directly as infantry their fellow soldiers being killed or wounded.

As proof of this point, we have seen fragmentary German armored divisions attacking and defending with surprising success.

There is a relationship between the number of men lost and how they were lost and the continued willingness of the remaining troops to fight, but it clearly defies precise definition. This whole review offers little ground for hard and fast generalization about the relationship of battle damage to unit combat performance. For every example that illustrates an apparent direct relationship there is another that refutes it. There is no abrupt line between "effective" and "ineffective," between "able to fight" and "not able to fight."

Subject to the availability of equipment and supply, especially for surviving troops in heavily mechanized formations, the key question is not so much the numerical strength of the formation as it is its willingness to fight. The two questions are obviously related but there are enough historical examples to suggest that the relationship may be in greater or lesser degree. So long as some men in a formation continue to fight as an organized entity, either in attack or defense, for whatever reason, the formation they represent cannot be termed "ineffective."

I. INTRODUCTION

The one inexorable fact of battle is that it produces casualties. The influence of these casualties on the ability of the survivors to continue to fight has long been a subject of interest. The purpose of the study is to attempt to determine from battles of this century the degree to which battle damage has degraded the combat performance of military units. The research may provide insight into the question of why some forces have fought longer and more successfully than others even when heavily attrited.

Current battle analysis for both conventional and nuclear operations assumes that a certain percentage of casualties will effectively put a unit out of action. The modeling community have developed a set of formulae for use in this determination, but it is not clear to what extent these formulae reflect actual battle experience. This paper will examine the impact or apparent impact of casualties under a wide variety of combat conditions, times, and places.

Military analysts have attempted to determine a specific casualty percentage which represents a military formation's limit of effectiveness. Commonly expressed casualty percentages are 25, 30, or 33-1/3 percent. Presumably the unit is then essentially wrecked. The point was made by one American writer:

"The large armored battles of 1943 [Russia] and 1973 [Arab-Israeli] were spent within 18 to 19 days. Tank elements were ground down to 40 percent of their [original] committed strength. Furthermore, combat exhaustion occurs in normal soldiers after 35 percent have become casualties and the combined impact of unexpected events, physical exhaustion, and loss of comrade support creates stress beyond endurance."¹

A Canadian military study states that if one-third of a fighting force become casualties, the unit will be wrecked psychologically, "if the experience is repeated."² The

¹ Colonel D. Gans, USA, "Fight Outnumbered and Win...Against What Odds," Military Review, (January 1981), p. 2.

² Anthony Kellett, Combat Motivation: The Behavior of Soldiers in Battle, Kluwer-Nijhoff, Boston, 1982.

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last clause represents a major qualification in contrast to the first quote. Yet there is clearly no agreement on the percentage. It is believed that the Soviets would expect a battalion to suffer 70 percent losses before being relieved.³

The analyst of this issue must contend with a rather fundamental problem of definition. The issue of casualty impact is usually posed in terms of its effect on "unit effectiveness." What is "effectiveness?" Does it mean that there is a critical level after which a unit can no longer achieve a set objective, either in attack or defense? Does it imply that a certain number of men or tanks are absolutely necessary to achieve the objective in attack or defense? What is the relationship between the number of men or vehicles still surviving after casualties have been taken and their probable ability to accomplish the objective? Is effectiveness to be measured in terms of the ability to inflict casualties and/or to seize or hold terrain?

An examination of battles since 1914 would seem to indicate that there is no such clear relationship and that the relationship is so dependent on other factors in addition to casualties that generalization is meaningless. Furthermore, as this paper will illustrate, the other factors themselves are not absolutes but are all subject to qualification and variation. The effect of casualties is real but very complex; no simple formula will comprehend it.

General Robert E. Lee suggested the complexity of the relationship of the parts of an Army to the whole in a letter to President Jefferson Davis in early May 1864. While he was not referring to casualties per se, he was objecting to the loss of units of the Army of Northern Virginia that had been assigned to other areas at Davis' order. Now as Lee awaited Grant's spring offensive, he wrote:

"We are inferior in numbers, and as I have before stated to your Excellency, the absence of troops belonging to this Army weakens it by more than the mere number of men."⁴

Lee was referring to the impact of missing men on both his tactical and his strategic flexibility, and also on the minds of the men in the Army of Northern Virginia about to engage a Federal army more than twice as numerous. That impact, though not directly

³ Lt.Col. L. W. Grau, "MOUT and the Soviet Motorized Rifle Battalion," *Infantry* (Jan - Feb, 1985, Vol. 75, No. 1.), p. 27.

⁴ Clifford Dowdey, *Lee's Last Campaign*, Little Brown, New York, 1960, p. 75.

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similar to the impact of casualties, still illustrates the inter-relationships that are impossible to quantify.

As this paper will show, there are probably more cases of units continuing to fight after having suffered heavy losses than there are of those that were "crippled" at some specified casualty level like 30 percent. The basic question is why some units and the individual soldiers who comprise them will fight longer than others. The French Marshal Foch who commanded all the Allied armies in the final eight months of the First World War once said, "A battle lost is a battle which one thinks one has lost."⁵ Willpower has its limits, but it remains true that so long as some men in a formation continue to fight as an organized entity, either in attack or defense, for whatever reason, the formation they represent cannot be termed "ineffective."

Reactions of men in battle are a function probably as much of what they think is happening as what may indeed be happening. In 1973 the author conducted a study of 90 infantry division attacks in the 1944 Normandy and the Siegfried Line campaigns, and the findings suggested that there may be no direct correlation between the number of casualties and the degree of resistance the troops felt they were encountering. The historical record is full of cases of attackers being stalled by very small opposing forces, because the attackers thought they were meeting "heavy" resistance rather than because that heavy resistance really existed. The descriptions of resistance found in unit histories very often did not accord with the actual resistance encountered as measured by the number of casualties. For example, in Normandy the 9th Division at Briouze-Fromental Road took 137 casualties against what was termed as "light" resistance, while the 2nd Division at Brest suffered 73 casualties against resistance termed "heavy." On 28 November 1944 the 104th Division reported heavy resistance but casualties numbered only 79. On 21 November the 8th Division, against "heavy resistance," incurred only 38 casualties, and on 27 November, against similar reported resistance, 46 casualties. The spread between losses to claimed

⁵ Quoted by Major General F. W. von Mellenthin, Panzer Battles: A Study of the Employment of Armor in the Second World War. University of Oklahoma Press, Norman, 1971.

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"heavy resistance" in the forty actions in the Siegfried Line campaign reviewed ran from a low of 38 to a high of 972.⁶

In short, how does one "measure" resistance? What are the benchmarks? As illustrated above, it is certainly not done on the basis of the casualties inflicted by that resistance.

This study examines cases where units suffered heavy losses and either faltered or continued to fight. The most interesting and indeed the most numerous of these cases involve non-U.S. forces. Recent U.S. experience, either in the First or Second World Wars, in Korea, or certainly not in Vietnam, does not contain many examples of having to fight with severely depleted forces since there usually have been available replacements to replenish units. The paper also examines actions where units suffered comparatively light losses in either attack or defense and yet collapsed as fighting entities.

For several reasons there are no Vietnam examples in these pages. The nature of the war was different from the conventional actions examined. It was of small unit actions, of short duration, against an enemy who did not hold formal defended positions. While missions may have been on divisional or brigade scale, the battles themselves were on battalion or company level. Inasmuch as no official Army narrative history has yet appeared, data of the type needed for this study have not been available.

The historical cases cited run from battalion level to army level, with concentration on the division level. While the reactions of men in battle can best be studied at the battalion or company/platoon level, modern mass warfare makes it difficult to examine a microcosm and extrapolate from it. A larger military formation is more than the sum of its component parts, the point General Lee was making above, although it is that element above and beyond the sum of the actual parts that defies delineation. It seems evident from the cases that the larger the formation the more easily heavy losses can be borne. At the same time this point is challenged by the fact that only a portion of the larger formation, growing relatively smaller as larger and larger formations are used for analysis, has borne the overwhelming brunt of the casualties. To put the thought into context, while in 1861-

⁶ Leonard Wainstein, Rates of Advance in Infantry Division Attacks in the Normandy-Northern France and Siegfried Line Campaigns. IDA Paper P-990. Institute for Defense Analyses, Arlington, VA, December 1973, p. 9.

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1865, ninety-three percent of the men in the Union Army had combat-related assignments, today fewer than 30 percent do.⁷ As the proportion of combat soldiers shrinks, the greater will be the impact of casualties.

This point can be made by the example of the Battle of Antietam, 17 September 1862. During the twelve hours the battle spanned, Lee's Army of Northern Virginia lost 13,700 of some 39,000 (34 percent), McClellan's Army of the Potomac 14,000 of the 46,000 actually engaged (30 percent). Yet because nearly all troops were fighting troops, neither army was crippled and lost its fighting capability, despite the loss of a third of its total strength in a single day.

Until 1939-1945 a study of casualties dealt with what was in essence a study of infantry casualties. As a seminal study of the subject put it, "In sum, divisional casualty rates are essentially indexes of combined rifle battalion experience."⁸ The coming of armored warfare has brought a major change to the study of casualties since the loss of a man is no longer the main criterion for assessment of unit performance/effectiveness. We shall see how the "loss" of tanks can differ from the "loss" of infantrymen. With the total mechanization (beyond motorization) of ground operations, with infantry being assigned to armored personnel carriers or fighting vehicles, the concepts of casualty impact will change even more. Armored operations and casualties will therefore be discussed in a separate chapter of this study.

It should be stressed that a perspective of battle experience such as this, broad in terms of time and scale, must of necessity be an impressionistic one. No single action has been examined in depth, and data available on the actions have varied markedly in scope.

⁷ Kellett, Combat Motivation, p. xviii. An article in the Chicago Tribune of 27 January 1986 asserted that of the 1.8 million enlisted personnel in all the U.S. Armed Forces, currently only 257,000 are assigned to duties that mean direct involvement in battle.

⁸ Robert J. Best, Casualties and the Dynamics of Combat. Research Analysis Corporation. TP-185. McLean, VA, March 1966, p. 32.

EARLIER STUDIES

Despite the interest in and significance of the subject, relatively little research has been done across the years on casualty-effectiveness relationships. Two of the handful of historical research efforts upon which those relationships have been based for modeling purposes were published in 1954 and 1966 respectively. It is worth summarizing their key points as a backdrop to this study.

A. THE ORO CLARK REPORT OF 1954

Dorothy K. Clark of the Operations Research Office (ORO) worked at the battalion level, using data on 44 US infantry battalions involved in seven engagements in the European Theater of Operations in the Second World War. She recognized that the same significant casualty rate would not apply to all units but would vary with the size of the unit (army, division, battalion) and with the type of unit (infantry, tank, artillery). The battalion level was seen as a first approach to the problem.

Clark's basic conclusion was the "the statement that a unit can be considered no longer combat effective when it has suffered a specific casualty percentage is a gross oversimplification not supported by combat data." Casualties could be taken as a significant measure of loss of combat effectiveness only if the proper defining and limiting factors were specified. "The very wide individual differences in the ability of infantry battalions to carry out a given mission cannot be accounted for in terms of casualties alone, no matter how the data are presented."

Clark listed eleven other variables which may have had some influence on the ability or inability of units to fulfill their missions:

- condition of troops at beginning of engagement
- unusual environmental stresses
- the imperative of the assigned mission
- morale
- leadership
- tactical plan
- reconnaissance
- enemy opposition

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fire support and reinforcement
logistical support
communications

Of these interacting variables Clark believed that failures and breakdowns in leadership, fire support and reinforcement, and communications were the most frequent and powerful influences.⁹

B. THE RAC BEST REPORT OF 1966

In March 1966 the Research Analysis Corporation (RAC) published a report by Robert Best on "Casualties and the Dynamics of Combat." Best's paper was of much wider scope than the earlier Clark work, covering the impact of casualties in the Second World War and Korea at levels from battalion to army group, both Allied and enemy. He pursued three lines of inquiry (a) how casualties occur in formations engaged in near-equal combat; (b) how casualties are directly linked to particular sorts or aspects of unit impairment and hence, by implication, to resultant unit operability; (c) how casualties relate to tactical progress.

Best's main conclusions were, like Clark's, tentative in regard to the main issues:

"1. Casualties are essential yet variously contingent determinants of combat, for they tend to diminish, constrain, depress, or derange the adaptive application of force to differing degrees in different situations; therefore, they (a) reduce the tempo of tactical development to varying extents, and (b) exert a varying influence on the tactical outcome--disproportionate and decisive, proportionate and substantial, or none at all.

"2. Casualties are a qualitatively, but not quantitatively predictable diffuse depressant in overall operational effect.

"3. Quantitative regularities in aggregated casualty rates are mainly expressions of the prevailing intensity of combat. Although in part determined by casualties, prevailing intensity is in greater part determined by other constraints and restraints on the functioning of tactical systems; uncertainty and risk; delays and deficiencies in communications, command, and adaptive maneuver; respites for redeployment, reorganization, or resupply and logistic insufficiencies." ¹⁰

⁹ Dorothy K. Clark, Casualties as a Measure of the Loss of Combat Effectiveness of an Infantry Battalion, Operations Research Office, ORO-T-289. Chevy Chase, MD, August 1954, pp. 1-2.

¹⁰ Robert J. Best, Casualties and the Dynamics of Combat, Research Analysis Corporation, TP-185. McLean, VA, March 1966.

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In the second part of the Best study, the author raises the question: are casualties causal? He raised doubts about the causative influence of casualties, pointing out that "the apparent and seemingly causal decrease in the rate of advance with increase in casualties has been shown to be largely a matter of increased duration. While casualties could be responsible for this, casualties could also increase as a result of prolonged exposure and increased duration could be determined entirely by other factors. Operationally, the casualties could be practically inconsequential."¹¹

He points out that on Iwo Jima the casualty incidence of the assault battalions steadily declined in absolute numbers, as did the rate of offensive progress. Did this slowing result from increasingly strong Japanese resistance or from the dwindling strength and initiative of the attacking Marines? If the latter was the case, could it be attributed to the inability to maintain a peak tempo effort, to sheer physical and mental fatigue, to the impact of casualties, or, most likely, to the combined effect of all these factors?

Casualty rates and advance rates similarly declined in parallel during the major British armored attack in Normandy, OPERATION GOODWOOD. In this case tank attrition seemed to be the key factor. The most striking characteristic of the battle was the heavy British tank loss, one third being lost on the first day in the crucial central sector of the battlefield. Despite the fact that many of these were quickly repaired and returned to action, the attack dwindled steadily over the next two days.

In the case of the initial German penetration into Russia, as the rate of advance generally declined and the degree of combat intensity increased, the overall casualty rate remained fairly constant. This suggests that the casualty rate for engaged units must have decreased. It is uncertain whether the advances were slowed by casualties or by logistic constraints consequent upon the deep penetrations and the following mop-up battles.

¹¹ Best, p. 96.

II. MORALE AND MOTIVATION

Let it be stated here that the term morale in this paper will refer to the overall spirit of troops and motivation to their willingness to push toward the accomplishment of a designated mission. The relationship between the two is obvious but the relationship of the two to unit combat performance is by no means as clear cut as is sometimes assumed. A variety of issues is involved, and they all show contradictory facets. Basically morale, a product of many factors, underlies motivation and when morale rots, motivation fails.

While morale can be affected by the fortunes of the individual soldier's unit and of the army as an entity, it can also be influenced by the awareness of the individual soldier of the personal well-being and fate of his immediate comrades. This need not always be negative. The most cogent example is obviously the effect on the individual of the sight of dead and wounded comrades. Casualties are certainly the most visible and forceful indications of the latent horror of combat. Soldiers not exposed to casualties close to them can view battle of the most savage degree in a somewhat detached manner, but the realization of the danger they face will be brought home vehemently when casualties begin to occur among their immediate ranks. The corrosion of motivation then begins.

Yet in the case of long-service regular British regiments in the early months of the First World War, where morale was high, even extremely heavy casualties had a less devastating effect than might have been expected. At the battle of Neuve Chapelle in March 1915 the Second Scottish Rifles attacked with 700 men. Losses during the day numbered 469, yet the battalion did not lose its cohesion. On the evening of the second day a second lieutenant gathered the remnants into position for a second attack which was fortunately cancelled. Even later in the war when war weariness afflicted all the combatants, battalions or pieces of them could still retain fighting spirit in the face of tremendous losses. During the first ten days of the March 1918 German offensive, the reconstituted (several times over) Second Scottish Rifles lost 638 all ranks from about 700. The Second Devonshires were also all but wiped out in a single day of the German offensive, yet survivors of both

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battalions regrouped and continued to fight.¹² The First World War will be discussed at greater length in the next chapter.

Investigation into the effect of casualties upon survivors of infantry actions in the Second World War produced some interesting results. When casualties within the battalion or company were replaced by strangers, the soldier's identification with the company was weakened and he was thus drawn closer to his squad or section. Casualties within the squad or section were far more damaging to the individual's sense of personal invulnerability since they threatened the sense of group support and protection. This was a serious issue since the smaller units seemed to be disproportionately subject to casualties. There was another way in which subunits were psychologically less able to absorb casualties than were their parent battalions or regiments. The subunits lacked the continuity that tradition and history conferred upon the regiment and battalion. Both Allies and Germans faced the same problem regarding this influence of casualties upon interpersonal relations. The officer commanding the German 156th Grenadier Regiment in Russia reported at the beginning of 1944 that his regiment had lost nearly 5000 men and had received fewer than 3000 poorly trained replacements. With such a turnover, no personal relations could be maintained.¹³

The moral fiber will also be affected by the way casualties are suffered. There is a category that might be called "unacceptable casualties"--soldiers killed by their own artillery or aircraft or lost in an action that turns out to have been unwise and fruitless.

A Korean War study of weapons effects on troop performance, using a sample of some 900 North Korean and Chinese POWs and 260 American POWs, stressed the impact of suddenness of casualties. The report stated, "It is the unexpected exposure to fire from a weapon more than the type of weapon that is important psychologically in bringing about acts of ineffective performance... Mention was often made in incidents of a sudden bombardment by artillery or planes or an unexpected strafing or napalm attacks from the air."¹⁴

¹² Anthony Kellett, Combat Motivation: The Behavior of Soldiers in Battle, p. 265.

¹³ *Ibid.*, p. 267.

¹⁴ L. A. Kahn et al, A Study of Ineffective Soldier Performance Under Fire in Korea, 1951. ORO-T-62. (Operations Research Office, Chevy Chase, MD, 2 October 1954), p. 37.

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Mines, especially anti-personnel mines, tended to dampen the motivation of attacking troops. These devices had as much a psychological impact as a tactical one, perhaps even more. The insidious nature of mines worked on the nerves of troops and imposed caution that in turn produced delay that has been termed "psychological interdiction."¹⁵ It took only a very few casualties from antipersonnel mines to reduce the aggressiveness of an attacking unit. In a very recent case, British officers in the Falklands War noted the inhibiting effect of the randomly scattered Argentine antipersonnel minefields, especially since the plastic mines could not be located by standard detectors.

Morale can also suffer severely from the loss, especially the sudden loss, of leaders. Officer and NCO losses are always disproportionately high in combat units because these people must lead the way. In the case of the Second Scottish Rifles at Neuve Chapelle mentioned above, in less than ninety minutes after the battalion went over the top all but two of the officers were dead or too badly wounded to remain in action, along with thirty of the fifty NCOs. While the effect of such a loss is usually a paralysis of the troops, the battalion nevertheless continued its attack with "natural" leaders from the ranks of private soldiers taking up the leadership role.¹⁶ At the very basic individual soldier level, morale and motivation can be seriously affected by fatigue, induced by fear, nervous strain and loss of sleep. While high morale can countervail fatigue resulting from the first two causes the simple factor of sleep loss can be crippling to motivation. A British Army exercise conducted in June 1976, demonstrated that troops who slept three hours a night could remain militarily effective for nine days or more; soldiers who slept one-and-a-half hours a night could remain effective for five days. Soldiers who did not sleep at all became militarily ineffective after three days. A follow-up exercise in late 1977 demonstrated that men ceased to constitute an effective fighting force after 68 hours without sleep.¹⁷

There are no doubt differences between the reactions of men kept awake during an exercise experiment and those kept awake by actual combat. In the latter case men may be able to go on for a bit longer, but not much longer. Once the adrenalin flow slows, the let down reaction is far greater.

¹⁵ J. Dailey et al, Historical Analysis of Mine Warfare. Army Materiel Systems Analysis Activity, Aberdeen Proving Ground, August 1979, p. 5.

¹⁶ Kellett, Combat Motivation, p. 269.

¹⁷ Ibid., p. 234.

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Experience with the effect of loss of sleep should raise questions about the current concepts of "continuous battle" in a NATO war context.

As an example of the crucial role that sleep plays in effectiveness, one can recount an episode from the American breakthrough in Normandy. On July 30, 1944, five days after the American breakthrough began, the German defenders were falling back under tremendous pressure, having been in action almost continuously. In the words of the official U.S. history:

"As they attempted to establish a defense they fumbled about in various stages of wakefulness. One unit commander [Colonel] von der Hydte, brought his 6th Parachute Regiment into a concealed bivouac and there, hidden from Americans and Germans alike, permitted his men to sleep for twenty-four hours before reporting his location to higher headquarters."¹⁸

Colonel von der Hydte's decision meant that the 6th Parachute Regiment continued to fight outstandingly after that and remained one of the most effective German units in the field.

There is a relationship between fatigue and fear. A recent journal article dealing with the U.S. 116th Infantry Regiment on Omaha Beach on "D" Day recounted how the troops were burdened with excessively heavy loads of equipment as they tried to cross the fire-swept beach. One staff sergeant was quoted as saying,

"We were all surprised to find we had suddenly gone weak, and we were surprised too to discover how much fire men can move through without getting hit. Under fire we learned what we had never been told, that fear and fatigue are about the same in their effect on an advance."

The article stressed that when the decision is made to load attacking troops with extra equipment, problems will be generated when the men come under fire and subsequently suffer from reduced stamina that fear induces.¹⁹

¹⁸ Martin Blumenson, The U.S. Army in World War II: The European Theater of Operations: Breakout and Pursuit. Office of the Chief of Military History, Dept. of the Army, Washington, DC, 1961, p. 281.

¹⁹ Captain Christopher Barnhouse, "Infantry in Action: Sustainability," Infantry (January - February 1986), p. 29.

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Combat fatigue was a major thinner of ranks of U.S. front line troops. In the campaign in Normandy,

"Many other men suffered combat fatigue. Not always counted in the casualty reports, they nevertheless totaled an additional 25 to 33 percent of the number of men physically wounded. A large percentage were returned to duty after rest and sedation for 24 to 72 hours."²⁰

The susceptibility of men to combat fatigue and more serious psychoneurotic disabilities was a function of many factors. A U.S. Army study in 1958 of World War II cases, working with groups of 1000 men from the European and Mediterranean Theaters of operation, found that even among men who had high risk MOS assignments, the chance of becoming a battle casualty dropped with increasing experience. At the same time, stress increases with time in combat, and the longer a man escaped a battle wound the more likely he was to fall to psychoneurotic disability or combat fatigue. There is, therefore, a trade-off between experience as measured by time in combat and the growing likelihood of stress-induced collapse. Variations were found in the several sociological variables examined. For example, National Guard troops broke down most rapidly, regulars least. Those better trained in infantry tactics broke down less rapidly than those less well trained, but only in the upper region of stress. Those with psychoneurotic admissions to hospital prior to entering combat broke down more rapidly than those who had not been afflicted. Finally, men with courts-martial convictions for AWOL prior to combat broke down more rapidly than those without such records.²¹

To swing to the other extreme in regard to influences on men in combat, it is apparently the case that broad abstractions do not usually motivate soldiers to an extreme effort. They will fight hard if they think they are accomplishing something worthwhile. S.L.A. Marshall expressed the point well:

"When confidence in the character of the unit falters, the unit itself is on the way to defeat and dissolution, without proportionate gain to the overall undertakings of the army. Just as certainly, faith in the rightness of a cause cannot

²⁰ Blumenson, *Breakout and Pursuit*, p. 175.

²¹ Gilbert W. Beebe and John W. Appel, *Variation in Psychological Tolerance to Ground Combat in World War II*. Report issued by the Medical Research and Development Board, Office of the Surgeon General, Dept. of the Army, Washington, DC, 10 April 1958, p.147.

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sustain the fighting will of troops unless they believe that the larger military undertakings will succeed. One may read this meaning from the great episodes of the war just past. Dunkirk, Bataan, Stalingrad, El Alamein, and Bastogne are monumental testaments to the fact that the belief in ultimate victory does more than all else to rally tactical troops and to persuade them to sell their lives dearly. In contrast, there is the example of the quick collapse of France when Frenchmen heard their leaders say that the democratic cause was lost.

The way in which the loss of morale incentive is reflected in the tactical behavior of troops was thoughtfully expressed many years ago by the British teacher, Colonel G.F.R. Henderson:

'When troops once realize their inferiority, they can no longer be depended on. If attacking, they refuse to advance. If defending, they abandon all hope of resistance. It is not the losses they have suffered but those they expect to suffer that affect them. Consequently, unless discipline and national spirit are of superior quality, and unless the soldier is animated by something higher than the habit of mechanical obedience, panic, shirking and wholesale surrender will be the ordinary features of a campaign.'

"When men become fearful in combat, the morale incentive can restore them and stimulate them to action. But when they become hopeless, it is because all morale incentive is gone. Soldiers who have ceased to hope are no longer receptive beings. They have become oblivious to all things, large and small."²²

The collapse of will can produce either panic or resignation. The former is best illustrated by the defeat of the French Army in 1940. Defeat is perhaps hardly the word since by the standards of 1914-1918 or even of the later campaign in Western Europe, the French Army was only lightly engaged. On May 13 - 14 in the battle for the Meuse River crossings Guderian's XIX Panzer Corps of three Panzer divisions was driving past Sedan during the Ardennes penetration. Defending the opposite bank of the river was the French 55th Infantry Division at full strength and with the artillery complement of two divisions. After a few hours of light action against German infantry that had crossed the river, and before any German tanks or other armor had crossed, the 55th Division simply dissolved. On the morning of the 14th, once German armor had crossed, the same thing happened to

²² Brigadier General S. L. A. Marshall, Men Against Fire: The Problem of Battle Command in Future War. Peter Smith, Gloucester, 1978 (Reprint), p. 170.

It should be noted that abstractions did seem to have greater motivating influence in the last century, for one. Civil War battle accounts always stress the central role of the flag carried at the head of the charging line of troops. While state and regimental flags were carried, it was the national flags, the Stars and Stripes and the Confederate Battle Flag, that symbolized the nations and the causes.

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the French 71st Infantry Division. The novelty of air and air-tank attack had collapsed the French will. Panic had taken hold.

Yet there were exceptions to the pattern above that unfortunately was to become general. On 12 May in the French Ninth Army sector just north of the 55th and 71st Divisions, four Panzer divisions were trying to cross the river. A single French regiment resisted superbly and threatened the entire German operational plan by defending the river line. One historian put it:

"Rommel's account is a reminder that in a battle where, as we have seen at Sedan and will shortly see here, so many French units broke and ran under the incessant bombing and at the sight, or rumor, of approaching panzers, there were French units, like the 66th Infantry Regiment at Bouvignes, that stood and fought gallantly, inflicting heavy casualties on the Germans."²³

What accounted for the difference in combat performance?

Another striking example of a general collapse, this time reflected in resignation, can be found in the defeat of the British in Malaya and Singapore, December 1941 - February 1942. Outgeneraled and outfought all the way down the Malay Peninsula by a considerably smaller Japanese force, the British troops lost their will to resist. By the time Singapore Island was reached a sense of resignation and hopelessness had permeated the whole army and the inevitable surrender occurred to a Japanese force less than half the size. The total Empire force lost in Malaya and Singapore numbered 138,708. It was the greatest military disaster in British history. What was even more shocking was that in two months of battle, only some 8000 had become casualties, more than 130,000 having been taken prisoner.²⁴ Japanese losses were only 9900.

Singapore was in contrast to Hong Kong where the British garrison surrendered to a far superior Japanese force after eighteen days of resistance. The British Government was shocked then at what was felt to be a too short resistance, yet British casualties numbered at least 4400 out of a total force engaged of about 12,000. The garrison suffered

²³ William L. Shirer, The Collapse of the Third Republic (Simon and Shuster, New York, 1969), pp. 652, 661.

²⁴ United Kingdom Military Series. Major General S. W. Kirby, et al. The War Against Japan, Volume I: The Loss of Singapore. (Her Majesty's Stationery Office, London, 1957). p. 473

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thus a 37 percent loss, as compared to the 6 percent casualty rate of the army in Malaya and Singapore.

Why was there a difference here? The garrison of Hong Kong stood and fought a defensive battle of the sort the British have always done well. They had not much room for maneuver or retreat. The Army in Malaya, on the other hand, experienced an almost 400 mile withdrawal, constantly being outflanked or fearful of being outflanked, fighting in a jungle environment for which they had little if any training. There were no major battles, and the long endless withdrawal clearly sapped willpower that ran dry when the force was ultimately trapped on Singapore Island.

On a very minor scale, the Falkland Islands War of 1982 is another case in point. A force of 13,600 Argentine troops, well equipped (as well and, in some cases, better than the British) defending on very defensible difficult terrain and the air being essentially neutral, were nevertheless forced to surrender by 10,000 British troops in less than two weeks fighting. They were mostly low quality conscripts, led by poor officers, sent to fight in an operation that had no strategic concept behind it. As a result they gave up after suffering losses that amounted to an estimated 15 percent of the 9600 Argentine troops engaged on the main island.

These were examples of disaster where defeat was inevitable. Even troops on the offensive with ultimate success also inevitable, can display an unexpected caution or reluctance to push hard. In Western Europe in 1944-1945, the U.S., British and Canadian troops had superiority in almost everything but fighting spirit. However, the experience of the six week stalemate in Normandy was reflected in the initial American offensive that produced the breakthrough in late July 1944. Against light opposition the VII Corps had moved only about a mile forward, disappointing General Bradley's injunction to be bold. As the official history stated it, "The battle of the hedgerows during the preceding weeks had inflicted its psychological toll on the combat forces. Habits of caution could not be dissipated by an air strike or by an order. The presence of German defenders per se implied stubborn and skillful opposition."²⁵

²⁵ Blumenson, Breakout and Pursuit, p. 245.

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The British showed similar tendencies. A major factor in the loss of the British 1st Airborne Division at the Arnhem bridge in September 1944 was the slowness of the advance of the British relieving force. One British historian said,

"The reason for their failure lay in what was at this stage of the war the gravest shortcoming of the British Army: the reluctance of commanders at all levels to call upon their troops to press on regardless of losses, even in operations which were likely to shorten the war and thus save casualties in the long run. It was this which prevented the timely advance of the 43rd Division, just as it had led Urquhart [Major General, commanding British 1st Airborne Division] to shrink from the cost he feared would be incurred in a direct assault on the Arnhem bridge."²⁶

Another British officer described the same syndrome in reference to four highly experienced British divisions, "The veteran British divisions transferred from the Eighth [Italy] to the Second Army for the invasion proved, on the whole, more cautious and less effective than the fresh divisions trained in England."²⁷

On the other hand, fresh divisions would be expected to be more cautious just because they are inexperienced. In the effort to close the Falaise-Argentan Pocket in August 1944 and thus complete the destruction of the German Seventh Army, the 4th Canadian Armored Division and the 1st Polish Armored Division (attached to the First Canadian Army) were given the task of driving down from the north and sealing the gap. In their first action, both units moved cautiously and a significant portion of the German forces was able to escape. While German resistance had been desperate and inspired, the relief of the commanding general of the Canadian division reflected the High Command's dissatisfaction.

Here then was a paradox. Two fresh divisions were cautious and slow because they were inexperienced. The four veteran British divisions from the desert and Italy were cautious because they were experienced.

Any review of these very broad tendencies in fighting spirit and motivation must look at the performance of the German Army in the Second World War. Some German units were better than others, but few could be called poor when it came to comparative battlefield performance. The official British history of the North African campaigns stated:

²⁶ Chester Wilmot, *The Struggle for Europe*, (Collins, London, 1952), p. 527.

²⁷ Major General F. M. Richardson, *Fighting Spirit: A Study of Psychological Factors in War*. (Leo Cooper, London, 1978), p. 77.

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"At the same time it would be unfair and ungenerous not to recognize the remarkable achievement of the German troops. They had been fighting just as long, and in many cases longer. They had all the same discomforts of the terrain and the climate with the added handicap of an uncertain supply line under constant attack by an aggressive air force. They had almost no rest and very little prospect of relief. Small groups of units or sub-units were constantly being flung together for some desperate enterprise--usually to plug some gap--and it is astonishing how often they brought it off. The German soldier always seemed capable of making one more supreme effort."²⁸

An even more sweeping commendation, although equally true, was offered by one American writer:

"It is, however, not on its victories--regardless how splendid--that the German Wehrmacht's reputation for fighting power is mainly based. For here the historian is confronted with an army that, depending on the particular front and category of arms one cares to select, was outnumbered three, five, even seven to one. Yet it did not run. It did not disintegrate. It did not frag its officers. Instead, it doggedly fought on. It fought on even though Hitler's war was never at any time really popular in Germany. It fought on even though its homeland was being bombed to smithereens behind its back. It fought on even though many of its generals--and numerous subsequent historians as well--regarded its commander in chief as little better than a raving lunatic. It fought at Narvik and it fought at Alamein. It fought on for years after the last hope for victory had gone. Even as late as April 1945, to quote the Allied Intelligence Summary, its troops went on fighting wherever the local tactical situation was at all tolerable. By that time it had already suffered 1.8 million casualties in dead alone and almost half as many again in captives who were to disappear forever in Soviet prison camps. Yet for all this, its units, even when down to 20 percent of their original size, continued to exist and to resist--an unrivalled achievement for any army."²⁹

Every other army in the Second World War knew the trauma of defeat at one time and to one degree or another. None, however, experienced it for so long or so consistently as the German Army during the last two years of the war. On every front, it fell slowly back. On a grand strategic scale the Germans experienced for two years what the British forces in Malaya experienced for two months. Colonel Trevor Dupuy has written:

"[The] record shows that the Germans consistently outfought the far more numerous Allied armies that eventually defeated them. ... On a man for man basis the German ground soldiers consistently inflicted casualties at about a 50 percent

²⁸ United Kingdom Military Series History of the Second World War. Major General I. S. O. Playfair, et al. The Mediterranean and Middle East, Volume III (Sept 1942): British Fortunes Reach Their Lowest Ebb. (Her Majesty's Stationery Office, London, 1960), p. 360.

²⁹ Martin van Creveld, Fighting Power: German and U.S. Performance, 1939-1945. (Greenwood Press, Westport, Conn., 1982). p. 5.

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higher rate than they incurred from the opposing British and American troops under all circumstances. This was true when they were attacking and when they were defending, when they had a local numerical superiority and when, as was usually the case, they were outnumbered, when they had air superiority and when they did not, when they won and when they lost.³⁰

As will be shown in the chapter on the Second World War, this fighting capacity of the German Army permitted decimated units to continue to attack and defend effectively and to make a mockery of any artificial loss percentage which said they should be out of action.

The Japanese Army, of course, also displayed an incredible capacity for endurance, based upon an Oriental fanaticism that could hardly be equalled even in the most ruthless of the German Waffen SS or paratroop units. The Japanese simply fought until they were almost all dead. The German achievement was based upon much more than mere fanaticism, but the nature of the morale and motivation that kept the ordinary German infantry going is difficult to portray.

Akin to the Japanese example and more pertinent to the military problems of today has been the demonstration by the Russians of the power of sheer mass, coupled with the cold-bloodedness to use it at any cost. The problem of defeating an army whose strength seems limitless was described by Field Marshal von Hindenburg in regard to the battles on the Eastern Front in 1915.

"In spite of the great tactical success...we failed...strategically. We had once more managed practically to destroy one of the Russian armies, but fresh enemy forces had immediately come up to take its place, drawn from other fronts to which they had not been pinned down. ... We could not achieve a decisive result. The superiority of the Russians was too great."³¹

The insensitivity of the Soviet Army to casualties was noted during the Second World War by both the Finns and the Germans. The leader of Finland in the brief war against the Soviet invasion (October 1939 - March 1940), Marshal Mannerheim, described the Russian officers as "being generally brave men who were little concerned with casualties. The fatalistic submission which characterized the Soviet infantry was

³⁰ Colonel Trevor N. Dupuy, A Genius for War. (Macmillan, London, 1977). p. 234.

³¹ Quoted in Winston Spencer Churchill, The Unknown War: The Eastern Front. (Scribner, New York, 1931), p. 299.

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outstanding. The Russian soldier was not very susceptible to outward impressions and in every situation quickly regained his composure."³²

Major General von Mellenthin, a German tank officer, wrote of his experience on the Eastern Front on 1942-44:

"The stoicism of the majority of Russian soldiers and their mental sluggishness make them quite insensible to losses. The Russian soldier values his own life no more than those of his comrades. To step on walls of dead, composed of the bodies of his former friends and companions, makes not the slightest impression on him and does not upset his equanimity at all; without so much as twinkling an eyelid he stolidly continues the attack or stays put in the position he has been told to defend. He is immune to the most incredible hardships, and does not even appear to notice them; he seems equally indifferent to bombs and shells."³³

Yet there was a contradictory and unpredictable streak in the Russian character. Von Mellenthin mentions occasions when Russian units, which had driven back German attacks with fierce courage, suddenly fled in panic before a small assault group. Battalions lost their nerve when the first shot was fired, and yet the same battalions would fight with fanatical stubbornness the next day.

General von Mellenthin mentions the iron discipline, ferocious punishments and unquestioned obedience to orders that characterized the wartime Red Army, and adds, "In my experience idealistic motives and enthusiasm for the Communist regime were not apparent during the last war."³⁴

Robert Best summed up the significance of these Russian characteristics by saying, "Mass attacks may be obsolescent but may not be obsolete. For armies rich in manpower and having a compatible national character, this may be an appropriate way of fighting."³⁵

Clearly some national forces have demonstrated across the years more aggressiveness or more staying power than others. Fighting style, fighting capacity, is a very real although unmeasurable thing. Nevertheless there is a limit, and that can be described in the words of the Duke of Wellington. In the aftermath of Waterloo he was

³² Marshal Carl Gustav Mannerheim, The Memoirs of Marshal Mannerheim. (Cassel, London, 1953). p. 368.

³³ Major General F. W. von Mellenthin, Panzer Battles, p. 233.

³⁴ Ibid., p. 233.

³⁵ Best, Dynamics of Combat, p. 125.

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telling a dinner party the story of the great fight. When he reached the point at which the allied Dutch and Hanoverian units broke and retreated from his line, his hostess said, "Oh your Grace, but British soldiers never run away." To which the Iron Duke replied, "Madam, all soldiers run away."

A SUMMATION

1. Where morale of troops is high, even very heavy casualties will not put the formation "out of action."
2. Morale is composed of many complex elements and is affected by an equal range, from simple lack of sleep to the way battle damage is incurred.
3. A failure of morale can lead to panic or resignation in which defeat occurs with little accompanying battle damage.
4. Reaction to battle may not differ markedly as between experienced and inexperienced formations.

III. CASUALTIES AND RESPONSE IN THE FIRST WORLD WAR

The 1914 - 1918 war stands apart in history for the scale of casualties incurred. In the Second World War only Soviet and German losses were on the same scale. The war offers numerous dramatic examples of military organizations, ranging from full armies to battalions that absorbed tremendous losses and yet continued to function.

The tone was set at the outset. In the first three months of actual fighting from the last week in August 1914 to the end of November when the German invasion had been definitely arrested and their drive for the Channel ports ended, the French lost 854,000 in killed, wounded and captured. In the same period the British Expeditionary Force lost 85,000, for a total of 939,000. The Germans lost 677,000. In the fighting from 21 August to 12 September when the battle of the Marne had been definitely won, the French lost nearly 330,000 killed or captured and another 280,000 wounded. This was more than one-sixth of their losses in the entire war. Of this number, three-fourths was suffered between 21 and 24 August (the Battle of the Frontiers) and 5 to 9 September, a total period of less than eight days.³⁶

The Battle of the Frontiers, for the number of men engaged and for the rate and number of casualties in a four day period, was the greatest battle of the war. Eighty German divisions were engaged with 62 French, three-and-a-half British, and six Belgian divisions. In their first five days in action the 70,000 man British Expeditionary Force lost some 15,000 men, divided almost evenly between the engagements at Mons, their first battle on the Continent since Waterloo, and Le Cateau.³⁷

As the Marne front stabilized in mid-September, the Germans began to move around the Allied left and this led to the First Battle of Ypres, 14 October - 11 November. This battle cost the BEF 58,000 casualties, 80 percent of the original force. The record of some divisional losses is instructive. The 7th Division, after three days of incessant

³⁶ Winston Spencer Churchill, *The Great War*, Volume III. (Newes, London, 1933), p. 1236.

³⁷ David Eggenberger, *A Dictionary of Battles*. (Crowell, New York, 1967), p. 234.

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fighting had lost 45 percent of its officers and 37 percent of its other ranks. It was pulled back and strengthened with some reinforcements and returned to the line. After a single day of battle, 31 October, the two brigades engaged had respectively 390 and 750 men instead of their establishment figure of 4100 odd. By that evening, both the 7th and 1st Divisions had about one-fourth of their called-for strength. Yet the fighting continued incessantly. By the evening of 2 November instead of the 124 officers and 4100 men per brigade called for, the 7th Division, despite reinforcements, was below one-third strength, its three brigades numbering 1228, 42/1315 (officers/other ranks), and 27/970.

By 11 November the battalion strengths (establishment total of 1000) of the 1st Division are given as follows in the official British history:

1st Northhamptonshires	-	1/200 (officers/other ranks)
1st North Lancashires	-	1/80
2nd Royal Sussex	-	5/250
1st Gloucestershires	-	5/130
Irish Guards	-	3/150
1st Queens	-	2/170
2nd Oxfordshire Light Infantry	-	6/300 ³⁸

As a reflection of the overall impact of the casualties incurred in the first twelve weeks of the war, it should be noted that of the first 100,000 British troops who had sailed for France in August, more than 30 percent were dead by the end of the First Battle of Ypres. The average remaining survivors in each of the original battalions were one officer and 30 men.³⁹

In the Battle of the Somme that opened on the climactic day of 1 July 1916, a British attacking force of 120,000 went over the top. In that single day almost exactly half the men of the 143 infantry battalions became casualties, 21,400 dead and 35,500 wounded. Only 600 were taken prisoner by the Germans. Officer casualties in the attack waves numbered 75 percent.⁴⁰ The greater proportion of overall casualties occurred during the morning alone. Typical of the British units on 1 July was the 8th Division. In

³⁸ Brigadier General J. E. Edmonds, History of the Great War: Military Operations, France and Belgium, 1914. (Macmillan, London, 1925), pp. 210, 339, 371, 437.

³⁹ Tim Carew, The Vanished Army. (William Kimber, London, 1964), p. 231.

⁴⁰ Martin Middlebrook, First Day on the Somme. (Norton, New York, 1972), p. 244.

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little more than two hours the Division lost 218 out of 300 officers and 5274 other ranks from the total of 8500 infantrymen who had assaulted the German defenses.

The troops had been led to believe that the German positions had been pulverized by the intensity of the British artillery barrage that had lasted several days and that consequently the infantry would probably encounter only light resistance. Yet when the illusion was dispelled so abruptly and murderously, the impact did not prevent the troops from continuing to attack. This sort of terrible abrupt unexpected reverse would be expected to smash troop motivation, especially since much of the British force, Kichener's New Army, was composed of ex-civilian volunteers, in their very first battle. It did not.

Despite the shattering first day, the British continued their offensive but never on such a grand scale. Nevertheless, before the battle was finally called off in mid-November, total British casualties had reached 482,000. The Germans lost 180,000. As the battle progressed the conditions of offense and defense became more equal as trenches were obliterated and barbed wire destroyed. Large British attacks occurred twice later, but most operations were small scale.

Churchill, a vehement opponent of offensives on the Western Front, nevertheless became convinced that the fighting on the Somme had taken something out of the rank and file of the German Army, and after the war found German divisional histories that provided ample support for that view. The same, of course, could probably also be said of the British infantry. The salient fact, however, is that despite the appalling slaughter that gained the British some two to four miles of advance, the units on both sides continued to fight.⁴¹

Verdun was comparable. The German offensive that began 21 February 1916 and continued until 11 July cost them 280,000 casualties and the French defenders 315,000.⁴²

In the 1917 British Flanders campaign (known as the Passchendaele battle), British overall losses were also extremely high. In the Battle of Pilckem Ridge on 31 July 1917, the attacking British Fifth Army lost more than one-third of its attacking complement in a

⁴¹ Churchill, *The Great War*, Volume II, pp. 909, 917.

⁴² Eggenberger, *A Dictionary of Battles*, p. 459.

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single day. The 55th Division suffered 70 percent casualties. Total British losses for the whole campaign, July - December 1917, came to 449,000.⁴³

It would be difficult to assert any measure of effectiveness in these costly endless attacks. While they did not break the German line in 1917, the British did grind down the Germans. By their own admission later, the German High Command was seriously concerned over the erosion of German capability, not so much in terms of numbers as of morale. Passchendaele was a classic attrition battle and recalls the words of Wellington to his staff late in the afternoon of Waterloo, "Hard pounding, gentlemen. Let us see who can pound the longer."

An interesting contrast can be drawn between the Somme and Gallipoli where the first British troops had landed in the face of fierce Turkish resistance on 25 April 1915. Here the effect of the initial losses seemed to be different from that on the Somme. One historian described the situation just three days after the landing in this way:

"Since dawn on the 25th, the British and Dominion troops had lost nearly 400 officers and over 8500 men; of these some 150 officers and 2500 men had been killed. None had dreamed of anything like this, and the effect on morale was proportionately greater than it would have been if such conditions and losses had been anticipated; the shock was almost palpable. Confidently expecting a walkover, the Army was numbed by reality."⁴⁴

The effect of the drop in morale soon became evident:

"Fresh troops were startled by the haggard look of men who had been fighting for less than a week. Hamilton [General, the British commander], with a lifetime's experience of fighting, and his deep sympathetic insight into the mentality of the soldier, was already extremely concerned about the morale of his troops. 'Any violent struggle for life always lowers the will to fight even of the most cut-and-come-again,' he wrote on the 27th [April]..., 'yesterday morning I saw our men scatter left and right before an enemy they would have gone for with a cheer on the 25th or 26th.'"⁴⁵

The British force probably never recovered its morale. The loss had been 9000 in the first three days out of an estimated 32,000 troops ashore. Yet we saw the British Fifth

⁴³ Leon Wolff, *In Flanders Fields: The 1917 Campaign*. (Ballantine, New York, 1958), pp. 138, 233.

⁴⁴ Robert J. James, *Gallipoli*. (London, Batsford, 1965), p. 141.

⁴⁵ *Ibid.*, p. 142.

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Army at Pilckem Ridge lose more than a third of its strength in a single day and continue the attack.

Still, the brutal small scale attack-counterattack pattern continued on Gallipoli until the tragedy was terminated by Allied withdrawal in December 1915. It is worth noting the fact that over half the total force engaged became casualties, many to disease:

Troops engaged –	British	410,000
	French	<u>79,000</u>
		489,000
Casualties	British	205,000
	French	<u>47,000</u>
		252,000

The Turks too suffered the same rate of casualties.⁴⁶

Another example of continued resistance in the face of catastrophic losses, but under quite different circumstances, came during the last great German offensive of March 1918. Four great offensives were planned by the Germans, the first two of which were specifically intended to destroy the British Army, and it was on the British front that the first tremendous blow fell on 21 March. The Germans had been reinforced by about a million troops and 5000 guns from the Eastern Front, released by the peace signed with the new Bolshevik government of Russia. The British forces, grouped into the Fifth and Third Armies were in very weak condition following the participation of 19 out of 21 divisions in the 1917 Passchendaele campaign. These divisions had lost a large proportion of their best soldiers whose places had been filled, if filled at all, by raw drafts and transfers.⁴⁷

Even more significant than the German reinforcements were the new tactics they had developed--a very short preliminary artillery bombardment and the use of specially trained shock troops to infiltrate the British lines and to bypass resistance points. The Germans achieved a surprise with their tactics and within a day had done what no other army had done since 1914, broken clean through the enemy lines.

⁴⁶ Alan Moorhead, Gallipoli. (New York, Harper, 1956), p. 360.

⁴⁷ Correlli Barnett, The Swordbearers: Studies in Supreme Command in the First World War. (Eyre and Spottiswoods, London, 1963), p. 309.

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Between the morning of 21 March and the night of the 22nd, the Fifth Army had been driven completely beyond its battle zone and half the Army was beyond its last prescribed defensive line. In the course of the next 40 days the British were to lose 300,000 troops, more than one-quarter of all the British troops in Belgium on 21 March, 75,000 between 21 and 26 March alone.

There was only a minimum of panic as the whole British line began to fall back, step by step, fighting all the way. The official British history relates that by the night of March 23, eight of the eleven divisions of the Fifth Army and three brigades of the remaining three divisions originally in the front line had suffered such losses that they were only remnants. They had been in continuous action for three days but the troops continued to resist, forming makeshift units to hold islands of defense rather than a continuous line. They would be repeatedly forced to retire by being outflanked rather than by being driven out.⁴⁸

General Gough, who commanded the Fifth Army, described the situation as of 24 March:

"Casualties by now had been so heavy that in some cases two or three brigades were organized into one, and battalions were concentrated as companies; yet all the time the frontage remained the same, and so did the pressure of the German attack. It placed a terrific strain on the morale and physical stamina of the men of Britain who composed the Fifth Army. The frequent gaps which inevitably occurred as the line got thinner and thinner brought a severe strain on officers and men, who were always finding their flanks turned, having to make sudden counter-attacks to clear them, or to throw back a defensive flank, and finally to retire across the open under close and heavy fire. But they never broke."⁴⁹

Gough visited the corps commanders daily during the retreat until the line stabilized around the 26th, not only to follow the action but to keep a finger on the pulse of both morale and the physical condition of the Army. He felt that "despite the cheery manner of the troops, it was evident that we could not go on forever, and that if the divisions and battalions were not 'nursed,' and if they were exposed too long to the onslaught of superior numbers, there would be a complete break."

⁴⁸ Brigadier General J. E. Edmonds, History of the Great War: Military Operations, France and Belgium, 1918, Vol. I. (Macmillan, London, 1935), p. 369.

⁴⁹ General Sir Hubert Gough, The Fifth Army. (Hodden and Stoughton, London, 1931). p. 282.

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He recounted the experience of particular units. On the 24th a South African brigade, reduced to 500 men was directed to hold a position. After holding for seven hours until fewer than 100 men remained, the position was overrun. The 14th Division, starting the battle under strength with 190 officers and 5737 men had lost by the 26th, 128 officers and 4261 men. Yet it was still fighting in the line and making local battalion size attacks. By the end of the retreat the average strength of the divisions (full infantry strength of 10,000) was 1000 men.⁵⁰

Gough graphically describes the state of exhaustion to which the divisions had been reduced. He quotes from the war diary of one unidentified division for 27 March:

"The troops were very badly in need of a rest; there was no such thing as a platoon or company, and the junior officers (mostly aged 19) were for the most part incapable of dealing with the situation. It appeared absolutely necessary that if the division was to be of any further use, it should be withdrawn from the line and given an opportunity to reorganize and pull itself together even if only six hours could be allowed. This state of affairs was explained to Corps, but the latter replied that such a course of action was unfortunately impossible and that the division must hold on in the line for the present."⁵¹

This was a division that had been continuously in action since the battle began and yet it lost little ground on the 27th and even counterattacked with success.

Even in the lesser campaigns of the First World War substantial loss rates were seemingly accepted. Mesopotamia is a good case in point. A campaign that should never have been fought, Mesopotamia began in September 1914 with the landing of a single British Indian brigade at Basra to protect the nearby oilfield. The British were drawn step by step into a classic case of incremental involvement until 450,000 men were committed. Along the way they suffered a disastrous blow to their prestige in the Middle East when a 12,000 man force was compelled to surrender to the Turks at the siege of Kut-al-Amara.

Unlike the other British desert operation in Palestine, this was essentially an infantry war. Some statistics on these minor fights, usually between forces numbering less than division strength, are enlightening. At the action at Shaiba on 14 April 1915, a British force of 6156 all ranks suffered 1257 casualties (20 percent) in driving the Turks from a position. On 20 November 1915 at Ctesiphon more than half of a British force of 8500

⁵⁰ Ibid., pp. 302, 323.

⁵¹ Ibid., p. 324.

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became casualties. While the Turks again withdrew, the British were too weakened to exploit their advantage. On 7 January 1916 at Sheikh Sa'ad the British lost 4000 men out of 12,000.

After the surrender of the British force at Kut, London decided to undertake a new offensive intended to capture Baghdad and then finish the job thoroughly. The British commander in Mesopotamia was released from the constraints that had held him to minor operations only, and he was authorized to undertake operations that might incur casualties up to a level of 25 percent of his force.⁵² This, in short, was apparently considered a perfectly acceptable level.

It is worth mentioning that in addition to battle casualties, British losses to disease in Mesopotamia and Palestine were enormous. In the Palestine campaign 1917-1918, there were 550,000 British casualties of which 90 percent were non-battle.⁵³ Many of these, of course, were very short term losses, but they must inevitably have had a debilitating effect on the British forces as great as the combat casualties.

The battles of the First World War, from great to small, with their heavy cost were to have an impact on the British in the next great war. As one British historian put it:

"However, the Somme made a lasting and terrible impression on the British national memory. Nothing in their experience of colonial wars had accustomed the British to such immense loss, although in proportion to the numbers employed it was in fact at a rate normal for great battles in the past. And for the first time the loss fell not on the professional army, but on civilians in uniform who had volunteered from every section of British society."⁵⁴

The same historian described the results in the 1939-1945 war:

"The men of the Second World War did not show the same qualities of stoical endurance as those of the Great War. Divisions lost their attacking "edge" more quickly. A lower proportion of casualties than in the Great War was needed to bring a unit to the point of needing relief. This was the price paid for higher effective intelligence and initiative--for social progress. Not even in Burma did the

⁵² Colonel A. J. Barker, *The Bastard War: The Mesopotamian Campaign of 1914-1918*, (Dial Press, New York, 1967), pp. 56, 108, 167, 283.

⁵³ Eggenberger, *A Dictionary of Battles*, p. 272.

⁵⁴ Correlli Barnett, *Britain and Her Army, 1509-1970: A Military, Political and Social Survey*. (William Morrow, New York, 1970), p. 397.

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British Army endure quite the same degree of hardship and loss as the Japanese, or the Russians and Germans on the Eastern Front."⁵⁵

A SUMMATION

1. Formations on both sides were willing to absorb enormous losses and still continue to fight. Even after the deadly pattern of trench warfare had sapped motivation, troops still attacked and defended fiercely.
2. The ability to absorb huge losses was in part a function of the fact that a very large proportion of any formation consisted of fighting personnel.
3. The war illustrated repeatedly the variability and unpredictability of the effect on a formation of sudden heavy battle damage.
4. Morale generally remained high for a surprisingly long time on both sides, and even in the last year of the war with all participants very war weary, troops fought stubbornly irrespective of losses.

⁵⁵ Ibid., p. 474.

IV. CASUALTIES AND RESPONSE IN THE SECOND WORLD WAR AND KOREA

In this chapter we shall examine a wide variety of battle experience, mostly from the Second World War. As in the case of the First World War casualties incurred by units are much easier to determine than the impact those casualties had on the units. What can be seen more clearly is just what these units did during the particular action or in actions afterwards.

A. TERMINOLOGY AND ANALYSIS

One of the most difficult problems in analyzing the problem in the Second World War is the semantic one. In the first World War the armies were based on the standard infantry division, fairly comparable among the major combatants. In the Second World War divisional types and organizations proliferated. With the passage of the years and the toll of battle, variations became even more extreme. For example in the West in the spring of 1944 no two German infantry divisions were alike. The variations among Panzer divisions were even greater.⁵⁶ The terms used in histories or unit records to describe the condition of a unit, its "combat effectiveness," vary so widely that no standard set of definitions is possible. A formation may be entering its first action, fresh and at full authorized strength, or it may be battle-worn and much reduced. Yet there is no assurance that the first category will be more "combat effective" than the second. Categorizations used to describe units that have been in action vary widely but usually give no indication of the criteria used to determine the category.

Only in its first action will a formation be at full authorized strength. Thereafter, even with a flow of replacements, it will almost inevitably be less than full strength to one

⁵⁶ Leonard Wainstein, Some Allied and German Casualty Rates in the European Theater of Operations, paper P-989, IDA, December 1973, p. 12.

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degree or another. The key question is not so much the numerical strength of the formation as its willingness to fight. The two issues are obviously related but there are enough examples to show that the relationship may be in greater or lesser degree.

A few examples will illustrate the point, beginning with German practice in the Second World War. The combat strength of all German forces, (including German fortress garrisons), engaging the Anglo-American forces in Western Europe on 6 September 1944 was recorded in the OKW War Diary in these terms:

"Fully combat efficient" divisions	-	13 infantry; 3 Panzer
"Battered" divisions	-	12 infantry; 2 Panzer
"Battle weary" divisions	-	14 infantry; 7 Panzer
"Decimated" divisions	-	7 infantry
"In process of rehabilitation" divisions	-	9 infantry; 2 Panzer

The War Diary states that all of Army Group B had only 100 tanks on 7 September. How these were divided among the categories must be left to the imagination.⁵⁷ How would one have determined the effectiveness of the last four of these categories?

While Allied forces were counted on a full personnel basis, strength figures representing all personnel in the particular unit, even here anomalies occurred. In April 1944 the British Eighth Army in Italy reported its strength in terms of a "fighting state" of 190,000 men, while the U.S. Fifth Army in Italy reported an "effective strength" of 360,000.⁵⁸ Since both armies were about the same overall size, it is clear that Allied reporting terms and methods did not always follow a standard pattern either at the higher level.

By the spring of 1944 the Germans had begun to ignore assigned or ration strength as a basis of counting or description, instead, calling for reports of "effective combat strength," "combat effectiveness," and "critical armament." "Combat effectives" were defined by the Army High Command as those individuals whose normal place of duty was

⁵⁷ Historical Division, HQ U.S. Army Europe, Foreign Military Series--B034, Oberkommando der Wehrmacht (OKW) War Diary (Transcript), 1 April - 18 December 1944, p. 152.

⁵⁸ G. W. Nicholson, Official History of the Canadian Army in the Second World War, Volume II: The Canadians in Italy, 1943-1945. (Edmond Cloutier, Ottawa, 1956), p. 345.

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at the command posts of the infantry regiments or forward of them. The definition was not that simple, however, since there were all sorts of exclusions (all drivers except for serviceable combat vehicles, all on leave, convalescence, etc.) Basically it included all personnel permanently up front, infantry companies, reconnaissance units, heavy weapons, anti-tank companies and artillery battalions. The personnel included as combat effectives were those on whom the tactical fate of an operation rested. They were definitely separated from those whose primary duty was logistics support but who were generally immune to artillery fire. Yet the term was very flexible and counted actual duty at any time. If cooks and drivers were pressed into action, they too became combat effectives.⁵⁹

To compound the confusion even further, it should be noted that the Germans apparently did not adhere rigidly to this counting method, some references to unit strength being in terms of "battalions" or just "men."

There was a code for reporting battalion combat strength:

"Strong"	-	Over 400 combat effectives
"Medium-strong"	-	Over 300 combat effectives
"Average"	-	Over 200 combat effectives
"Weak"	-	Over 100 combat effectives
"Exhausted"	-	Less than 100 combat effectives

This code in action was shown in the official Canadian history in regard to German strength in Italy:

"The [German] Tenth Army's condition report for the week ending 25 September 1944 reveals that of its 92 infantry battalions only 10, classified as 'strong,' had a strength of more than 400, and 16, 'fairly strong,' between 300 and 400. There were 20 'average' battalions (200 - 300); 38 had less than 200 all ranks (and two were unreported)."⁶⁰

The important point to note is that while American and British infantry battalions at full strength numbered 800 - 900, a "strong" German battalion could be only half that strength. The Germans, in short, were operating from a base line of severely depleted forces, and yet presumably expected that a "strong" battalion could be as combat effective

⁵⁹ James B. Hodgson, The Germans in Normandy, 1 July 1944, Office of the Chief of Military History, MS-R49, April 1954.

⁶⁰ Nicholson, The Canadians in Italy, p. 494.

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as a full U.S. or British battalion. The implications of this for an analysis of the impact of casualties is obvious. While Allied units might well suffer heavy losses in an action, they started from a base line strength much greater than the Germans. Yet to indulge in a very broad generalization, severe casualties seemed to have had greater impact generally on the Allied units than on the Germans.

In the course of this chapter we will look at a number of actions which seem to show considerable divergence in the assessment of combat capability. The formations involved, from armies to companies, are those that suffered heavy losses in a relatively short time. Some of those formations became "ineffective," most continued to operate.

One might start on the macro level with early German losses in Russia. Between 22 June - 30 November 1941, the Germans lost 743,000 men, about 23 percent of the average of a total strength of 3.5 million. This probably amounted, according to General Guderian, to one-third of total division strength. The average daily Wehrmacht loss in this period can be compared with two other campaigns:

Poland 1939	19 days duration	2332 average casualties per day
Western Europe 1940	47 days duration	3320 average casualties per day
Russia 1941	161 days duration	4050 average casualties per day

The blood-letting on the Russian front was continuous and by the fall of 1943 the German Army was a pale shadow of the one that had entered Russia in June 1941.

Another breakdown shows what happened to the Germans in Russia well into 1942⁶¹

<u>Period</u>	<u>Days</u>	<u>German Battle Casualties</u>	<u>Mean Casualties per day</u>
22 June - 31 Aug 41	71	409,998	5770
1 Sept - 31 Dec 41	122	420,905	3450
1 Jan - 31 March 42	90	276,927	3080
1 April - 31 Aug 42	153	481,252	3150

⁶¹ Best, *Dynamics of Battle*, p. 91.

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1 Sept - 10 Sept 42	<u>10</u>	<u>50.198</u>	<u>5020</u>
Total:	446	1,839,280	3670

Despite these fearful losses, the Germans had retained the initiative for most of the first two years of the war, despite the two great and successful Soviet counteroffensives at Moscow and Stalingrad. The straits to which the Germans had been reduced can be seen in a breakdown of comparative strengths for Army Group South presented to Supreme Headquarters by General von Manstein, Army Group commander in August 1943. What is significant is the drastic difference between the number of German divisions and their estimated fighting power.

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Own Formation	Breadth of Front	Number of Divisions	Approx. Fighting Power	Number of Enemy Formations (Excluding those withdrawn to date)
Sixth Army	155 miles	10 infantry 1 armoured	Equiv. to 3-1/2 divs. 1/2 div.	31 rifle divisions 2 mechanized corps 7 armoured brigades (total complement of tanks about 400)
First Panzer Army	155 miles	8 infantry 3 armoured (or panzer grenadier)	Equiv. to 5-1/2 divs. 1-1/4 divs.	32 rifle divisions 1 tank corps 1 mechanized corps 6 armoured regiments 1 armoured brigade 1 cavalry corps (total complement of tanks about 220)
Eighth Army	130 miles	12 infantry 5 armoured	Equiv. to 5-3/4 divs. 2-1/3 divs.	44-45 rifle divisions 33 mechanized corps 3 tank corps 11 armoured brigades 16 armoured regiments (total complement of tanks about 360)
Fourth Panzer Army	170 miles	8 infantry 5 armoured	Equiv. to 3 divs. 2 divs.	20-22 rifle divisions 1 mechanized corps 5 tank corps 1 armoured brigade 1 armoured regiment (total complement of tanks about 490)
<hr/>				
Southern Army Group	610 miles	38 infantry 14 armoured	Equiv. to 18 infantry 6 armoured	

One is struck by the stated approximate fighting power of the German divisions and, on the one hand, the size of the fronts defended and, on the other, the Soviet superiority in numbers. However, von Manstein honestly follows up this breakdown with the following statement:

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"When estimating the case of most of the rifle and armoured formations it lay somewhere between 30 and 50 percent. In the case of a small number of still fresh divisions and individual tank or mechanized corps it was conceivably still between 70 and 80 percent. Undoubtedly, then, the enemy, too, had had very heavy losses, since depreciation of his fighting power was more or less the same as our own."⁶²

The basic disparity between the forces remained the same and both forces continued to fight with much reduced formations.

In the first week of October 1943 the same Army Group South had 37 divisions with an average "front line" infantry strength (another vague German designation) of 1000 men each, which came to about 80 combat soldiers per mile of front.⁶³ This was after the disastrous German defeat at Kursk, the last major offensive they were ever to make on the Eastern Front. With Soviet pressure unremitting from then on, the Germans fell back gradually, resisting all the way. There was no general collapse although losses continued at the same level. The Soviet superiority in manpower and heavy weapons grew steadily.

Another example, on the army scale, of a force inferior in size that nevertheless retained the offensive is that of the North Korean Army (NKA) early in the Korean War. During the period 24 June 1950 when the invasion of South Korea began until early July the NKA never outnumbered the UN Command (UNC) force by more than 2 to 1. By 22 July the UNC total forces equalled the NKA and in the closing days of July gained a numerical superiority which continued to increase until the Communist Chinese entered the war in November.

The NKA launched a major offensive against the Pusan Perimeter at the beginning of September. The official U.S. history states:

"However, any realistic analysis of the strength of the two opposing forces must give a considerable numerical superiority to the UNC. There was an even greater superiority in artillery and armor than in men, with a weapon firepower superiority probably of 6 to 1 over the NKA."⁶⁴

⁶² Field Marshall Erich von Manstein, Lost Victories, (Presidio Press reprint, Navato, CA, 1982), p. 457.

⁶³ Earl F. Ziemke, U.S. Army Historical Series. Stalingrad to Berlin: The German Defeat in the East. Office of the Chief of Military History, U.S. Army, Washington, DC, 1968, p. 174.

⁶⁴ Roy E. Appleman, The U.S. Army in the Korean War. South to the Naktong. North to the Yalu. Office of the Chief of Military History, Dept. of the Army, Washington, D.C. 1961, pp. 265, 547.

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On 1 September the UN forces numbered 180,000 in the Perimeter. There were 600 U.S. medium tanks armed with 90mm and 76mm guns, opposed by probably not more than 100 North Korean T34 tanks with 85mm guns. The North Koreans had launched their offensive with some 98,000 troops, a third of whom were raw conscripts with little or no training and few weapons. They lost some 28,000 in the two weeks, and probably more since some reinforcements may have reached them.

In mid-September, after two weeks of heavy fighting in which the NKA maintained a general offensive, it was estimated that the NKA numbered about 70,000 while the UNC consisted of 85,000 U.S. troops, 2000 British, and 73,000 South Koreans.⁶⁵

The official history explains, almost parenthetically, one of the reasons for this seemingly curious disparity. It points out that at the beginning of the NKA September offensive, "the assigned strength of U.S. divisions was belied by the strength of the rifle companies, some of which were down to 50 or fewer effectives." What this suggests is that the "combat effectives," to use the German term, of the UNC were not more numerous than the NKA and perhaps were even equal. The increasingly large non-front line tail of Western armies accounts for the phenomenon.

The capability of the North Korean Army to continue to fight is exemplified by what we know of the 3rd NK Division at the end of August 1950. The formation had been at full strength, 11,000 men, at the outset of the invasion on 24 June. By 31 August some 8600 replacements had been received but these were poorly trained, and U.S. intelligence estimated that "the combat effectiveness of the unit may be assumed to have fallen at least 40 percent." Strength on 31 August was about 4300.

Yet this force, at less than 40 percent of its designated strength, attacked and fought U.S. forces in a stern battle over the next three weeks.⁶⁶

B. UNEQUAL DISTRIBUTION OF CASUALTIES

That the infantry battalions of larger formations have in the past incurred the bulk of the casualties is a truism, yet its extent is sometimes not recognized and, therefore, its

⁶⁵ Ibid., pp. 382, 392, 395, 547.

⁶⁶ Robert J. Best, A Study of Battle Casualties Among Equivalent Opposing Forces, Korea, September 1950. Operations Research Office, 5 September 1951, p. 121.

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impact not fully appreciated. Approximately 90 percent of an infantry division's casualties have been incurred by the infantry regiments. Usually this means in any specific action the two lead regiments normally will incur the bulk of the losses since one regiment will be kept in reserve for commitment as needed. In the Second World War an American infantry regiment of 3207 full strength represented 22.8 percent of a divisional total of 14,032. In Korea the regiment had increased to 3662 and the division to 18,180, the regimental proportion then being 20.4 percent.⁶⁷

In the campaign on Luzon, the Philippines, 9 January - 15 August 1945, the infantry incurred 90 percent of all the U.S. Sixth Army casualties and 90 percent of all troops killed in action.⁶⁸ The three U.S. Marine divisions that assaulted Iwo Jima suffered 22,827 casualties. The 24 participating rifle battalions supplied 83 percent of this total and 95.7 percent of the losses of their parent regiments. The two Marine divisions on Saipan experienced similar ratios, their 18 infantry battalions contributing 71.5 percent of the 10,360 divisional casualties and 93.4 percent of the regimental losses. The nine battalions of the Army's 27th Division on Saipan sustained 77.8 percent of its losses and 90.8 percent of their regimental losses.

To refine the point further, during the battle for Taegu, Korea, in 1950, in the 8th U.S. Cavalry Regiment, the four non-rifle companies--heavy mortar, medical, service, and regimental headquarters constituted 21 percent of the regimental strength, yet they suffered only 9.3 percent of the regiment's 857 casualties.

Among the five British divisions in Burma during 1943-45, the infantry brigades sustained 68 percent of the casualties although they comprised 44 percent of the total divisional strength. Perhaps most enlightening is the example of Operation GOODWOOD, the largest Allied armored operation launched in the Western campaign, by the British in mid July 1944. Using an armored corps of three British armored divisions plus two independent armored brigades and supported by three British and Canadian infantry divisions, Montgomery tried to punch a hole through tough defenses in good defensive

⁶⁷ Historical Evaluation and Research Organization, Average Casualty Rates for War Games Based on Historical Combat Data, Washington, D.C., 15 Feb 1967, p. 10.

⁶⁸ Robert R. Smith, The U.S. Army in World War II. The War in the Pacific: Triumph in the Philippines, Office of the Chief of Military History, Dept. of the Army, Washington, DC, 1963, p. 652.

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country, using armor as the battering ram. Despite the fact that the three day battle that failed to break through put nearly one-third of all the British tanks on the Continent out of action at one point, 88 percent of all the casualties were still suffered by the three infantry divisions.⁶⁹

In the campaign in Italy the average loss rate for infantry companies was 34.3 percent, the Eighth Army average being 34.6 percent, the Fifth Army 33.9 percent.⁷⁰

The burden borne by the front line combat infantry elements, especially in a force on the defensive against very heavy odds, is illustrated by the table below, giving German divisional strengths in Italy as of 2 July 1944.

STRENGTH LEVELS OF TYPICAL GERMAN DIVISIONS IN ITALY*

Division	Entire Division		All Combat Units		Infantry Units	
	Strength	Percent of TO	Strength	Percent of TO	Strength	Percent of TO
356th Inf	10,909	88	3927	37	2269	38
4th Prcht	9,161	58	4050	28	1850	19
29th Panz Gren	12,889	93	5217	44	2734	20
90th Panz Gren	11,840	86	3954	33	1839	22

* N.C. Phillips, Italy, Volume 1: Sangro to Cassino. (War History Branch, Dept. of Internal Affairs, Wellington, New Zealand, 1957).

The German commander at Cassino was later to write:

"Even in the most favorable case, only 25 percent of all combat troops [underscore added] were in the infantry of the forward line at the outset of fighting. It is just this fraction that quickly melted away in a major battle, while the other 75 percent, the helpers of the infantry, remained. It was tirelessly sought to equalize

⁶⁹ Best, *Dynamics of Combat*, pp. 63-67.

⁷⁰ John Ellis, *Cassino: The Hollow Victory*. (McGraw Hill, New York, 1941), p. 198.

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this gross disproportion. Yet it didn't help to use the specialists of the helping units in battle, for which they were not prepared. Thus conditions worsened from day to day."⁷¹

The British official history of the Western Europe campaign gives an enlightening breakdown of the composition of the British personnel in Twenty-First Army Group as of August 1944. Of some 660,000 personnel, 56 percent were what was termed "fighting troops" and 44 percent "services." The 56 percent was composed of the following:

Royal Artillery (including anti-aircraft regiments of the Royal Marines) - 18 percent
Infantry (rifle, machinegun, mortar, parachute and air-landing battalions:
commandos and glider pilot wings) - 14 percent
Royal Engineers - 13 percent
Royal Armoured Corps - 6 percent
Royal Corps of Signals - 5 percent⁷²

The British infantry, comprising only 14 percent of British Army Group strength, carried the burden of upwards of 90 percent of total British casualties in Twenty-First Army Group.

Even in armored divisions the burden of losses fell most heavily on the armored infantry battalions. A case study of the U.S. 6th Armored Division in a five day action during the Battle of the Bulge indicated that 70 percent of the overall battle casualties were incurred by the Division's armored infantry battalions in contrast to 13 percent for the tank battalions. Each infantry battalion took between 20 and 25 percent of total divisional losses, tank battalions between 3.6 and 5.1 percent.⁷³ In another action in the Bulge, the U.S. 7th Armored Division at St. Vith, losses among the tank companies totaled 8 percent of the divisional loss, those of the armored infantry 40 percent.⁷⁴

The casualty burden on the infantry battalions and rifle companies particularly had a skewing effect on the casualty picture as well as a gradually accelerating cumulative effect

⁷¹ General F. von Senger und Etterlin, Krieg in Europe. Kiepenheuer and Dritsch, Cologne, 1960. p. 230.

⁷² United Kingdom Military Series, History of the Second World War. Major L. F. Ellis et al, Victory in the West. Volume I: The Battle of Normandy. (HMSO, London, 1962), p. 536.

⁷³ Captain J. W. Compton, Personnel Attrition Data. (TRASANA TR-29-83. Dept. of the Army, U.S. Army, TRADOC Systems Analysis Activity, White Sands Missile Range, New Mexico, Nov. 1983), p. 36.

⁷⁴ Ibid., p. 109.

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on the operation of the units. A U.S. Army study on the replacement problem, conducted after the war, stated:

"Early in 1944, the severity of infantry combat had aroused misgiving about the adequacy of the individual replacement system. Battle and non-battle casualties in infantry were so much higher than in the other branches that divisions rapidly lost their full effectiveness, even though non-infantry elements of the divisions were capable of further effort. Long periods of unrelieved combat produced large casualties; these in turn laid heavy demands on the replacement system. Even where replacements were provided promptly, they actually had to be fed into units while actively engaged with the enemy. New men, under these circumstances, suffered heavy casualties because they were not adjusted to battlefield conditions or acquainted with members of their units. The dwindling stock of veterans was more rapidly reduced then because these men had to expose themselves more often in providing needed leadership for the large drafts of replacements."⁷⁵

A German officer responsible for administration and personnel made the same point in a study done in 1948. He dealt with the practice, sponsored by Hitler, of creating new divisions instead of keeping old ones fully manned.

"New organizations, particularly of special troops, were certainly desirable and, to a certain extent, unavoidable, but they should not be allowed to render the remanning of already existing divisions impossible as actually did happen. Losses increase at a disproportionately fast rate if an inadequately manned unit be committed to action, and this applies particularly to officers and NCOs, who are hard to replace. The result is a decreased standard of training condition in the unit which again results in a still greater increase in losses until the point is reached where the combat value of the troops can no longer be re-established and disintegration commences. If the inherent character of a unit has once been affected in this manner, that unit cannot be restored to the level of its original combat value, even if it be brought up to full strength in manpower and equipment, etc..."⁷⁶

Hitler also resisted the dissolution and combining of divisions on the grounds of unit prestige and to deceive enemy intelligence. There was a steady reduction in the size of the standard German infantry division, from 17,895 in the 1939 organization to 12,769 in the 1944 type division, but this was seen as justified by making the formation more controllable and flexible.

⁷⁵ Historical Section, Army Ground Forces, Provision of Enlisted Replacements. Study #7, Washington, DC 1946, p. 32.

⁷⁶ General Major Burkhard Mueller-Hillebrand, Personnel and Administration, Foreign Military Series MS-P-005. 30 August 1948, p. 51.

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The same thought on the accelerating and cumulative impact of infantry losses was reflected in the words of the commanding general of the 1st Canadian Infantry Division in Italy. On 3 January 1944 the Division reported that a month long advance from the Moro River to the Riccio River had cost 176 officers and 2163 other ranks, killed, wounded and missing, plus another 1617 lost to sickness. This represented a total of 3959 out of the 18,347 in the full strength British/Canadian division (870 officers, 17,477 ORs), 21 percent casualty rate overall.

The arrival of reinforcements, 150 officers and 2258 ORs, partly met the deficiencies that were further reduced by the return to duty of some of the sick. The Division was still 1050 below strength. The commanding general, however, reported "that it was no longer possible to maintain the sharp fighting edge." Every one of his infantry battalions had suffered 50 percent casualties in its rifle companies, and it was by the rifle strength of its battalions that the condition of the Division had to be judged. Units in contact with the enemy could not readily absorb large numbers of reinforcements, no matter how well trained. The commanding general continued, "Without a pause for reorganization, the offensive spirit of an infantry division is bound to become spent, not for lack of offensive spirit, but simply because the quality of the offensive team play within the rifle companies had deteriorated."⁷⁷

The point of interest and significance is the difference among armies and the formations within them as to when that point of diminishing returns is passed. The examples that follow will show the contrast.

C. VARIABILITY AND UNPREDICTABILITY OF THE IMPACT OF CASUALTIES

At the Fuehrer Conference on 17 June 1944 Field Marshal Rommel reported that the German troops were approaching exhaustion and that some of the infantry divisions had been reduced to mere battle groups.⁷⁸ This was after only the first eleven days of the invasion. Representative losses in German divisions between 6 June - 11 July had been:

⁷⁷ Lt.Col. G. W. Nicholson, Official History of the Canadian Army in The Second World War, Volume II: The Canadians in Italy, 1943-1945. (Edmund Cloutier, Ottawa, 1956), p. 338.

⁷⁸ James Hodgson, The German Defense of Normandy: The Situation at the Beginning of July 1944 and the Background--OCMH-R-24. September 1955, p. 7.

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243rd Division	-	over 8000
352nd Division	-	almost 8000
716th Division	-	more than 6000
12th SS Panzer Div	-	4485 (infantry components reduced to the strength of one battalion, 1/6 authorized strength)

Only 5200 replacements had been received to make up for 33,000 casualties among the six divisions (6 percent replacement rate, although another 7500 (9 percent) were promised or on the way.)⁷⁹ The six divisions were probably fairly typical of those German formations that had been in contact continuously with the Allies.

Nevertheless, in their reduced state these German divisions still were able to exact a heavy toll from the attacking Allies. A few examples of U.S. divisional losses in early July will illustrate what severe casualties these badly attrited German forces were able to inflict.⁵⁴

90th Division: 2-7 July -- over 2000 casualties

79th Division: 2-7 July -- over 2000 casualties (over 1000 on 7 July alone)

83rd Division: 4 July (first day of combat) -- almost 1400 casualties

83rd Division: 6 July -- 750 casualties

The official history states in regard to the 83rd, "With these losses, many among key personnel, the future effectiveness of the division had been seriously impaired."⁸⁰ By 13 July the 83rd had suffered a "staggering total of 5,000 casualties and "would have been a skeleton but for progressive integration of replacements."

The 4th Division from "D" Day to Cherbourg took 5400 casualties. Only five of the "D" Day company commanders were still with the 4th Division three weeks later. 4400 replacements had arrived but the Division commander noted that he no longer had the division he had brought ashore. The Division was relieved and put into reserve 15 July, after taking 2300 casualties in the previous ten days, including three battalion commanders and nine rifle company commanders.

⁷⁹ Blumenson, *Breakout and Pursuit*, p. 181.

⁸⁰ *Ibid.*, p. 84.

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In the case of the 90th Division, by 12 July no company had more than 100 men. However, the Division was unable to advance rapidly because of other factors besides casualties--fatigue, the hedgerows, supply and communication difficulties.

The 30th Division between 7 and 11 July took 1300 casualties. Four days later the unit had taken another 2000 casualties.

The 29th Division on 11 July suffered 500 casualties; on 12 July, 500 more. In this particular action the German 3rd Parachute Division had been reduced to 35 percent of its authorized strength while a battle group of the 353rd Division had been reduced from 1000 to 180. Nonetheless, these forces held up the 29th Division's attack. Skeletal German forces had managed to inflict severe losses on the attacker, surely a measure of the effectiveness of a defense.

One of the more memorable examples of the cumulative effect of infantry losses on U.S. units was the battle of the 28th Division at Schmidt in the Huertgen Forest, November 1944. The battle was the first sharp defeat inflicted on a U.S. division size force since the breakout from Normandy and it reflected the reduced tempo of advance that had set in as the U.S. armies approached and dug their way into the Siegfried Line. The 28th had participated in the later stages of the Normandy battle and had joined in the pursuit across France. Rested after a month along a relatively inactive sector of the Siegfried Line front, the Division was almost at full strength, although there had been many replacements as a result of an unsuccessful effort to penetrate the Siegfried Line near Pruen after the pursuit.

The battle for Schmidt was fought in the dank, dark forest, the gloominess of which clearly influenced the spirit of the troops. The main supply route chosen turned out to be a trail virtually impassable except when the weather was good, and that was rare. As the Division moved into the line it found among the units it relieved much evidence of hard fighting and this made a strong impression both on the troops and their commanders.⁸¹

The Germans later acknowledged the difficulties of fighting in the cold, wet forest, as difficult for the defenders as for the attackers. Added to these mutual difficulties, the Germans mentioned poor communications, poor observation, danger of flank attacks,

⁸¹ C. B. MacDonald and S. T. Mathews, The U.S. Army in World War II: Three Battles: Arnaville, Aluzzo and Schmidt. (Office of the Chief of Military History, Dept. of the Army, Washington, DC, 1952), p. 255.

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abrupt differences in elevation that made the use of tanks very difficult and dangerous, and the condition of the ground due to the cold rain. The Germans recognized, however, that these environmental conditions did favor them since the U.S. superiority in air and artillery could not be effectively employed.⁸²

The effective strength of the 28th Division at the start of the action on 2 November was 13,932 plus 2334 attachments, a total of 16,266. In the course of the battle 3903 replacements were sent to the division, covering 53.8 percent of officer losses and 83.8 percent of enlisted losses. Overall 82.3 percent of the division's losses were replaced and 31.7 percent of the losses of the attached troops. After twelve days of action, however, the division was reported destroyed as a fighting unit and was relieved.⁸³ Total casualties, battle and non-battle, had been 6184 ⁸⁴, 2100 of these from the 112th Infantry Regiment. Despite the steady flow of replacements, the operability of the combat battalions had steadily declined. Of the nine rifle battalions, four were withdrawn on 8 November, having shifted from attack to a positional defense. As percentages of their partly replenished strengths, their cumulative losses from the start of the battle were 31, 51, 57, and 68 percent. A fifth battalion, which had also been brought to a standstill, collapsed on 10 November in a rarely seen rout, its losses being unknown. A sixth battalion, also forced onto the defensive, was withdrawn when its cumulative loss reached 64 percent.⁸⁵

The casualty rate for the original division, plus attachments and replacements was 30 percent, concentrated in the infantry regiments. The 28th Division was clearly not shattered by simple numerical losses since these were for the greater part made up. The collective will probably collapsed because of the loss of "old timers," the psychological block derived from the unexpected and effective German defense, the nature of the battlefield, and all those intangible elements that confound precise analysis of battle.

A month later, however, the 28th Division was recuperating in the sector where the German Ardennes offensive was launched. The formation now fought well and played its full role in halting the Germans.

⁸² Major General V. Gersdorff, The Battle of the Huertgen Forest, November-Early December 1944. (Foreign Military Series, A-891, U.S. Army Europe, no date), p. 4.

⁸³ Clark, Casualties as a Measure of the Loss of Combat Effectiveness..., pp. 39-40.

⁸⁴ Charles B. MacDonald, U.S. Army in World War II. The European Theater of Operations. The Siegfried Line Campaign. (OCMH, Dept. of the Army, Washington, D.C., 1962), p. 374.

⁸⁵ Best, Dynamics of Combat, p. 123.

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In the Ardennes some German units were reduced to shreds but none broke, and when the retreat began, it was on a step-by-step basis. The 276th Volks Grenadier Division, for example, had losses such that many of its companies were reduced to 10 man strength, while the 212th Volks Grenadier Division in twelve days had companies with an average strength of 25 to 30 men.⁸⁶ Yet they made the Americans fight for every yard of ground they were forced to yield.

At Cassino, a classic infantry battle, terribly depleted German forces did fight on and hold a position for a long time against heavy odds. When the third major Allied assault on the ruins of Cassio was launched on 15 March 1944, the town was held by the German 1st Parachute Division. One of its component regiments (the 3rd) under the same commander, had fought the now attacking New Zealanders in the battle for Crete in May 1941. Despite a very heavy preliminary air and artillery bombardment, the Germans emerged to resist the New Zealand Division in a furious and continuous engagement. Their losses were extremely heavy, one company at the end of the third day of battle having sunk to a strength of eight men. By the sixth day the remnants of the 3rd Parachute Regiment had lost all identify as battalions and had consolidated into a single group, daily being compressed further into a shrinking defended sector. Nevertheless, the paratroops were reported as undaunted and their spirits high. The German commander, General von Senger, would not hear of replenishing their ranks with other second rate troops that were available to use. The handful of paratroopers held out until the New Zealanders broke off the attack two days later.

The five New Zealand battalions committed lost respectively, during the period 15 - 26 March 1944, 223, 141, 183, 280, and 99 casualties. The TO strength of the battalions was 763 but they probably were not at full strength. The casualty rates by battalion were roughly 30 percent, 18 percent, 24 percent, 37 percent, 13 percent, or an average of about 24 percent, if TO strength is assumed.

One analyst says of this operation:

"The attack plainly was not defeated by casualties alone. Its outcome must be attributed to relative failure of performance stemming in part from circumstances external to the assault units and in part from high casualties in taxing conditions.

⁸⁶ Cole, The Ardennes, p. 507.

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"As casualties mount from hour to hour in a bitterly fought engagement, activity tends to ebb toward inertia. With the forward units becoming inoperable on both sides, the close combat situation approaches a quasi-stable state in which neither stymied force is capable of rising spontaneously to dispatch the other."⁸⁷

This suggests that the defender should try to finish off the attacker, but, in fact, the virtue of the defense is the ability to stand fast and thereby achieve the objective. It is not necessary to wipe out the attacker as the attacker ideally has to do to the defender, if the latter does not ultimately withdraw from his position. An attacking force may break off an engagement not merely because of casualties actually incurred but because of expectation of more or even heavier casualties to come. If there has been little progress to show for the losses already suffered, the attack can be discontinued as a way of cutting losses in a hopeless operation.

In the two-day effort of the U.S. 36th Infantry Division ("The Texas Army") to force a crossing of the Rapido River in Italy, 20 - 22 January 1944, the battle casualties for the 141st and 143rd Infantry Regiments that made the assault were 1007 and 969 (perhaps 35 - 40 percent of regimental strength). Casualties for the whole division for the month of January, mostly incurred in the Rapido crossing, were 2255 battle casualties and 2009 non-battle. Yet one historian has described the result, "The combat effectiveness of both regiments committed at the Rapido River crossing was for the time being destroyed."⁸⁸

Another case from Italy was even more devastating, again around the Anzio bridgehead. On 30 January 1944 near Cisterna the U.S. 1st and 3rd Ranger battalions (the U.S. World War II equivalent of the British Commandos) were surrounded during an advance by a hastily organized German battle group. Relief did not reach them and the next day the units were nearly all captured. Six men escaped out of 767 in the two battalions, about 120 being killed or wounded. The men surrendered as their ammunition gave out.⁸⁹ With a casualty rate of 15 percent the Rangers were not defeated by battle damage; they simply ran out of the means to resist. This case represents another category of the subject

⁸⁷ Best, Dynamics of Combat, p. 131.

⁸⁸ Robert L. Wagner, The Texas Army: A History of the 36th Division in the Italian Campaign. (R.L. Wagner, Austin, 1972), p. 121

⁸⁹ United Kingdom Military Series, History of the Second World War, Brigadier J. C. Molony et al., The Mediterranean and the Middle East, Volume V--The Campaign in Sicily 1943 and the Campaign in Italy, 3rd Sept 1943 to 31 March 1944. (HMSO, London, 1973), p. 673.

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of this paper . Unit performance can be just as much degraded by logistical failure as by battle damage.

Mutual exhaustion was the result of the first month of fighting at the Anzio bridgehead. A five day German counterattack in mid-February 1944, for example, cost the U.S. 45th Division 400 dead, 2000 wounded, 1000 missing and 2500 non-battle casualties. After the first month of battle at Anzio, the losses on both sides were about equal, 20,000. The U.S. history describes it, "losses totalling almost 40,000 casualties from forces [Allied and German] numbering 200,000 meant that the combat units on both sides of the front were close to impotence. A temporary stalemate had been reached."⁹⁰

Yet contrasts in performance can be shown repeatedly. During the Lorraine Campaign, in an action at Farebersviller during the U.S. XII Corps drive to the Loire River, the 3rd Battalion of the 317th Infantry Regiment (U.S. 80th Infantry Division) had captured half the town after a fierce fight. Despite German counterattacks the 3rd Battalion reported around noon that it was "beginning to creep forward again," although the largest company had only 35 men and one company numbered but 16.⁹¹

In the same campaign by the night of 2 December 1944, the 95th Division was described in its G3 Periodic Report as being "tired." In four of the infantry battalions effective combat strength had been reduced to 55 percent or less, with the efficiency ratings of some battalions reading "very weak." The 95th grew weaker and its condition shortly later was described in familiar terms:

"Now like the rest of the American divisions actively engaged on the Western Front, the 95th Division had to rely more and more on green replacements who were being thrown into battle with generally no more than basic or refresher training. These replacements did not suffice to fill the gaps in the ranks, for an alarming shortage was already making itself felt as the replacement depots and battalions ran dry."⁹²

In September 1944 two brigades of the Canadian 3rd Infantry Division assaulted and captured Boulogne. What was expected to take two days took six. The principal resistance was not from the rather low quality German infantry defenders but from dug in

⁹⁰ Martin Blumenson, The U.S. Army in World War II. The Mediterranean Theater of Operations. Salerno to Cassino (OCMH, United States Army, Washington, DC 1969), p. 424.

⁹¹ Hugh Cole, The U.S. Army in World War II. The European Theater of Operations: The Lorraine Campaign. (Historical Division, U.S. Army, Washington, DC, 1950), p. 485.

⁹² *Ibid.*, p. 573.

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German artillery that delayed every step in the Canadian attack.⁹³ The lesson here for unit performance in the face of battle damage concerned time. Casualties cause delay and delay causes casualties. The 640 Canadian casualties (about 15 percent of the six attacking battalions) would have been fewer had the operation been shorter. It should also be mentioned that the Canadian armored vehicles, tanks and personnel carriers, were hampered by the broken up ground resulting from Allied bombing that preceded the attack.

Operations in the Pacific also produced heavy casualties against an enemy who usually preferred not to surrender. On Tarawa the 2nd Marine Division had to kill 4700 of the 4800 defenders before the island was secured. Of the 5000 Marines in the initial assault, 1500 became casualties, while in the whole four day operation, 991 Marines were killed and 2311 wounded. Since a Marine division numbered some 20,000, the divisional loss rate was not excessive, some 16 percent. The losses, of course, were in the rifle battalions.⁹⁴

Tarawa reflected the distinctive character of the Pacific island war in which the battlegrounds (with the exception of New Guinea and Luzon) were quite circumscribed, where the U.S. forces brought to bear overwhelming power, and where after the first year the end of the game was a foregone conclusion. Both Japanese and American troops knew this by 1943 and it no doubt influenced their approach to battle. The Americans, especially the Marines, were willing to accept high casualty rates to achieve more quickly the inevitable victory, knowing that there were always more resources behind them to carry the job through.

The conquest of the Palau Islands, on 15 September - 25 November 1944, caused the 1st Marine Division 6526 casualties (1252 killed) and the 81st Infantry Division 1393. 13,600 Japanese were killed and 400 captured. During the initial fighting the 1st Marine Regiment lost 56 percent of its starting strength as battle casualties in the first six days of sustained attack by nearly all its units. It was at this point relieved as ineffective for further use, but no component had broken. After the first two days of battle K Company with 67 percent loss went into reserve, but C Company with 62 percent loss renewed its attack. On 20th September A Company attacked with 56 men and 10 returned unwounded, and by

⁹³ Best, *Dynamics of Combat*, p. 38.

⁹⁴ Eggenberger, *Dictionary of Battles*, p. 429.

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late on the 20th the nine rifle platoons of the 1st Battalion had 74 men left, a 79 percent loss rate.⁹⁵

The capture of Iwo Jima in a 38 day battle produced very heavy losses among the three Marine divisions engaged. Total casualties were 6821 dead and over 18,000 wounded, some 25,000 out of the 60,000 odd involved. The TO strength of a Marine battalion was then 1114, and of a regiment about 3550. The typical rifle battalion incurred about 680 battle casualties plus about another 100 suffering combat fatigue. Aside from casualties among replacements, at least 60 percent of each battalion's starting strength was put out of action. The 28th Regiment lost 895 men in the first five days, received 322 replacements by the fourteenth day and estimated its efficiency at that time as being 40 percent. The average battalion of the 27th Regiment with replacements numbered about 316 at the end of the battle or 34 percent of initial landing strength.⁹⁶

In the case of the 5th Marine Division, the strengths and casualties were:

Units	Number on 17 Feb 45	Casualties	Percentage
Organic	17,067	7180	.45
Attached	3,529	190	.05
Replacements	2,545	1400	.55

In addition 1275 men were evacuated as sick, but 1075 returned to duty during the battle. About 125 were permanently evacuated for serious psychoneurotic conditions.

The 5th Marine Division losses on Iwo showed a high ratio of dead to wounded.⁹⁷

⁹⁵ Best, *Dynamics of Combat*, p. 120.

⁹⁶ *Ibid.*, p. 46.

⁹⁷ Howard M. Conner, *The Spearhead: The World War II History of the 5th Marine Division*. (Infantry Journal Press, Washington, DC, 1950), p. 179.

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Rank	Killed in Action	Wounded	Missing
Officers	104	250	2
Enlisted	2378	5968	17
Total:	2482	6218	19

The casualty rate per 1000 men per day for all three Marine divisions was: killed 3.77; wounded -- 10.34; missing -- .04.⁹⁸ Despite the loss rate, however, none of the divisions were relieved and continued in action for the full period of the battle.

The fight for Okinawa was overall the most costly of the war in the Pacific. Between 1 April and 30 June 1945, the U.S. Tenth Army lost 7374 killed and 32,056 wounded. The Navy suffered 5000 dead and 4600 wounded. 125,000 Japanese were killed and 7400 captured.

Casualties by divisions were:⁹⁹

Division	Battle Casualties	Non-Battle Casualties
7th	6068	4825
27th	5325	2969
77th	5026	2100
96th	7430	2817
1st Marine	7901	5101
2nd Marine	94	1
6th Marine	8326	4489

⁹⁸ G. W. Beebe and M. DeBakey, Battle Casualties: Incidence, Mortality, and Logistic Considerations. (C.C. Thomas, Springfield, Ill., 1952), p. 51.

⁹⁹ R. E. Appleman, et al., The U.S. Army in World War II. The War in the Pacific: Okinawa: The Last Battle. (Historical Division, Dept. of the Army, Washington, DC 1948), p. 490.

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Six of the seven U.S. divisions suffered losses equal to at least 50 percent of their original strength, but in this last campaign of the Pacific War, replacements must have been available in sufficient number to keep up unit strength.

The Japanese had more maneuver room on Okinawa than in most of the island battles and their resistance was both skillful and fierce. As the Americans moved forward to engage relatively fresh Japanese units, the remnants of those Japanese units decimated in the action were amalgamated in one way or another. Although units as such were successively all but consumed, it would seem that the Japanese succeeded in maintaining effective overall operability despite the protracted fighting and increasingly severe overall attrition.¹⁰⁰

These U.S. loss figures reflect American strategy in the Pacific War. The battle was against a fierce enemy who could not retreat or be reinforced but could only stand his ground and die. Heavy losses were inevitable in battles where it was necessary to kill virtually the entire enemy force. The battle grounds offered little scope for tactical maneuver so each battle against the Japanese tended to be a stand-up slugging match to the very end, with the Japanese weakening at a faster pace than the American units that were steadily reinforced and replenished.

Sometimes a heavy loss of men in a very short period of time can have a shock effect on a unit which can be almost as corrosive to morale as protracted attrition. The first use of poison gas is one earlier example, heavy loss combined with a new and fearsome weapon. The first gas attack on 22 April 1915 hit a French Algerian division which totally collapsed. Adjacent British and Canadian units were also hit, but the troops quickly tried simple expedients like holding wet handkerchiefs to their faces, so casualties were much fewer than in the French sector and panic and rout avoided. Casualty figures are uncertain but it is believed that the first gas attack may have inflicted some 15,000 casualties, 5000 of them dead.

One of the few cases of an American unit being virtually wiped out occurred on Saipan. There a Japanese banzai charge of 1500 - 3000 men overran the two forward

¹⁰⁰Best, Dynamics of Combat, p. 121.

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battalions of the 165th Infantry Regiment, killing 406 and wounding 512 of the 1100 - 1200 effectives.¹⁰¹ The whole 27th Division was staggered.

The U.S. 2nd Division in Korea also experienced very heavy losses in a single day at the Battle of Changchon, 26 - 30 November 1950. The division was carrying out a fighting withdrawal in the face of the Chinese offensive and found on the last day that the road was blocked by a Chinese division that had come in behind them. Total casualties for the division during the four day battle were 4163, most of which occurred the last day along with all the equipment lost.¹⁰² The division had to be taken out of the line.

Other examples of heavy shock, this time from aerial attack, occurred during the massive carpet bombing of the German positions in Normandy that preceded the American breakout. Operation COBRA, 24 - 25 July 1944. The Panzer Lehr Division was directly in front of the main American thrust. An elite force, at full strength it would have comprised 14,519 men (7120 combat effectives) and 200 odd tanks, but it had been overrun by the British in late June and reduced to 45 armored vehicles and 2200 combat effectives. These were required to occupy the outposts, man the main line of resistance, and constitute reserves.¹⁰³

No fewer than a thousand Germans must have been killed in the 25th July air attack, including a full third or more of the combat effectives in the main line and the reserve positions, leaving the survivors dazed. Perhaps only a dozen tanks or assault guns remained in operation. The battalion command posts of Panzer Lehr were demolished and the attached paratroop regiment (500 combat effectives) virtually vanished. The bombing had brought temporary demoralization and loss of will to fight. "Even more important than casualties were the confusion, disruption of communications, and the shock effect. Some German soldiers were still deaf 24 hours later. As a result only feeble and local resistance was possible against attacking American infantry." However, overall German casualties for all forces in the breakthrough area were conservatively estimated at 10 percent.¹⁰⁴

¹⁰¹ Ibid., p. 126.

¹⁰² United States Military Academy, Operations in Korea. (USMA, West Point, 1954), p. 26.

¹⁰³ James Hodgson, The Effect of the COBRA Bombardment on the Panzer Lehr Division, 24 - 25 July 1944. OCMH-R31. (OCMH, Washington, DC, November 1953), p. 6.

¹⁰⁴ Blumenson, pp. 240, 329.

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The same COBRA air bombardment also hit American forward units, both on 24 July and 25 July. On the 24th the short bombing hit elements of the 30th Division, killing 25 men and wounding 131. The official history states, "On the Corps' left, the 30th Division did not advance at once because the assault elements were stunned and demoralized by the bombardment incident. It took almost an hour for the units to recover and reorganize."¹⁰⁵

On the 25th another short bombing killed 111 American infantrymen and wounded 490, including Lt. General McNair. The official history states:

"As news of the second short bombing spread across the battle area on 25 July, the sense of elated anticipation that had come with the appearance of the COBRA bombardment fleet vanished... . Near the vicinity where the short bombs had fallen, troops were disorganized and in some cases attack plans disrupted. The entire command group of the 3rd Battalion, 47th Infantry, had been destroyed with the exception of the battalion commander."¹⁰⁶

Despite the disorganization caused by the bombing, only two units, a regiment of the 9th Division and a battalion of the 30th Division, were unable to attack on schedule and these jumped off after a relatively brief delay. The 30th Division recovered with what the official history termed as "amazing quickness." However, soon after the infantry started forward, U.S. fighter planes bombed and strafed the troops again, driving them into ditches and bomb craters. Fortunately the Assistant Division Commander was on hand "to inspire the men who appeared to be on the verge of panic."¹⁰⁷

The same misfortune befell Canadian and Polish troops during the effort mentioned earlier to close the Falaise-Argentan pocket in August 1944. In order to avoid a collision between Allied forces, U.S. forces on the southern shoulder of the German escape route from the pocket were ordered to stand fast while responsibility for closing the exit was given to the 4th Canadian Armored Division and the 1st Polish Armored Division. Operation TOTALIZE was to be the first battle experience for both formations. As the two divisions closed up for the attack on 8 August, Allied heavy bombers launched another massive carpet bombing. Bombs falling short hit the Polish units as well as British and Canadian. Casualties numbered 65 dead and 250 wounded, including a division

¹⁰⁵ Ibid., p. 231.

¹⁰⁶ Ibid., p. 236.

¹⁰⁷ Ibid., pp. 241-243.

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commander, mostly among Polish units. Again on 14 August bombs falling short caused nearly 400 casualties among Canadian and Polish units, the Poles losing 42 dead and 51 missing. The official Canadian history states, "There were many reports to indicate that this incident, following the similar one six days earlier, had momentarily a severely depressing effect on the morale of the units and formations that suffered."¹⁰⁸ Both Canadian and Polish forces suffered heavy equipment losses.

In the aftermath of the battle both divisions were criticized for not driving hard enough to close the gap through which the remnants of the German Seventh Army were able to escape. The official Canadian history explained it thusly, "Less raw formations would probably have obtained larger and earlier results."¹⁰⁹ It seems very probable that the initial divisional losses from the short bombs added measurably to the caution that normally would be expected from raw units. To what degree is impossible to determine, but the effect of being hurt, in the opening moments of the first action, by friendly forces, must have been significant in blunting their aggressiveness.

A final note might be made in regard to COBRA. With the German front collapsing in early August and their units badly hurt, the Germans nevertheless launched their Mortain counterattack. The 17th SS Panzergrenadier Division had been reduced to regimental strength and the 353rd Division to battle group size. Nevertheless these units were not defunct. The 353rd and 363rd Divisions on 6 August knocked out 28 American tanks, indicating, in the words of the U.S. history, "that the German units, though severely reduced, were still combat effective."¹¹⁰

A SUMMATION

1. For the Second World War analysis of the relationship of battle damage to unit performance is complicated by the wide diversity of organizational forms and the terminology used to describe their status. This was particularly the case with the Germans.

¹⁰⁸ Colonel C. P. Stacey, Official History of the Canadian Army in the Second World War. Volume III. The Victory Campaign: Operations in Northwest Europe, 1944-1945. (Queen's Printer, Ottawa, 1960), pp. 223, 244.

¹⁰⁹ Ibid., p. 276.

¹¹⁰ Blumenson, Breakout and Pursuit, p. 461.

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The relationship between unit strength starting an action and its performance in the face of casualties therein tends to be blurred by this problem.

2. The war showed numerous cases of smaller or badly attrited forces successfully carrying out offensive or defensive actions against numerically superior enemies. The Korean War, until the Inchon landing, demonstrated a similar performance on the part of the North Korean Army.

3. Both the Second World War and Korea showed the grossly disproportionate losses incurred by foot infantry compared to all other elements in larger military formations.

4. The overall loss rates of higher formations may tend to mask severe loss rates for the cutting edge elements--rifle companies and tank crews--rates that could have a serious impact on their battle performance. However, as in the First World War, the effect of heavy battle damage was variable and unpredictable. Some formations were crippled and had to be withdrawn from action. Others, suffering just as heavy losses, would continue to attack or defend.

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V. ARMORED FORMATIONS

The Second World War saw the acceleration of the trend toward motorization of modern armies, a trend that has now culminated in the almost complete mechanization of forces. An all armored force constitutes the cutting edge, rather than a combined force of tanks and foot infantry, blurring the distinction between infantry and tank units. The definition of "casualties" is similarly blurred. When a foot infantryman became a casualty, he was either dead or wounded and out of action. A wounded man in most cases was out of the line for a period at least of days and more usually of weeks. (As pointed out earlier in this paper, psychoneurotic cases were usually different; a soldier could be treated and rested and returned to duty in 2 to 3 days.) The unit of combat was the individual infantryman.

In an armored force that unit becomes both the man and the vehicle from which the soldier fights (the tank) or that which carries him to where he dismounts to fight (the armored personnel carrier). Casualties can be expressed in terms either of vehicles or personnel. The two are obviously interrelated, casualties in one automatically putting the other out of action.

The impact of this "double accounting" system was recognized early in the Second World War. A revealing statement was made by the German Army High Command on 6 November 1941 in regard to the combat effectiveness of German units in Russia:

"Infantry divisions are short an average of 2500 men each because of battle casualties, and of this figure some 2000, the equivalent of almost one whole regiment, are infantry losses. When non battle infantry casualties are added to battle casualties, the total infantry strength of the division is reduced by one third.

"The armored divisions excluding the 2nd and 5th Panzer divisions, are at about 35 percent of their authorized strength. Net losses for battle and non battle casualties are similar to the infantry divisions, which means for an armored division a reduction of about 50 percent of its combat strength. Losses of equipment in the regiments have reduced their striking power by approximately 65 to 75 percent. Equipment losses of other armored elements, especially losses in motor vehicles, have reduced their combat effectiveness by 40 - 50 percent.

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"Combat effectiveness of the motorized infantry divisions and separate brigades and regiments is estimated at 60 percent. Casualties in the motorized infantry units is approximately the same as those in the infantry divisions. However, because of the poor condition of their motor transport, upon which the effectiveness of the motorized infantry depends, their combat effectiveness is more impaired than that of the infantry divisions."¹¹¹

The phenomenon is obviously much more marked today.

A word first on crew casualties. Generally it has been the case that tank crewmen injured when their vehicles are struck suffer more serious wounds. Many infantry wounds, in contrast, tend to be from small fragments and are relatively minor. Crewmen thus as a class tend to be out of action longer for wounds than infantrymen. If the tank is considered a tactical entity, a large proportion of its crew is usually put out of action with it. A sample, for example, of 275 medium tanks (Shermans of the US First Army) that had been hit by gunfire or bazooka rocket showed a casualty rate for the 275 of 51 percent of all crewmen involved. For 50 light tanks (Stuarts) the rate was even higher--65 percent. (A sample of 333 British tanks in Western Europe indicated that 11 percent of their total casualties occurred while the crew or crew survivors were escaping from their vehicles. These crewmen would fall to machine gun or artillery fire brought down on the disabled vehicle for that specific purpose.¹¹² A high proportion of this type of casualty was fatal.)

The figure of 2.5 men out of action per tank in the American sample was somewhat higher than various unofficial estimates that averaged about 1.5 - 2.0 men per tank.¹¹³ Any of these numbers, however, represent a crippling of the crew that would prevent further operating of the vehicle, even if it were mechanically possible.

We have seen how the burden of infantry division losses falls on the rifle battalions and particularly the rifle companies. Losses are even more concentrated in an armored division. The World War II US armored division (triangular) authorized strength was

¹¹¹ B. Mueller-Hillebrand, MS P-190, Consumption and Attrition Rates Attendant To the Operation of German Army Group Center in Russia (22 June - 31 December 1941). Chief of Military History, US Army, 12 March 1949, p. 69.

¹¹² Alvin D. Coox and L. Van Loan Naisawald, Survey of Allied Tank Casualties in World War II. ORO-T-117. Operations Research Office, 1 March 1951, pp. 330, 34.

¹¹³ *Ibid.*, p. 33.

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10,666, but its cutting edge lay in the 186 Shermans and 83 light Stuarts.¹¹⁴ With crews numbering five per Sherman and four per Stuart, the cutting edge thus numbered only 1312 men out of that 10,600. The loss of 15 or 20 percent of these had a disproportionate effect in terms of skill, leadership and capability.

In the British GOODWOOD offensive of 18 - 20 July 1944, the total infantry and tank fighting force consisted of some 48,600 men--15 tank, 3 reconnaissance, and 3 motor (infantry) battalions, 30 rifle battalions, and 4 machinegun battalions. The armored force numbered 1299 tanks on the first day, of which 1100 were medium Shermans and 199 light Stuarts. The tank crews thus numbered some 6300 out of the total fighting force, roughly one-eighth. Losses on the first day comprised 8.6 percent of tanks on the British left, 33.5 percent for the tank battalions and 17 percent for the reconnaissance battalions in the center, and 5.5 percent on the center right, an average tank loss of 22.2 percent. Nevertheless the offensive was maintained for two more days, although at a diminishing tempo. The result was a clear repluse for the British.

General Dempsey, the British Second Army commander, realized the attack would be costly, but said, "he was prepared to lose two or three hundred tanks in the course of the battle." He had tanks enough to spare, his constraint being his infantry which even at this early date was beginning to run short of replacements. Dempsey felt he could not afford to sacrifice the infantry whom he would need to ensure that the Allied left flank remained a firm bastion.¹¹⁵ This tank-infantry strategic relationship would obviously have an influence on how he fought the battle and on how hard he drove his attack force.

GOODWOOD was significant because it was the largest tank force the Allies ever engaged in a single battle against the Germans on a narrow front. Yet the action was called off after a loss of some 20 percent of the tanks and only 6.7 percent of the personnel involved. These were modest losses, especially in personnel, and the three British armored divisions that had attacked in the center had begun the battle fresh and at full strength. The tank losses here were high, two or three times higher than among the tank brigades on either flank. The battle was a good example of the relationship between tank losses and tank crew losses.

¹¹⁴ US Army in World War II, Cole, The Ardennes, p. 651.

¹¹⁵ Wilmot, The Struggle for Europe, p. 356.

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Table 1 indicates the strengths and losses for personnel and tanks. Tank battalion personnel losses for the three days were 2.7 percent for the left flank, 6.3 percent for the center, and 2.4 percent for the right flank, an average of 3.8 percent. The significance of these small numbers can be seen when they are matched with the number of tanks lost with the men. For example, a loss of 5 percent of the tank crew personnel in the center force on the first day represented the loss of one-third of all the tanks in the three divisions, or the equivalent of three full tank battalions. What is implied is that many of the tanks went out of action for non-enemy weapon causes.

Table 1. PERSONNEL AND TANK LOSSES IN THE GOODWOOD BATTLE, 18 - 20 JULY 1944

Unit and Sector	Men					Tanks		
	Initial Strength Group	Casualties %			Initial Tank Strength	Cumulative ^a		
		18 July	19 July	20 July		18 Jul	19 Jul	20 Jul
Left								
1 Armored brigade: 3 tank battalions	1,983	0.35	0.05	2.7	220	8.6	11.8	11.4
4 Infantry brigades: 12 rifle battalions 2 machinegun ^b battalions	9,251 1,200	3.3 0.8	3.1 0.0	10.9 1.8	--	--	--	--
Center								
3 Armored brigades	6,259	1.4	0.6	6.3	665	33.5	27.1	25.3
3 Infantry brigades:								
9 tank battalions	4.3							
3 reconnaissance ^b battalions	2,062	2.25	0.15	3.1	212	17.0	22.2	14.2
3 motor battalions	2,438	2.45	1.55	5.6	--	--	--	--
9 rifle battalions	7,379	2.7	1.6	6.5	--	--	--	--
Center-right								
1 Armored brigade: 3 tank battalions	2,055	0.2	0.3	2.4	202	5.5	7.9	8.4
3 Infantry brigades: 9 rifle battalions 1 machinegun ^b battalion	7,162 738	1.2 0.15	0.55 0.95	10.0 1.0	--	--	--	--
Right								
3 Infantry brigades: 9 rifle battalions 1 machinegun ^b battalion	7,492 738	3.5 0.1	4.8 3.5	9.3 4.1	--	--	--	--
Total:								
15 tank, 3 reconnaissance, and 3 motor battalions	14,697	1.4	4.7	0.6	--	--	--	--
39 rifle battalions	31,225	2.6	8.0	2.5	--	--	--	--
4 machinegun battalions	2,676	0.4	2.2	1.2	--	--	--	--
	48,597	2.76	2.10	6.70	1,299	22.2	20.7	18.5

a - Allows for return of repaired tanks.

b - Divisional units.

Source: R. Best, Casualties and the Dynamics of Combat
U.K. History, Ellis, Victory in the West, Vol. I.

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As an example, the 11th Armored Division lost 126 tanks on 18 July, more than half its strength. Some 40 of these were actually destroyed (burned out), another 40-odd were knocked out but recoverable, and the other 46 (36 percent) went out of action for mechanical or other causes. Casualties among the crews in one regiment that lost 41 tanks were 17 killed and 39 wounded.¹¹⁶ Thus for a unit whose strength was 61 Shermans and 11 light Stuarts, the tank loss was 57 percent while the crew loss was somewhere around 13 percent of all tank crewmen, depending on which type vehicles were lost.

Armored units, just as infantry units, have nevertheless continued to fight and to be effective even when reduced to a small fraction of the original strength. The Germans provided some striking examples. On the first day of the GOODWOOD battle, 21st Panzer Division and 1st SS Panzer Division launched a counterattack. The tenacity and fighting spirit of the German troops is revealed by the official British history:

"Both attacks were some time in getting underway. The 21st Panzer, with the 503rd Heavy Tank Battalion under its command, had started the day with about a hundred tanks, thirty-nine of them Tigers, but the Bomber Command attack on the left flank had destroyed or damaged so many that it was nearly midday before the survivors could be made fit to fight. Most of the 1st SS Panzer Division had been in positions to the south of the bombed areas, and two battle groups, with forty-six tanks and some assault guns, were available to attack. They advanced against the Guards and the 11th Armoured Division at many points but complete lack of air cover prevented their making the concentrated effort necessary to regain the Caen-Troarn road, as had been ordered."¹¹⁷

Here, in short, was a German force of perhaps at very most 100 tanks (assuming half of 21st Panzer had been put out of action by aerial bombing), attacking two full fresh British armored divisions, at odds of at least 6 to 1.

However, on the day after Montgomery called off GOODWOOD, the German commander, von Kluge, wrote Hitler about the implications of the British attack:

"Whole armoured formations, allotted to the counter-attack, were caught in bomb carpets of the greatest intensity, so that they could be extricated from the torn up ground only by prolonged effort and in some cases only by dragging them out. The result was that they arrived too late. The psychological effect of such a mass of bombs coming down with all the power of elemental nature upon the fighting troops, especially the infantry, is a factor which has to be given particularly serious consideration. It is immaterial whether such a bomb-carpet catches good troops or

¹¹⁶ Ibid., p. 360.

¹¹⁷ Ellis, *Victory in the West*, p. 341.

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bad, they are more or less annihilated. If this occurs frequently, then the power of endurance of the forces is put to the highest test; indeed it becomes dormant and dies."¹¹⁸

The German commander was warning Hitler that the line would break sooner or later, but the significant point for this study is that the German defenders endured such a tremendous assault from the air and on the ground and still fought the British to a standstill.

In the battle for Mersa Matruh in June 1942, the 21st Panzer Division of the Afrika Corps led the attack with 23 tanks and 600 combat effectives in the motorized infantry. The 90th Light Division consisted for the attack of about 1600 men. These two units nevertheless compelled the withdrawal of five of the demoralized divisions of the British Eighth Army and captured 9600 prisoners. When the Afrika Corps attacked the main British position at Alamein in early July, a similar tactic was used, a penetration of the center and then an attack on the British rear. This was a tactic of necessity. As one analyst put it, "Because the attacking units were too weak for heavy fighting, it was hoped they could be maneuvered onto the rear of the British forces, causing them to retreat as before."¹¹⁹

The same 21st Panzer, fighting the Americans in Lorraine in October 1944 with 19 tanks and four Panzer grenadier battalions of 60 to 70 men each, was put into the line to meet the attack of the U.S. 6th Armored Division, Combat Command B of the 4th Armored Division, and the 35th Infantry Division.¹²⁰

During the first three days of the 1973 Middle East War, some 200 of the 300 tanks in the three Israeli brigades in action against the Egyptian bridgehead across the Canal became casualties. The remainder continued to attack the lodgement.¹²¹

The ability of tank forces to continue fighting after having been decimated is probably in part a function of the peculiar nature of armored battle. The tank crews do not, like the infantry, experience so directly the sights and sounds of their fellow soldiers being

¹¹⁸ Ibid., p. 364.

¹¹⁹ Lt.Col. Alan Kinghorn, The Dynamic War: A Study in Military Leadership in the British-German Campaigns in North Africa, February 1941 - January 1943. (Exposition Press, New York, 1967), p. 71.

¹²⁰ Maj.General F. W. von Mellenthin, Panzer Battles: A Study of the Employment of Armor in the Second World War, 1971, p. 326.

¹²¹ Colonel T. N. Dupuy, Elusive Victory: The Arab-Israeli War, 1947-1974, (Harper Row, New York, 1978).

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killed or wounded during an assault. Insulated by their steel walls and head phones, they suffer less of the immediate psychological stress that can sap the will of an infantry formation in battle. Each tank is an independent fighting force that can function at full effectiveness until it is knocked out, breaks down, or runs out of ammunition or fuel. A tank crew too functions as a collective unit, not as subject to individual decision. A tank and its crew cannot opt out of the fight like the individual infantryman by going to ground. It must fight or leave the battlefield.

In short, given the nature of tank battle, it is and has been shown to be possible for a tank formation to be reduced to a bare handful of operative fighting vehicles and still represent significant fighting power if the will to fight is present.

Because a tank is a high value combat item compared to an infantryman, with only a few representing the cutting edge, American experience has shown that most U.S. commanders have tended to use armor cautiously. Perhaps this is because U.S. experience with large tank battles is very limited. In World War II U.S. armor fought enemy tanks in only one out of every four actions involving that armor.¹²² Except for the exploitation and pursuit after the breakout from Normandy and in the last few weeks of the war, once the Rhine had been crossed, U.S. armor in the European and Mediterranean theaters usually operated in combined tank-infantry operations. Because of the close terrain and with the tanks moving in concert with infantry, there was little opportunity to see American tank units engaged while heavily attrited.

Much attention has been given to the apparently heavy tank losses in the last two Middle East wars, especially in 1973. However, tank loss rates then did not exceed those in similarly short actions in the Second World War, as at Kursk, Anzio, or Caen. These losses must be viewed in the context of a brief, high intensity period of battle.¹²³

Defining tank casualties

Any effort to determine through historical research the impact of battle damage on armored forces quickly encounters the question of definition. Broadly, tank casualty can include, at one extreme, a vehicle that has been hit and burned out, through a vehicle that

¹²² Coox, Survey of Allied Tank Casualties, p. 44.

¹²³ *Ibid.*, p. 593.

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has thrown a track while under artillery or small arms fire that prevents the crew making repairs, to a tank that has simply run out of gas.

During the Second World War it was found that a large proportion of tank casualties were repairable in a relatively short time. These included mechanical breakdowns and minings. The latter could usually be repaired in a few hours, since the effect of a standard antitank mine was very small. The shock effect broke the track but rarely disabled the crew.¹²⁴ The overall repairability rate of tank casualties for the U.S. and Britain in Italy and Western Europe and for the British in North Africa in terms of causative agent and percent repairable was:

Gunfire	-	50.7%
Mines	-	78.3% ¹²⁵
Mortar	-	87.5%
Hollow charge	-	71.0% ¹²⁶

An overall combined total of American, British, and Canadian tank losses, based on a sample that showed casualties as a percentage of the total known sample, indicated:

of those by mines	-	21% burned out
of those by gunfire	-	65% burned out
of those by hollow charge	-	61% burned out ¹²⁷

A survey of 167 U.S. First Army tanks that had been mined showed less than 10 percent had burned out, only 3 percent had their ammunition hit, and less than 15 percent had been penetrated.¹²⁸

¹²⁴ Coox, *Survey...*, p. 34.

¹²⁵ In all theaters in World War II mines accounted for some 20 percent of tank casualties. During the first three months in Korea, July - September 1950, 70 percent of U.S. tank casualties were to mines.

Appleman, *The U.S. Army in the Korean War*, p. 602.

¹²⁶ *Ibid.*, p. 57.

¹²⁷ Coox, *Ibid.*, p. 29.

¹²⁸ *Ibid.*, p. 57.

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Recovery and repairability capability developed during the Second World War. For an early example, in the second British offensive in Libya in late 1941, the recovery and repair for the 7th Armored Division for a two-week period at the height of the desert battle was as follows:

Date	Cumulative Battle Casualties & Breakdowns	Cumulative Recoveries	Cumulative Repaired	Number Under Repair
29 November	about 300	187	72	46
6 December	450	338	138	64
12 December	526	456	231	50*

* United Kingdom History of the Second World War. Maj. Gen. I.S. Playfair, et al, The Mediterranean and Middle East, Volume III: British Fortunes Reach Their Lowest Ebb. (HMSO, London 1960), p. 100.

In short, 86 percent of the total cumulative battle casualties and breakdowns were recovered and of the recoveries, 53 percent had been repaired or were under repair as of the last date covered by the data. At Alamein 23 October - 4 November 1942, the British suffered 530 tank casualties out of 1114 tanks. Three-hundred-thirty-seven of these were repairable (some 63percent), 193 not.¹²⁹

The Germans in the desert had a particularly effective recovery organization. Huge tracked and wheeled tank transporters were actually going into battle with the tanks, and in the midst of an action, they would dash in, hook onto a damaged tank and haul it to a point where they could start repairs.¹³⁰ On the night of 2 November 1942, at Alamein, the Germans had only 24 tanks left from the 90 with which they had begun that day, but before

¹²⁹ Coox, Survey..., p. 61.

¹³⁰ Ibid., p. 86.

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the next morning German maintenance crews had returned all but nine of those vehicles to operational status.¹³¹ While British tank recovery and repair methods had also been improved to ensure the continuity of attack by the armor, the German maintenance system kept its striking power high even though the number of tanks actually available was small. It should be said, however, that the desert is uniquely favorable to recovery operations.

(Late in the North Africa campaign, in the confused fighting in Tunisia in early 1943, the British made particular efforts to defeat the admirable German tank recovery system. After actions in which damaged enemy tanks were left, British infantry attacks were launched during which Royal Engineer sappers destroyed the damaged vehicles to prevent their recovery and repair.)¹³²

The point to be made here is that it can be difficult to determine the effect of battle damage on tank formations when a good proportion of that damage can be fairly rapidly repaired. It also stresses the crucial role of recovery and repair units close up to the battle area. Of course, given the loss rate of crews in knocked out tanks, the availability of replacement crews is the other part of the equation.

Non-battle inflicted tank casualties

A further complication in consideration of the relationship of battle damage to tank formations is the fact that a large proportion of tank casualties are not the result of enemy weapon action. These are the equivalent of the non battle casualties of unarmored forces. Such casualties do not involve the loss of crews or the emotional stress of a combat loss, but their significance in the totality of armored operations is clearly considerable.

In an armored formation, then, one can experience two forms of non-battle casualties. The crewmen will be subject to the same forms of non-battle injuries and sickness as the infantry while their fighting vehicles will be similarly vulnerable to a variety of non-enemy-caused disabilities.

¹³¹ Col. R. J. Icks, Famous Tank Battles (Doubleday, Garden City, 1972), p. 142.

¹³² United Kingdom History of the Second World War: The Mediterranean and Middle East. Major General I. S. Playfair et al, Vol. IV. The Destruction of the Axis Forces in Africa (Her Majesty's Stationery Office, London, 1966), p. 328.

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A sampling of 1207 German tank casualties in 1944-1945 will illustrate the point:

Miscellaneous Non-Enemy Causes	Number of tanks	Percentage of total known
Mechanical or terrain	49	9.4
Abandoned (lack parts, gasoline, recovery prevented by attack.	222	42.5
Self-destruction	251	48.1
	522	

The other 685 tanks were knocked out by enemy action.

The ORO analysts who conducted this study believed the figure of 10 percent for "mechanical-terrain" to be far too low, this being a poor sample from scattered data available. They offered testimony from three senior German officers who believed the percentage to be higher. General Dietrich gave an estimate of 30 percent, General Hausser of 15 percent (plus 20 - 30 percent during long approach marches), and General Guderian, the virtual father of the German armored forces, 60 to 70 percent for the Eastern Front. One unidentified German general officer was quoted as asserting that "usually more Panthers were disabled by overland moves (motor troubles) than by actual battles."¹³³

The same report states that of every 10 German tanks immobilized against American, British, Canadian or French forces (not including 1940), two were abandoned, two were self-destroyed, four were destroyed by gunfire, one by aircraft attack, one by hollow charge weapons.¹³⁴

Allied statistics for non-enemy inflicted casualties are poor, only the Canadians and the U.S. Marine Corps having kept complete records. These records show what is

¹³³ Coox, Survey..., p. 87.

¹³⁴ Ibid., p. 4.

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probably an accurate figure of 25 to 40 percent for these causes. Canadian data show a higher proportion immobilized in offensive and pursuit operations, relative to other causes. During the breaching of the Gustav Line in Italy, terrain and mechanical failures accounted for twice the toll exacted by the usually greatest causative agent, gunfire. Canadian figures for non-enemy weapon cause as a percentage of total number of known causation casualties in Italy were:

1943	-	33.3%
1944	-	50.4%
1945	-	38.5%

Overall Canadian figures for non-enemy weapon causes were:

Western Europe	-	29.5%
Sicily	-	20.0%
Italy	-	40.7%

A U.S. Third Army study of 107 tank casualties, completed before the German collapse, indicated that 28 percent "were destroyed by terrain obstacles or mechanical deficiencies."¹³⁵

There is good reason to believe that tank casualties due to mechanical failure rise very sharply during periods of exploitation and pursuit, often as a ratio of four to one over tank casualties due to enemy action alone. One fairly complete British sample of mechanical failure, for the very short period 28 August - 7 September 1944, the pursuit after the breakout from Normandy, is shown on Table 2. The figure indicates that very little maintenance can be done during a pursuit or any fast paced operational phase, because of the distances involved, the times traveled, and the need to be ready for action at all times.

¹³⁵ Ibid., p. 11.

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Table 2. BRITISH SAMPLING OF MECHANICAL FAILURES AND ENEMY-INFLICTED LOSSES
WESTERN EUROPE, 28 AUGUST - 7 SEPTEMBER 1944

Unit	Mechanical Causes		Enemy Action Number	Total Number
	Number	Percent		
Guards Armored Division	59	92.2	5	64
8th Armored Brigade	57	74.0	20	77
11th Armored Division	44	88.0	6	50
7th Armored Division	28	76.0	12	50
1st Polish Armored Division	50	62.5	30	80
4th Canadian Armored Division	57	91.9	5	62
Total	305		78	383
Average per Armored Brigade	51	79.7	13	64
Average per Days in Pursuit	5.4	79.4	1.4	6.8
Average per 100 miles	16	79.6	4.1	20.1

The logistical vulnerability of an armored force has been demonstrated repeatedly during and since the Second World War. In the November 1941 battle in North Africa, the 21st Panzer Division ran out of gas and was left stranded in the desert. During the battle at Gazala in June 1942, the 15th Panzer Division similarly was completely immobilized for lack of fuel.¹³⁶ During the German offensive in the Ardennes, December 1944, fuel constraints became painfully apparent within four days, the 12th SS Panzer Division, one of the leading formations, being brought to a halt. The situation then grew worse. The Germans discovered that bad terrain and weather reduced the mileage gained from a tankful of gasoline by half.¹³⁷ Gasoline constraints meant that the Germans could use only a portion of the total number of tanks they had. In fact, the shortage of spare parts plus the

¹³⁶ von Mellenthin, *Panzer Battles*, p. 65.

¹³⁷ Cole, *The Ardennes*, p. 666.

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fuel shortage led the Germans to cannibalize numerous new tanks to maintain those already in action.¹³⁸

During the 1973 Middle East war in the period 6 - 9 October, the Syrians reportedly lost about 650 tanks in the Golan area, 250 by enemy action and 400 abandoned.¹³⁹ Israeli air attacks had concentrated on Syrian supply columns and later it was established that at least a quarter of the abandoned Syrian tanks had simply run out of gas.¹⁴⁰

A SUMMATION

1. Battle damage for armored formations must be considered in terms of both vehicles and crews, casualties in one automatically putting the other out of action.

2. The self contained character of the individual tank permits it to continue to fight effectively even when its parent formation has been decimated. The effect of casualties in a formation are less immediately felt by surviving tank crews because of the peculiar nature of armored action.

3. Determining the effect of battle damage is complicated by the variety of ways in which a tank can become a casualty and by the fact that a sizable proportion of tank casualties could be relatively rapidly recovered, repaired, and returned to action. This latter point is especially the case with the very large proportion of armored vehicles that are put out of action by non-enemy-weapon causes.

¹³⁸ U.S. Army, Europe, An Interview with General der Panzertruppen Horst Stumpfl, Tank Maintenance in the Ardennes Offensive, ETHINT 6, 11 August 1945, p. 2.

¹³⁹ USMC USMC Development and Education Command, Analysis of Lessons Learned in the October 1973 Arab/Israeli War. January 1975, PA-2-34.

¹⁴⁰ Insight Team of the London Sunday Times, The Yom Kippur War. (New York, Doubleday, 1974), p. 183.

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VI. SOME DATA AGGREGATIONS

In the course of this paper, some 54 actions have been identified in which a unit's performance could be matched against battle damage incurred or in which a badly attrited unit has still managed to maintain an effective defense or attack. This sample, small in the light of the scale of the wars from which it is drawn, can be described statistically in this fashion:

A. War

World War I	-	17
World War II	-	34
Korea	-	3

B. Force Size

Army	-	13
Division	-	33
Regiment/battalion	-	8

C. Battle Stance

Attack	-	38
Defense	-	16

D. Nationality of Unit

U.S.	-	21
British	-	18
German	-	4
French	-	4
Canadian	-	2
New Zealand	-	1
Polish	-	1
Anglo-American	-	1
North Korean	-	2

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E. Geographical locations

Western Europe	-	27
Italy	-	5
Pacific islands	-	13
Asian mainland	-	2
N.Africa/Near East	-	4
Korea	-	3

The spreadsheets that follow provide the basic data on the actions. The comments under "Outcome" are broadly correct, more clearly definable for the smaller formations than the larger. Clearly in the course of a battle involving an army, there will be pluses and minuses and often the result itself is unclear. The "Circumstances" are so varied and complex that only the essence can feasibly be given and these comments must necessarily be judgmental where the imponderables of battle are concerned.

Of the 54 cases only 11 represent those in which a formation collapsed, surrendered, was repulsed, was stalemated or had to be taken out of the line after suffering some degree of damage. These cases and the damage incurred by the formation are:

1. France 1940 - French 55th Division - virtually no damage;
2. France 1940 - French 71st Division - virtually no damage;
3. Malaya - British Army - combat casualties 6%/overall 100% (surrender);
4. Hong Kong - British garrison - combat casualties 33-1/3%/overall 100% (surrender);
5. Cassino - 5 New Zealand battalions - 30%, 18%, 24%, 37%, 13%, average - 24%;
6. Huertgen Forest - U.S. 28th Division - 30%;
7. Rapido River - U.S. 36th Division - 28%;
8. Anzio - Anglo-American Army - 20%;
9. Palau Islands - 1st Marine Regiment - 56%;
10. Changchon - U.S. 2nd Division - 30%;
11. GOODWOOD - British 21st Army Group - 20% of tanks, 6.7% of personnel.

Some of the casualty percentages are estimates since in some cases overall formation strength data were not available.

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There are no discernible patterns here. The first two cases represent immediate collapse of morale and motivation; Malaya a drawn out collapse of morale and motivation; Hong Kong a resistance to the limits of capability; Cassino a repulse; Huertgen Forest a repulse followed by withdrawal of the formation; the Rapido River, the same; Anzio, an exhausted stalemate; the Palaus, a formation withdrawn because of losses but advancing successfully; Changchon, a sudden heavy loss while retreating, and GOODWOOD a sharp repulse.

The losses ran from virtually none to 56 percent, and the heaviest were suffered by a formation that was successfully advancing. The eleven cases were equally divided between attacking and defending forces, with Anzio being classed as both attack and defense.

All the other 43 cases represent formations that continued to attack or defend despite losses of some degree of severity. Eleven were in defense, 32 in attack. This ratio also does not represent a pattern, but merely the choice of actions. In fact, it would seem likely that there are more examples to be found of decimated units successfully defending than attacking, since the advantages of the defense can compensate to a degree for reduced strength.

Action	Unit Nationality	Force Size	Attack Defense	Casualties	Outcome	Circumstances
<u>World War I</u>						
1. Neuve Chappelle, March 1915	2nd Scottish Rifles	Battalion	A	46 ⁰ out of 700	Maintained attack	British offensive; long service Regulars; tough opposition; both sides worn down at outset; trench warfare.
2. Flanders, March 1918	2nd Scottish Rifles	Battalion	D	638 from about 700	Maintained cohesion and resistance	British retreat in face of German offensive; surprise attack w/new German tactics; British forces weak; German numerical superiority.
3. Battle of the Frontiers-Marne, 21 Aug-12 Sept 1914	French Army	Army, 1.4 million	D	610,000	Stabilized front	Fighting retreat and counterattack; both sides at full initial strength and fresh; mobile operations; high morale on both sides.
4. Ypres, 4 Oct-11 Nov 1914	British Expeditionary Force	Army, 4+ divisions	D	58,000	Line held	Concluded 3 months of continuous battle; both sides exhausted; British troops Regulars with high morale.
5. Ypres, 14-17 Oct 1914	British 7th Division	Division	D	45% Officers, 37% ORs	Line held	As above.
6. Somme, 1 July 1916	British Army	120,000-Army	A	57,500	Repulse	Volunteer army, mostly in first action; high morale; expected little opposition; massive artillery support; tactical plan poor; good German defenses.
7. Somme, 1 Jul - mid-Nov 1916	British Army	Army	A	482,000	Minor gain	Planned breakthrough battle, continuation of above; attrition battle developed; morale equal.
8. Verdun, 21 Feb-11 Jul 1916	German Army	Army	A	280,000	Repulse	Attrition battle; both sides equal morale.
9. Passchendaele, July-Dec 1917	British Army	Army	A	449,000	Minor gain	Attempted breakthrough; terrain and weather bad, tough defenses.
10. Passchendaele, 31 July 1917	British 5th Army	Army	A	More than 1/3 strength	Minor advance	Continued attacks; attrition battle developed.
11. Passchendaele, 31 July 1917	British 55th Division	Division	A	More than 70%	Minor advance	Continued attacks.

- | | | | | | | |
|---|-------------------|--------------------------|---|-------------------------------------|--|---|
| 12. Gallipoli,
25-28 Apr 1915 | British | Army | A | 9000 out of 1st
approx. 32,000 | Stalemate, only
small bridgehead
gained. | Amphibious assault; unexpectedly strong
resistance, difficult terrain. |
| 13. Belgium,
21 Mar-30 Apr 1918 | British | Army | D | 300,000 (more
than 1/4 strength) | Retreat but lines
remained intact | Massive German offensive, British forces
weak; surprise achieved & new tactics;
German numerical superiority. |
| 14. Belgium,
21-26 Mar 1918 | British 14th Div. | Division | D | 128/4261 out
of 190/5737 | Continued resistance,
launched battalion-
size counterattacks. | Continuous retreat. |
| 15. Mesopotamia,
Shaiba, 14 Apr 1915 | British force | 6156 (small
division) | A | 20% (1257) | Turks driven from
position | Forces about equal in size; stiff Turkish
resistance, terrain and environment very
hostile; little artillery support. |
| 16. Mesopotamia,
Ctesiphon, 20 Nov 1915 | British force | 8500 (small
division) | A | More than 50% | Turks withdrew | British too weakened to exploit. As above. |
| 17. Mesopotamia,
Sheikh Sa'ad,
7 Jan 1916 | British force | 12,000 | A | 4000 (33-1/3%) | British advance | As above. |

Action	Unit Nationality	Force Size	Attack/Defense	Casualties	Outcome	Circumstances
<u>World War II</u>						
1. France, 14 May 1940	French 55th Div.	Division	D	Very light	Collapse and rout after light action	German tank-air offensive; German morale high; French morale poor; French tactical plan poor.
2. France, 14 May 1940	French 71st Div.	Division	D	Very light	Collapse and rout after light action	German tank-air offensive--as above.
3. France, 12 May 1940	French 66th Infantry	Regiment/ Bn	D	Unknown	Strong resistance against German attack, forced to retreat, but delayed 4 Panzer divs.	German tank-air offensive--as above.
4. Malaya-Singapore, Dec 41-Feb 42	British	Army (138,000)	D	8000 casualties, 6% 130,000 surrendered	British surrender	Two month British retreat, loss of morale in face of jungle, Jap tactics, Jap air superiority; poor British defense plan.
5. Hong Kong, Dec 1941	British	12,000	D	4000 - 33-1/3%	British surrender	Outnumbered; no air cover, no hopes of relief, no maneuver room.
6. Iwo Jima, Feb-Mar 1945	U.S. Marines	3 Divisions	A	6821 dead, over 18,000 wounded	Capture of island, destruction of Jap garrison	Amphibious assault; overwhelming US strength; high morale, very strong & stubborn Jap defense; very small island objective.
7. Cassino, 15-26 Mar 1944	New Zealand	5 Battalions	A	30%, 8%, 24%, 37%, 13%, average- 24%	Repulse, failure to take town.	Heavy attrited defenders but high quality troops; difficult terrain; good defensive position.
8. Moro River, Italy, Dec 1943	Canadian, 1st Infantry Div.	Division	A	21%	Successful advance, but unit run down.	Difficult terrain; stubborn German resistance; bad weather.
9. Normandy, Jun-Jul 1944	U.S. 83rd Div.	Division	A	5000	Maintained offensive, efficiency reduced.	Stubborn German resistance; difficult terrain; growing Allied power; continuous action.
10. Huertgen Forest, 2-14 Nov 1944	U.S. 28th Div.	Division	A	6184	Repulse. Unit withdrawn from action.	Difficult terrain; weather poor; unexpectedly strong German resistance
11. Rapido R., Italy, 20-22 Jan 1944	U.S. 36th Div.	Division	A	Approx 4000. For 2 regiments, 35-40%	U.S. repulse. Division combat effectiveness declared shattered.	River crossing; strong German defense

12. Anzio, Feb 1944	U.S./British Army	Army, 100,000	A/D	20,000 - 20%	Stalemate. Combat units close to ineffectiveness.	Amphibious assault, strong defense; difficult terrain.
13. Anzio, Feb 1944	U.S. 45th Div.	Division	D	5900	Division badly weakened. Continued to fight.	5-day German attack.
14. Tarawa, Nov 1943	U.S. 2nd Marine Div.	Division	A	1500 of 1st 5000, 16% of total engaged	Island captured, enemy destroyed.	Amphibious assault; very small island; fanatical resistance; heavy fire support; high US morale.
15. Palau Islands, Sept-Nov 1944	U.S. 1st Marine Div.	Division	A	6526 of 20,000	Islands captured, enemy destroyed	Amphibious assaults; high US morale; fanatical resistance.
16. Palau Islands, 15-21 Sept 1944 Pelliu	U.S. 1st Marine Regiment	Regiment	A	56%	Regiment relieved as ineffective, but no element had broken.	Amphibious assault; as above.
17. Iwo Jima, Feb-Mar 1945	U.S. 28th Marine Regiment	Regiment	A	895 in 5 days	Continued advance. After 14 days, w/replacements, at 40%.	Fanatical resistance; difficult terrain; overwhelming US strength, morale high.
18. Iwo Jima, Feb-Mar 1945	U.S. 27th Marine Regiment	Regiment	A	Unknown	Continued advance. With replacements, at end of battle, average battalion strength at 34% of initial strength.	As above.
19. Iwo Jima, Feb-Mar 1945	U.S. 5th Marine Division	Division	A	50%	Continued advance.	As above. Continual replacement flow.
20. Okinawa, Apr-Jun 1945	U.S. 7th Div.	Division	A	6068 battle, 4825 non-battle	Capture of island, enemy destroyed.	Fanatical & skillful defense; difficult terrain; fortified enemy positions; overwhelming US strength & firepower.
21. Okinawa, Apr-Jun 1945	U.S. 27th Div.	Division	A	5325 battle, 2969 non-battle	"	"
22. Okinawa, Apr-Jun 1945	U.S. 77th Div.	Division	A	5026 battle, 2100 non-battle	"	"
23. Okinawa, Apr-Jun 1945	U.S. 96th Div.	Division	A	7430 battle, 2817 non-battle	"	"

24. Okinawa, Apr-Jun 1945	U.S. 1st Marine Division	Division	A	7901 battle, 5101 non-battle	"	"	"
25. Okinawa, Apr-Jun 1945	U.S. 2nd Marine Division	Division	A	94 battle, 1 non-battle	"	"	"
26. Okinawa, Apr-Jun 1945	U.S. 6th Marine Div.	Division	A	8326 battle, 4489 non-battle	"	"	"
27. Normandy, Jul 1944	German Panzer Lehr Div.	Division	D	At least 1/3	Minimum capability to resist U.S. advance.	Carpet bombing by Allied air forces; unit fragmentary; in continuous de- fensive combat for 6 weeks.	
28. Normandy, 24 July 1944	U.S. 30th Div.	Division	A	156	Delayed advance, lowered motivation.	Short bombing & strafing by Allied air forces; prepared for break- through attack; morale high.	
29. Normandy, Aug 1944	4th Canadian Armored Div.	Division	A	315	Reduced aggressiveness. Moved cautiously in attack.	Short bombing (twice) by Allied air forces; new units in 1st action; crucial mission.	
30. Normandy, Aug 1944	1st Polish Armored Div.	Division	A	400	"	"	"
31. Mersa Matruh, Egypt, Jun 1942	German 21st Panzer Div.	23 Tanks, 600 Combat Effec- tives	A	Unknown	Compelled withdrawal of 5 British divisions.	German units at small fraction of TO&E strength; successful German offensive; German morale high, British low; great German leader- ship.	
32. Mersa Matruh, Egypt, Jun 1942	German 90th Light Div.	1600 Men	A	Unknown	"	"	"
33. Lorraine, Farebersviller, Nov 1944	U.S. 3rd Battalion 317th Infantry	Battalion	A	Heavy cumulative losses; one company 35 men, one 16 left.	Continued to press advance.	Advance, counterattacked, advance; street fighting.	
34. Normandy Jul 18-20, 1944 (GOODWOOD)	British 21st Army Group	Army (49,000 men 1299 tanks)	A	20% of tanks 67% personnel	Repulse, attack called off	Skillful; strong German defenses, congestion, ground broken up by supporting air attack.	

Korean War

1. Korea, Jun-Sept 1950	No. Korean 3rd Div.	Division	A	15,000 (including replacements)	Continued to attack U.S. forces.	U.S. estimated unit in Sept at 40% combat effectiveness; unit retained aggressiveness; some troops poorly trained.
2. Pusan Perimeter, Sept-1-15, 1950	No. Korean Army	98,000 Army	A	Est. 28,000	Maintained offensive against 180,000 UN troops.	Allied superiority in strength while holding defensive positions; UN had air superiority; steady UN build up.
3. Changchon, Korea, 26-30 Nov 1950	U.S. 2nd Div.	Division	D	4163 (mostly in one day)	Unit severely mauled in ambush.	Retreat culminating in heavy enemy attack; U.S. morale low; Chinese morale high.

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