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Development of the Squad: Historical Analysis

Ahmed Hashim with contributions by
LtGen Paul VanRiper, USMC (Ret.)

Center for Naval Analyses
4825 Mark Center Drive • Alexandria, Virginia 22311-1850

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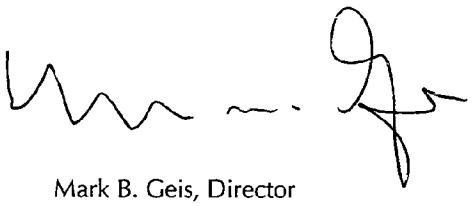

Mark B. Geis, Director
Naval Operations and Support Team
Integrated Systems and Operations Division

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Introduction

From ancient times until the late 19th century man fought his battles in relatively dense and tightly packed formations. Modern battles, by way of contrast, are largely fought by small units of men called a "squad." The squad was once defined as the "smallest unit to conduct tactical operations under command of its own leader."[1] This remains an accurate definition. The squad evolved from a military need to carry close combat to the enemy under increasingly lethal battlefield conditions. Notwithstanding the mechanization of warfare—e.g., the invention of the tank and the aircraft over the course of the 20th century—"groups of foot soldiers remain to this day among the most powerful and influential forces on the battlefield."[2] The infantryman has been, continues to be, and will remain a durable element of the battlefield even as technologies and combat environments change.

The infantryman can best be defined by his roles. A frequently cited definition of the roles of the infantryman was written by John Weeks several years ago:

> First to hold ground against enemy armor and infantry attacks and provide a firm pivot for counterattacks or other maneuvers; second, to dominate and control the close country; third, to close with the enemy and clear his defensive positions; and finally, to provide observation, reconnaissance and early warning.[3]

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1. Virgil Ney, *Organization and Equipment of the Infantry Rifle Squad: From Valley Forge to R.O.A.D,* Fort Belvoir, VA: United States Army Combat Developments Command, 1965, p.74.
2. John English, *On Infantry,* New York: Praeger Publishers, 1981, p.xvii.
3. John Weeks, "The Modern Infantryman," *Military Technology and Economics,* May-June 1979. pp.23-24.

This is a class of soldiers for whom war remains an intensely personal, dirty, bloody business; as put three years ago by the Chief of Infantry of the U.S. Army, "The infantry fight is a close, brutal and personal gunfight in which victory goes to the side that can seize and retain the initiative, normally turning on the skill and will of the squad."[4] Nothing supports this view better than the Falklands War in 1982, when the British landing force, consisting of infantry on foot with only relatively light artillery support, defeated twice its own number of dug-in defenders. It was a classic victory by small groups of fighting men (squads) from one of the best-trained armies in the world.[5]

This research memorandum, is a product of the USMC Ground Combat Study, which analyzes the size and organization of small infantry units. Our goal is to use this analysis of historical changes in squad size and organization to provide the Marine Corps with an assessment of the future relevance of these units. In this part of the study, we explore the factors behind the emergence of squads, and how and why they have changed in size and organization with time. We believe that understanding the drivers of these changes will allow us to analyze, with some confidence, the kind of impact the complex future warfighting environments that the Marine Corps may face are bound to have on its current 13-man squad.

Roadmap

This section outlines our methodology which is both historical, that is to say it looks back into the past; and extrapolative, that is to say, it looks forward briefly into the future as well. One of the leading military historians of this century, Major General J.F.C. Fuller, once remarked that "Looking back is the surest way of looking forward."[6] Now it may be incongruous in this study to quote a historian who, in the inter-war era, declared that the tank would render the infantryman

4. Major General Carl Ernst, "The Infantry Squad—How Much Is Enough?" *Infantry,* January-February 1997, p.1.

5. See Christopher Bellamy, *The Future of Land Warfare,* London: Croom Helm, 1987, p.291.

6. Cited in John English, *On Infantry.*

more or less superfluous. Many have disagreed with or disproven Fuller's theory in this area; however, this epigram is relevant to our approach.

This research memorandum is divided into several interrelated parts:

- **Historical background:** We briefly explore how armies fought prior to the rise of squads. We look at the factors that led to the emergence of squads (a more detailed examination will follow in the next section). We will draw upon examples from various armies in order to draw out the key factors, or drivers, responsible for the emergence of the squad:
  - — Technological and technical changes
  - — Organizational and socio-cultural changes
  - — Experiences wrought by combat particularly during the American Civil War, the Boer War, World War I and World War II.
- **The rise and development of the squad:** Having established the reasons behind the emergence of the squad, we address in detail the experiences of various armies as they struggled with the issues of right **size** and right **organization.** Our focus, is on the historical evolution of changes in the size and organization of squads in the United States Army (USA) and the United States Marine Corps (USMC). We found that the size and organization of USA squads have changed considerably more over the past 60 years than those of USMC squads. Has the UMSC found the optimal size and organization for the squad? If so, why has the USA not adopted the "tried and proven" 13-man squad of the USMC? We try to find some explanation for this in the section described below, with the caveat that this dichotomy between two services may need to be explored further.
- **Conclusions: past, present, and future:** Finally, we explore whether—and, if so, how and why—the complex warfighting environment of the 21st century will affect the size and organization of the squad in the USA and the USMC.

Historical background

This historical background will concentrate primarily on Western armies. The Western world has often been in the forefront of developments in military organization.[7] Also, more resource material is available on the evolution of Western arms than on non-Western arms.

The squad is a modern invention. In this context, it may seem odd to the non-expert on the subject to begin our discussion with the Roman Army. However, it is within that fighting force that we can see the genesis of a structure akin to the squad. The Roman Legion was divided into centuries of 80-100 men led by a centurion. Two centuries made up a maniple. Six centuries or three maniples made up a cohort. Ten cohorts formed a legion. What interests us is the smallest unit in the Roman Army, the *contubernium,* a party of **eight men** who shared a tent and a packhorse that transported their equipment and supplies. These men spent their lives together and built up a level of primary cohesion that was unique among armies of that era. In theory, the Roman centurion could control his centuries so long as he could see its members and they could see him. Similarly, the commander of the maniple could theoretically exert control over his two centuries. In the "fog of battle," things were different. Once the legionnaires achieved contact with the enemy, the centuria essentially dispersed into small groups of fighting men. It was easier for a small group of, say, eight men to stay in close contact with one another in a melee. Therein lies the importance of the *contubernium.* Few, if any, other armies that were contemporaneous with the Roman Army developed

7. Non-Western civilizations were often on a technological par with—and sometimes even superseded—Western civilization in developing weapons. However, it is the formidable ability ofWestern civilization to organize and effectively fund war-making capacity that led it to pull ahead of all others by the 18th century.

small units in this manner.[8] This may have been a major factor in the triumph of Roman arms.

Few noteworthy tactical developments took place between the decline of the Roman world and the rise of early modern European armies. In medieval times the individual knight reigned supreme as the key combat soldier until he was overthrown by the long-bowman.

From the mid-15th to the mid-19th century, the invention of firearms, European armies developed the classic linear formation of musket-bearing infantrymen.[9] This line was formed by three ranks of men standing shoulder to shoulder with a one-pace interval between ranks, armed with smoothbore muskets and socket bayonets. Combat formations of the day were of a mass type, either in huge companies or battalions. Although the platoon existed and was the smallest fire unit, it rarely maneuvered away from its parent organization, the company, as an independent entity. The squad did not exist. The object of most battles was to break the opposing rigid line of infantry by blazing away in volleys. These volleys were fired by simply pointing the muskets at the opposing enemy line; there was no aimed fire.[10] After the front rank fired, it would then fall back through the rear to reload. The second rank would repeat the same procedure as the first rank and so on. When the enemy seemed to be on the verge of disorganization or breaking as a result of the exchange of fire, the infantry would charge with their bayonets. Breaking the enemy line was the key to victory. Infantry organization was thus founded on the need to form the line, control it in battle, renew it when decimated, and maneuver it to place the enemy at a disadvantage.

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8. The Greeks used the phalanx, a densely packed formation of men and at one time a formidable method of fighting, which was ultimately defeated by the Romans.

9. Lynn Montrose, *War through the Ages,* New York: Harper and Row, 1960, pp.320-321; see also Archer Jones, *The Art of War in the Western World,* Urbana: University of Illinois, 1987

10. See Steven Ross, *From Flintlock to Rifle: Infantry Tactics, 1740-1866,* London: Frank Cass, Paperback edition 1996, p.13.

It now remains to explain sociologically why the tactics as practiced by the armies of modern Europe did not permit any breaking up of the huge battalion masses. For the infantrymen who fought in battle lines, war was a particularly gruesome affair. To stand and fight at such ranges amid carnage required iron discipline, effective leadership, and rote training. It is unnatural for the average human being to place himself willingly in a situation that might result in his being maimed or killed; the desire to flee is great. Not surprisingly, in battle these men needed to be controlled carefully by both noncommissioned and commissioned officers. This meant that there could be no dispersion into smaller groups; indeed, failing to march in linear formation and rushing to take cover were regarded as cowardly.[11]

Based on our review, we believe that starting in the mid-19th century two major factors gradually changed the way Western armies fought and ultimately contributed to the emergence of the squad as the smallest fighting unit. These factors are technological and technical changes, and organizational and soci-cultural changes.

Technological and technical changes

As long as the smoothbore musket reigned supreme, the opposing sides did not begin blazing away at each other until they were 50 yards from one another. This was because the musket was a highly inaccurate weapon. The ball tumbled and fell in flight. As stated above, the opposing lines marched steadily towards one another until one or the other got disorganized and broke as a result of the gruesome casualties inflicted by the exchange of musketry. The invention of the rifle or rifled musket in 1849 *theoretically* changed all that. In 1849 Captain Claude Etienne Minie of the Chasseurs d'Orleans of the French Army publicly unveiled the rifle. Even before Minie, some inventors had

11. Albert Nofi cites a noteworthy example of this attitude as late as the American Civil War: During the West Virginia campaign in mid-1861, a company of green Illinois volunteers was wearily making its way down a road in execrable marching order until its captain shouted, "Close up, boys! Damn you, close up! If the enemy were to fire on you when you're straggling along that way, they couldn't hit a damn one of you! Close up!" Whereupon the troops closed up. Albert Nofi, *The Civil War Notebook,* Conshohocken, PA: Combined Books, 1993, p.24.

pioneered the idea of dropping a small bullet down the barrel of a rifled musket. The bullet would expand and be spun by the barrel's helical grooves as it was fired. Such a bullet would travel further and was more accurate than the bullet fired out of the musket. Minie patented the idea and produced the first practical rifle. This revolutionized infantry tactics. Soon after that, this revolutionization of tactics was solidified by the invention of the breech-loading rifle, which allowed soldiers to take cover or "go to ground" to (re)load their rifles. This reduced vulnerability of the individual soldier but made command and control difficult.

Organizational and socio-cultural changes

Context

Technological inventions or innovations often force dramatic organizational and socio-cultural changes in the human environment or social systems. The introduction of the rifle brought about organizational, doctrinal, and socio-cultural changes within militaries. The rifle did not directly lead to the creation of the squad in the 19th century, as will become clear from the discussion below. However, it did set the stage for the emergence of this structure later on.

With the appearance of the rifle, theorists and practitioners of the art of war began pondering the following question: How could an assault unit of infantrymen "cross the deadly ground" and remain intact? [12]

The European experience

In 1853, the French began experimenting with sheer speed of movement. In this context, they formed **battalions** of extremely fit men, the Chasseurs, who would jog rapidly into the assault. When the Chasseur units were still in an embryonic stage, a French officer described them in this way: "The new infantry...would move so fast that they would be exposed to relatively few of the enemy's shots, and would demoralize him by their onset to the extent that his aim would be

12. Note that we do not say "an infantryman," because individuals are bound to become casualties; what a unit needs to avoid is the destruction of unit cohesion as it moves into its objective.

spoiled."[13] But it rapidly became apparent that no matter how fast and how fit the Chasseurs were, the "gymnastic jog" could not outrun bullets. The French returned to older close-order linear tactics. The Crimean War in the 1850s seemed to justify this return to tradition; however, it only worked because the opposing Russians did not have rifles with which to cut down the French as they marched towards them in linear formation.

Still, the rise of the Chasseurs contributed to the decentralization of tactical command—which was vital to the evolution of the squad. Since they did not advance in a linear formation, the Chasseurs were not under strict control of their officers. Moreover, they were taught to be individually independent.

> There were twenty Chasseur battalions in the French army by 1853. They regarded themselves as a separate arm of the service. No longer was the infantry to be fully under the control of his officers. He was to be master of his own fire—and indeed the Chasseurs had dispensed with the word of command to fire altogether.[14]

This was something novel in the European armies. Ultimately it showed that men could be trusted *not* to run away from the battlefield but to move towards danger. But the French returned to tradition because they were unable or unwilling to develop the Chasseur tactic to its logical conclusion—that is, by forming squads. Since the Chasseurs could not outrun bullets, they did what any rational soldier would do: they went to ground and commenced a desultory and inclusive fire-fight with the entrenched enemy in front of them. Those who managed to reach the enemy were exhausted by their "jogging" ordeal and were cut down. To put it another way, no set of tactical rules was developed to enable the Chasseurs to move separately as individuals but together as a unit (i.e., as a squad). That development was still in the future.

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13. Quoted in Paddy Griffith, *Forward into Battle: Fighting Tactics from Waterloo to the Near Future,* Novato, CA: Presidio Press, 1992, p.23.

14. Paddy Griffith, *Forward into Battle,* p.53.

The American Civil War experience

In the meantime, in the United States of America under the bloody impetus of the American Civil War, infantry tactics developed slowly but surely towards the emergence of squads. The war began with officers on both sides trying to use the tactics of European armies. The influence of the French infantry's tactical principles was strong in both the Union and Confederate armies.[15] Hence both sides resorted to column assaults that caused heavy casualties. As a result of bloody failures, heavy casualties, and the introduction of rifles, both Union and Confederate officers began to innovate. Some of these innovations contained the seeds of future small-unit tactics, even if the innovations themselves proved to be failures. The American Civil War witnessed three types of tactical innovations to deal with the fire of the opposing side: successive lines, short rushes, and offensive trenches.

Successive lines

In an attack, this method was characterized by the launching of a succession of two lines of men 150 yards apart rather than in dense columns. This tactic proved to be a miserable and expensive failure. In practice during battle, the first line would stall or even stop under withering fire. The rear line would bunch into the stalled first line, and the result was a breakdown in cohesion and the transformation of the assault force into a vulnerable mob. Some officers thought that the solution was to train their assault forces to such a high pitch that they would be able to maintain the integrity of each of the assault line. For example, a Union officer under Sherman's command, George Thomas, managed to train his men so well that they climbed Kennesaw Mountain in perfect formal lines which did not bunch. However, the Union suffered a humiliating defeat.[16]

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15. See Steven Ross, *From Flintlock to Rifle,* pp.180-181.

16. John Mahon, "Civil War Infantry Assault Tactics," *Military Affairs,* Vol.25, Summer 1961, p.63.

Short rushes

Many soldiers in assaulting units would take cover before the defending side let off its volley or when its fire slackened, but it had not been formally codified in armies. Skirmishers played an important role in the tactical system of short rushes. In a number of Civil War battles, they were used to deliver a steady stream of what, today, we would call, "suppressive fires." Meanwhile, the assault unit would lie down behind the skirmishers. Whenever the prone assault force felt that its skirmishers had managed to successfully suppress the fires of the defenders, it would rise as one and rush forward, absorb its skirmishers, and then lie back down. From this point the skirmishers would then move forward towards the defenders and re-engage them in a fire-fight. The cycle would be repeated until the assault unit closed with the enemy. This was fine in theory; indeed, in a battle at Fort Donelson in February 1862 it worked quite well for the attacking Union forces under General Morgan Smith.[17]

However, this tactic suffered from critical weaknesses that usually combined to defeat it. First, defenders did not merely fire volleys at the assaulting force, they often delivered **aimed fires** at the skirmishers. Skirmishers were individual soldiers who moved forward independently. There was absolutely no way that they could outnumber the defenders—and it was physically impossible for them to suppress aimed fires by defending forces that outnumbered them. A simple and ready logical solution offered itself: increase the number of skirmishers. This was tried in practice, but it took away men from the main assault force, whose unity, cohesion, and momentum was thus sacrificed. Second, the technique of short rushes demanded a high degree of training in decentralized command and control, which neither the officers nor their men had. The exigencies of the civil war did not provide the time or the opportunity to effectively teach decentralization of command and control.

Offensive trenches

Given the opportunity, defenders would dig in and thus wait for the attackers to bleed themselves against prepared positions. During the

17. Mahon, "Civil War Infantry Assault Tactics," p.64.

Civil War, some of the more innovative officers of both armies simultaneously hit upon the idea of constructing trenches for offensive movement.[18] In other words, the attacking side would dig trenches towards the defenders. In theory this solution allowed the attacker to cover the deadly ground under cover for much of the way and thus minimize the amount of time the assault force would have to be exposed to the fires of the defending force. This tactical solution suffered from two serious flaws. First, it was time-consuming. Second, it was subject to disruption by spoiling attacks by the forces of the defending side.

From the late 19th to the early 20th century

With the American Civil War, the world entered the age of industrial war.[19] Many prescient observers recognized this. European military men and observers were mesmerized by the "industrialization" of war: the extensive use of railways, the engineering feats of both sides, etc. Others were not so impressed. When Helmuth von Moltke, the Prussian chief of staff and the man who led German forces to victory over France in 1871, was asked his opinion of the American Civil War, he allegedly replied that he was "not interested in the clash of mobs in the wilderness." Ultimately, few if any observers paid much attention to the innovations at the tactical level.

Not surprisingly, some of the embryonic American responses to the emergence of deadly rifle fire could not be built upon to create a new tactical framework. The problem lay largely, but not entirely, with the fact that the maneuver element in the armies of the 19th century ranged from division size to regiment size. There was no smaller maneuver element.[20] By the 1880s the minimum size of the maneuver element began to drop. The battalion was the tactical unit, and

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18. For more extensive details on trenches, see Edward Hagerman, *The American Civil War and the Origins of Modern Warfare: Ideas, Organization and Field Command,* Bloomington: Indiana University Press, 1992, pp.175-198.

19. With the French Revolution in 1789, the world had entered the modern period of warfare (the period following the French Revolution).

20. See John English, *On Infantry,* pp.4-6.

the company the fighting unit.[21] Anything organizationally smaller than the company was still inconceivable. For many of the aristocratic officer corps of European armies with atavistic notions about class stature and honor within the military establishment, the thought of decentralizing command and control and delegating responsibility to the "lower classes" was too much to bear. It was traumatic enough that the French Revolution had created the mass army, which even allowed commoners to become officers and permitted the emergence of a class of soldiers known as skirmishers who acted independently on the battlefield. For some, the introduction of the rifle was equally as traumatic because it promised to cause even greater dispersion of units.

The question that was posed with the introduction of the rifle in the mid-1800s was still being asked well into the late 19th century: How does one deal with crossing the deadly ground? As one late 19th century military theorist put it:

> A certain space of from 1,500 to 2,000 yards swept by fire, the intensity of which increases as troops approach the position from which the fire is delivered, has to be passed over. **How shall it be crossed?**[22]

This matter preoccupied the minds of many military theoreticians and national military establishments in the period between the end of the American Civil War in 1862 and the beginning of the First World War in 1914. For the most part their solutions were not effective. Some theoreticians—the "firepower" advocates—believed that advancing infantrymen should stop and fire back at the defenders. The "shock" advocates believed that the infantryman should unflinchingly advance until he is on top of the enemy, whom he dislodges with the cold steel of the bayonet. Indeed, the theoretical discussions of infantry assault tactics descended to the level of the mystical and irrational.[23] For example, the French army, whose cult

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21. Emory Upton, *The Armies of Asia and Europe,* New York: Appleton, 1878, pp.296-301.

22. Robert Home, *Precis of Modern Tactics,* London: Her Majesty's Stationary Office, 1882, pp.70-71.

of the offensive during the initial stages of WWI was to lead to severe casualties, seems to have been deprived of the famous Gallic sense of *raison* because it fervently believed that energetically and bravely led units could prevail against the most violent fire. Even more absurd were the views of Russian General M.I. Dragomirov who claimed that "national character" dictated tactics. He believed that Northern Europeans such as the Swedes, Germans, and British, were cold and calculating and were best at long-range combat action. However, he said, Russians, French, Italians and other southern Europeans were emotional and hot-blooded types who preferred to fight shoulder to shoulder and to close with the enemy. He believed that troops with those national traits would not engage in "long-distance lead pumping. For them, resolution in the attack was all that was required...."[24]

Within this larger question of how to cross the "deadly ground" lay three seemingly subordinate questions:

- Do you need to decentralize authority even further to be able to cross the "deadly ground?" (That is, can there be a combat element smaller than the company?)
- How small can an independent maneuver element be and still remain effective?
- How small can an independent maneuver element be and still include a useful mix of weapons?

On closer examination, the questions were to loom larger in the coming years, because the answers to them led to the emergence of the squad.

In the late 19th century, the U. S. Army had some new innovations. In 1867, under the impetus of General Emory Upton, it adopted a new

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23. For an illustration of the differences between the two schools within the British Army see Shelford Bidwell, *Firepower: British Army Weapons and Theories of War, 1904-1945,* London: Allen and Unwin, 1982, p.31.

24. John English, *On Infantry,* p.7; for more extensive details on M.I. Dragomirov, see Bruce Menning, *Bayonets before Bullets: The Imperial Russian Army, 1861-1914,* Bloomington: Indiana University Press, 2000, pp.123-151.

system of loose-order infantry tactics based on the movement by two ranks of four. This constituted a rejection of linear tactics and was, in effect, the creation of the first American eight-man infantry squad.[25] The U.S. Army was able to further develop some of its ideas about decentralized command and control and small unit combat during the wars against the various Native American tribes. Indeed, the U.S. military was responsible for the creation of the squad as we know it. But, as was often the case, U.S. military innovation had only a transient impact on the European militaries. The Europeans had to come around to the concept of a squad through their own experiences.

The Boer War (1899-1902), which pitted well-trained but unimaginative British regulars against descendants of Dutch settlers, also provided some pointers in the right direction. The Boer soldier (who was also a farmer) proved to be a first-class rifleman with tremendous initiative and sense of independence. These characteristics enabled small groups of Boer soldiers to fight effectively and to implement new tactical procedures on an *ad hoc* basis. Wilhelm Balck, who later became a famous German officer and military theoretician and who participated in the war on the side of the Boers, has left a dramatic description of how far the Boers were able to go in the decentralization of command:

> One man crept forward once or twice his length, raising his body slightly, while the man next to him fired; then they exchanged roles and this procedure was repeated uninterruptedly....The firing line, while keeping up an incessant fire, slowly but steadily advanced. The advance of this uncanny crawling line is said to have produced an especially disquieting and paralyzing impression on the immovable defender, who was tied to his position, because of his inability to inflict perceptible losses on these small prone targets, and because, moreover, he himself was continually under a galling fire. As no upright assault was made, no opportunity was offered to the defender for using his rifles against targets the height of a man. The British infantrymen were, however, insufficiently trained in handling their weapons independently....[26]

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25. See Emory Upton, *Infantry Tactics Double and Single Rank,* New York: D. Appleton and Company, 1874, p.7.

But the Boer soldier lacked discipline and respect for authority. Indeed, the Boer soldier did not feel obliged to follow the orders of his superiors if they were not to his liking. In fact, orders were subject to a vote. These characteristics prevented the Boer side from institutionalizing their way of fighting into coherent tactical procedures. Thus, the invention of the squad could not come from them—but their decentralization of command did help point the way.

Some astute military observers suggested that their respective armies should adopt a tactical approach in which one unit of infantrymen covers the advance of another. A noted British military theorist, G.R. Henderson, was among those who proposed such a scheme:

> Nor is it the artillery alone that should cover the infantry advance....(A) portion of the infantry should be detailed for this purpose before the remainder move forward....Such fire is little less effective than that of the field artillery. It may be less demoralizing; but if the exact range can be ascertained, it will be more accurate, for infantry has not to contend with the technical difficulties, fuses, errors of the day, etc. of the sister arm....

However, it was left to the Germans, who learned from the Boer War and their own experiences in the early stages of WWI, to set the stage for the emergence of the squad on the European theater of operations.

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26. Wilhelm Balck, *Tactics,* Fort Leavenworth: U.S. Cavalry Association, 1911, pp.87-88.

The rise and development of the squad

This section explores the rise and development of the squad from World War I to the present day. It also explores the determinants of squad size, organization and structure by looking in some detail at historical examples drawn from foreign armies, the United States, and the United States Marine Corps.

Impact of technology

In the section on the historical background we noted that technological developments, among other things, led to the emergence of squads. Changes in military technology had a dramatic impact on *how* squads evolved, while the deadlock on the trenches played a key role in *why* squads evolved. In 1914, the Imperial German Army, like other European armies, expected a short war based on infantry actions. By that time the machine gun had replaced the rifle as the predominant weapon of infantry units. But the machine gun of the time was very heavy and thus not very mobile. This made it beneficial to the defender, not the attacker. The rifle could not overcome the heavy machine-gun in a contest of firepower. By late 1917 the situation had changed dramatically, enabling the Imperial German Army to undertake some brilliant breakthroughs in March 1918. What had happened? The German success stemmed from the development of the light machine-gun (LMG).[27] This enabled the Germans to change their infantry organization and size to take advantage of the mobility of the light machine gun. In this context, the Germans developed small-units called *Stosstrupps* or *Sturmtrupps* (assault squads). Each of

27. For more extensive details see Martin Samuels, *Command or Control? Command, Training and Tactics in the British and German Armies, 1888-1918,* London: Frank Cass, 1995; Bruce Gudmundsson, *Stormtroop Tactics: Innovation in the German Army, 1914-1918,* Westport, CT: Praeger Publishers, 1995.

these new squads consisted of eight men and a non-commissioned officer. A German officer, Hauptmann Rohr, was in charge of the development of the assault squad tactics. The essence of the new assault tactics was that attacking infantry should be able to react rapidly and effectively to the resistance of the defending enemy. The key to this was the decentralization of command so that squads could operate on their own initiative according to the evolving combat situation. This required a very high level of training, particularly among NCOs, because of the need to maneuver in close combination with fire support from the heavy squad weapon, i.e., the machine gun.[28] The German assault squad was also armed with light mortars, a liberal amount of grenades, and flamethrowers for added firepower. The assault squad could fire and maneuver, with the former used to support decisive maneuvers to close with the enemy.[29]

Impact of combat experience

The combat experience of one's own side and that of others has often played a critical role in the adoption of a squad of particular size and organization. However, time and space limitations do not allow us to examine the combat experience of all major armies. [30] In this context, it is particularly instructive to look at the early modern evolution of small-unit size and organization in the United States Army. In the previous section we explored some of the developments in the United States Army in the Civil War.

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28. For more details see Martin Samuels, *Command or Control?* pp.93-94; Bruce Gudmundsson, *Stormtroop Tactics.*

29. This new German assault tactic also benefited from critical doctrinal changes introduced in artillery fires that did away with the preliminary bombardments that lasted for days before the assault began. With the introduction of assault squads, artillery's rolling barrages were tied to advance of the infantry. This was a revolutionary idea at the time and was developed by Lieutenant Colonel Georg Bruchmuller; for more details see Captain Scott Ukeiley, "Tempo and Fires in Support of WWI German Infiltration Tactics," *Field Artillery Journal,* September-October 1997, pp.26-29; and David Zabecki, *Steel Wind,* Westport, CT: Prager Books, 1994.

30. English's *On Infantry* does this in some detail.

The United States Army entered WWI with the small-unit structure developed by Emroy Upton. However, at that time it was essentially an administrative rather than a combat element. Under the influence of the French Army—considered to be at the cutting edge of the development of small unit tactics—this informal American squad quickly evolved into something bigger, the **16-man section.** Two squads made up a section or "half platoon." The section became the smallest combat element, and the squad remained an entity devoted to administrative matters and the facilitation of control and movement of the section. This latter function—movement—contained within it the theoretical underpinnings for a return to the squad as the smallest combat element. This fact was evident in the Infantry Drill regulations of 1919, which, in spite of its attempts to rationalize the disappearance of the squad, stated:

> The section leader guides his unit. He looks at it only when his exercise of control demands it—his eyes should be fastened upon the enemy. The section must be bound to its leader, who, under all circumstances, is the rallying point. *The squad leaders maintain the positions assigned to them and see that the platoon and section leaders' orders are executed. They transmit the commands and signals when necessary, observe the conduct of their squads, and assist in enforcing fire discipline. When the ability of platoon and section leaders to control the actions of their units ceases, squad leaders lead their squads on their own initiative, lending each other mutual support.* [Italics added].

However, it took only about one year to see that the section was too unwieldy. From late 1920 to 1932, the United States Army returned to the **eight-man** squad as the smallest combat element.

The 1920s and 1930s constituted a period of turmoil in tactical thought. Far-sighted officers and military theorists in Western armies were beginning to think in detail about the role of infantry units in future war. There was a greater attempt to refine the role of the infantry squad, its size and organization. A detailed attempt was undertaken by Colonel Walter Wheeler of the United States Army in his definitive and influential work of 1936, *The Infantry Battalion in War.* In that book he defined the squad in the following manner:

> The rifle squad comprises eight men at most, grouped round an automatic rifle and led by a corporal. One man is designated to replace the squad leader in case of casualty. Two men act as scouts, one as assistant automatic rifleman and one as rifle grenadier. The squad leader lives with his squad at all times and is responsible that they are fed, equipped and trained; in combat he sees that they fight....[31]

Moreover, tactical doctrine within the U.S. ground forces began to diverge from that in Europe. In Europe, the firepower of the squad was augmented by the addition of the light machine gun, of which the German Army's MG34 and its successor, the MG42, were the outstanding examples. The United States Army was unable to field an LMG. As a result, it added automatic riflemen armed with the ubiquitous Browning Automatic Rifle (BAR) as a remedy.

On the eve of U.S. entry into World War II, General Leslie McNair ordered an extensive and exhaustive reorganization of the squad. The conclusion of the committee that presided over this reorganization was that the eight-man squad with which the army went to war in 1917 had not been large enough to absorb casualties and continue to function as an effective and cohesive unit. The committee's recommendation was that the army should adopt a **12-man squad.** The automatic rifle team was eliminated and the BAR was incorporated directly into the squad as an integrated three-man team (two of them armed with the M-1 rifle and one with the BAR). A sniper was added to the BAR team, making it, in effect, a four-man team. With a sergeant as the leader of 11 men, the squad had grown to be almost comparable in strength and combat capabilities to the rifle platoon of WWI.

In battle during WWII, the value of fire and maneuver was constantly stressed in firefights that pitted American and German troops against one another. During WWII, the German squad and tactics revolved around the MG42. The squad's main goal in a firefight was to get the the MG42 up and firing on the enemy as quickly as possible, with the rest of the squad ready to bring more ammunition to the gun if

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31. Colonel Walter Wheeler, *The Infantry Battalion in War,* Washington, DC,: Infantry Journal Press, 1936, pp.1-2.

needed. United States Army practice differed substantially. The 12-man squad was broken down in the following manner: a two-man scout team (ABLE), a four-man BAR team (BAKER), and a five-man maneuver and assault team (CHARLIE). According to the "theory" the squad leader would stay with ABLE until the enemy was located and fixed (pinned down by fire). Once this was accomplished, the squad leader had to rapidly formulate an assault plan. In this context, he would signal BAKER to provide covering fire, while he then made his way to CHARLIE to lead the assault by short rushes. That was the theory. The reality proved markedly different:

- The squad leader often found himself pinned down with ABLE once contact was made with the enemy. He could not make his way back to CHARLIE to lead it into the assault.
- The squad leader found the 12-man squad difficult to control.
- Two to three casualties within the ranks of the CHARLIE assault team degraded the integrity and cohesion of this team, thus making the assault very difficult to undertake.[32]

In light of the above observations, combat in WWII showed, rather conclusively, in the minds of many observers, that eleven men were difficult for one leader to control.[33]

1946 Infantry Conference

In 1946 the Infantry Conference at Fort Benning was convened to address the lessons learned from the experiences of American small units during WWII. Once again, a key issue was what constituted the optimal size and organization of an infantry squad.

The conference members concluded that the 12-man squad of WWII should be replaced by a nine-man squad. This decision was justified

32. Note that we are not talking here about casualties within the entire squad, but *only* among the CHARLIE assault team.

33. Brian Mennes, "United States Army Infantry Squad: Year 2015," U.S. Army Command and General Staff College, Fort Leavenworth, KA, June 1999, p.32.

three years later in a a report that wholeheartedly accepted the recommendations of the Infantry Conference:

> Combat experience proved that it was difficult for a squad leader to control and direct more than eight other men in battle and technical developments in weapons indicate greater dispersion in future warfare. The new squad consists of a squad leader and his assistant, five riflemen, and an automatic rifleman and his assistant.[34]

Three key "micro" factors influenced the members of the Infantry Conference to reduce the size of the squad:

- ***Squad command and control:*** The experience of WWII showed that decentralization of command and control—which, as we have stated, was historically important in the rise of squads—eventually comes up against a set of sheer physical limitations. To exercise direct control over the squad, a squad leader must be able to communicate orders to his men by voice or signals and to supervise them as they execute these orders. In this context, no matter how well trained and how physically fit a squad leader is (and how well his men respond to him), there is a point beyond which he can not control a certain number of riflemen and crew-served weapons on the battlefield. When a squad has so many men that the leader cannot communicate with or see them, he must do so through subordinate leaders—hence, the emergence of the assistant squad leader. However, the emergence of the assistant squad leader had two paradoxical results:
  - — It increased the information load on the squad leader because he had to transmit and receive information to and from the men he directly controls and to and from his assistant squad leader.
  - — It restricted the squad leader's effective control over the squad by adding another layer of authority.

34. *Report of Activities, Army Field Forces, 1945-1949,* September 30, 1949.

- ***Sustainability and attrition:*** A squad's ability to maintain itself in combat for the duration of the fire-fight—a short, intense, and rapid exchange of fire followed by an assault—depends on how well it can handle two types of sustainability and attrition rates:

  — Maintaining adequate levels of ammunition, equipment, and other necessities between periods of re-supply. This is a matter of logistics and, of course, leadership qualities. It need not concern us here because these factors do not relate to squad size and organization.

  — Absorbing combat casualties and remaining combat effective. This issue involves a dynamic and dialectical interaction between size and control. In other words, a squad should be small enough for the squad leader to control but large enough to account for the effects of attrition. Attrition through combat or other causes results in a loss of firepower and limits the ability of the squad to accomplish the mission. These considerations apply universally for any squad, of any size, in any army. However, these considerations become very significant when the squad is small to begin with. The 1946 Infantry Conference concluded that the nine-man squad is the ideal size: large enough to absorb casualties and small enough to be controlled by the squad leader and his assistant.

- ***Firepower*** is both the ability to deliver accurate fire and the amount of fire delivered by a unit. Another important aspect is fire control. It rests in the hands of the squad leader and is defined as the squad leader's ability to:

  — Have the squad open fire when ordered to do so

  — Adjust the fires of his squad on the target

  — Shift the fires of his squad in part or all from one target to another

  — Regulate the rate of fire and to order ceasefire.

The U.S. Army leadership accepted the 1946 Infantry Conference recommendations that the squad be downsized from a 12-man to a

nine-man unit. The ABLE, BAKER, and CHARLIE teams were dropped. The conference attendees felt that the nine-man squad organized around an LMG would be large enough to sustain casualties, yet small enough for a squad leader to command and control effectively. Although the conference resulted in the downsizing of the squad from 12 to nine men, many of the participants did not feel that a nine-man squad could function as an independent entity that could do both fire and maneuver. The matter was left unresolved.

By 1947 all the changes had been implemented, save one: the U.S. Army was unable to field an effective LMG as a replacement for the BAR. This was to prove a critical weakness, particularly in light of the conference attendees' observations that in order to fire or maneuver, the squad needed to be equipped with the suppressive fire of an organic LMG. Rifle fire, even if automatic, was inadequate.

The experience of the United States Marine Corps during WWII

The United States Marine Corps adopted a different philosophy from that of the United States Army. This is not surprising since the USMC more often involved in "small wars" or so-called police actions. The experiences of the Marine Corps in "small wars" in such places as Nicaragua and Shanghai in the early part of the 20th century had taught Marines the importance of the automatic rifle as a base of fire. Maneuver was not as important. By way of contrast, the United States Army gave equal value to both. Furthermore, during WWII the USMC found itself fighting in an environment—jungle and island warfare—that only few U.S. Army units participated in. Last but not least, amphibious operations became the hallmark of the USMC. Indeed, the Marines became and continue to be the experts in the world of this form of warfare. Amphibious operations, particularly in the Pacific theater of operations, were bloody affairs. Upon leaving the protection of the landing craft, survival depended on projecting maximum small arms and machine-gun fire as far forward as possible. The Marines with their fixation on firepower were better suited to this type of operation than the standard U.S. Army unit which attacked from the sea in waves in accordance with the organization's tactical doctrine.

By the beginning of WWII, the Marine infantry platoon comprised a seven-man headquarters, an eight-man BAR squad, and three **nine-man** rifle squads. Each squad consisted of a squad leader, a BAR man, six riflemen, and a rifle grenadier armed with a grenade launcher.

With the onset of WWII, the platoon and squad organization described above was found to be sub-optimal, particularly for both jungle and island fighting. Consequently, USMC officers introduced the most dramatic revolution yet in the USMC infantry squad. First, the BAR squad disappeared from the platoon. Second, the rifle squad was increased in size to **12 men.** This comprised a squad leader, an assistant squad leader, six M-1 riflemen, two assistant BAR-men armed with M-1s, and two BAR-men. This organization structure allowed the rifle squad to be broken down into two six-man fire units, each containing an automatic rifle and five semi-automatic rifles.[35]

Further experimentation continued at Camp Pendleton based on lessons learned in action in the Pacific theater of operations. Three different experiments were tried:

- Two-BAR, 13-man squad
- Four three-man fire groups
- Three four-man fire groups.

The last experiment was deemed the most optimal because it was better able to absorb casualties and was easier to control. Consequently, in March 1944 the USMC adopted a squad organization of 13 men organized into three four-man fire teams built around a BAR. This was broken down into a squad leader, three fire team leaders, three riflemen armed with M-1s and M-7 grenade launchers, three assistant BAR-men armed with carbines, and three BAR-men. This organization provided a significant amount of firepower, as was required for the small intense actions in the thick jungles of places such as Bougainville. Furthermore, the break-down of the squad into

35. Some Marine units, particularly elite raider or commando units, experimented with different structures. For example, the Second Raider Battalion retained nine men divided into three fire groups of three men each.

three four-man fire teams was crucial because a squad leader by himself could not control 12 men in combat even under normal circumstances (i.e.,open terrain). Combat in thick jungle tended to wreak havoc with command and control, due to poor visibility and mobility. In this context, small groups such as fire-teams would be able to operate effectively as independent units which, however, retained their role as part of a larger whole.

The Korean War

The U.S. Army went to war in Korea with the nine-man squad. Experiences in this sanguinary war did result in the introduction of some changes to the infantry squad. One noteworthy change was made during the conflict as a result of the lessons learned from tactical failures early in the war: the squads lacked firepower because it had no organic LMG. The BAR did not have the firepower of an LMG. However, since no LMG prototype was on the horizon, the U.S. Army increased the number of BARs in the infantry squad. These additional BARs were intended to give the infantry squad the suppressive fires of an organic LMG. When this change was introduced, many felt that the nine-man squad organized around additional BARs performed well.[36] The BAR proved to be an effective weapon in support of squad operations against Communist troops because its mobility allowed it to be carried relatively easily over the rugged terrain of Korea.

The relative success of United States Army squad operations did not not slow down continued reform and development in the organization of the squad. The changes in this area were largely due to the observations of the famous U.S. Army officer and commentator, Brigadier General S.L.A. Marshall, in his book *Infantry Operations and Usage in Korea,* and the Korean war combat experiences of Major General J.C. Fry.

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36. For example, see the comments of Brigadier General S.L.A. Marshall, *Commentary on Infantry Operations and Weapons Usage in Korea: Winter 1950-1951,* Chevy Chase, MD: The Johns Hopkins University Press, 1951, pp.53-54.

Marshall observed that in Korea units were compartmented into disparate and smaller elements, as a result of the rugged terrain that made command and control difficult. As a result, there had been more "real" small-unit actions in the Korean War than there were in WWII. In this light, Marshall made three crucial observations: (a) the squad could not function as a unified entity, and often split up into separate teams; (b) that the infantrymen closest to the BAR fired their rifles more often those who were remote from it; and (c) when the BAR was moved tactically from location to location, a pronounced lull occurred in the intensity of combat. Marshall argued that the nine-man squad be broken into two four-man squads, each armed with a BAR. In 1953 a change in the Table of Organization and Equipment (TOE) authorized the addition of an extra BAR.

The combat experiences of Major General Fry were also to offset U.S. infantry tactics. Fry was the commander of the Second Infantry Division in the Korean War, during which time he instituted modifications in infantry tactics. Fry ordered his division's infantry squads to deploy into two "battle-drill" (i.e., fire and maneuver) teams. One team would act as a base of fire while the other would maneuver. After the war, Fry rationalized his modifications in his two-part article, "Battle Drill," which appeared in an edition of the unofficial but well respected *Combat Forces Journal*. In his article, Fry claimed that his introduction of fire and maneuver teams eliminated "pin-downers," soldiers who could not move because they were pinned down by enemy fire.[37]

Marshall's observations and Fry's modifications ensured that the debate on squad *organization* and *size* would continue after the Korean War. Clearly, their ideas on the adoption of fire teams would ultimately require the squad to be enlarged beyond its nine-man level. Indeed, after the Korean War, the U.S. Army conducted a series of squad exercises and tests to try to discover the optimal squad organization and size.[38]

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37. J.C. Fry, "Battle Drill," *Combat Forces Journal,* April 1953, pp.18-22; May 1953, pp.37-39. Fry later expounded his ideas in greater detail in *Assault Battle Drill,* Harrisburg, PA: The Military Service Publishing Company, 1955.

Studies of the mid-1950s: Falcon, Follow Me, Sagebrush, ASIRS, and ROCID

In 1953, the Chief of Army Field Forces directed the XVIII Airborne Corps based in Fort Bragg to undertake a squad exercise, FALCON. Its goals would be to assess the:

- Ability of one leader to command and control ten men
- Simultaneous employment of two BARs in two different fire teams
- Ability of the squad to conduct fire and maneuver.

The post-test XVII Airborne Corps report concluded that each one of these ideas could be successfully implemented. However, the report's recommendations were extremely vague. For example, the report added that fire and maneuver could only be done if the squad were able to maintain sufficient strength in terms of personnel. But the report did not discuss what the squad's sufficient strength should be. Representatives of the U.S. Infantry School who were present at the test did not believe that a case was made for the deployment of an 11-man squad (i.e., a fire-team based one) or that one man could control such a squad.

In 1955, the Third Infantry Division undertook its own field exercise, Follow Me, during which it experimented with a seven-man squad. This was the smallest squad size with which the U.S. Army has ever experimented. The goal was to see whether a smaller squad size would lessen the command and control burden on the squad leader. The results were not very encouraging. First, the seven-man squad, which was equipped with only one BAR, suffered from a noticeable

38. S.L.A. Marshall's reputation as one of the leading authorities on small-unit combat during World War II and the Korean War has been damaged. Several years after his most famous study on the topic of small-unit actions, *Men Against Fire,* observers discovered that Marshall's ratio of fire values, in which he claimed that "on average not more than 15 percent of the men (in the WWII infantry squad) fired at the enemy," proved to be false. This has put in doubt much of his other observations, including those of the KoreanWar.

lack of firepower. Its trial record in both the defense and assault was not inspiring. Second, the assistant squad leader could not assist the leader because he had to concentrate on firing his weapon to add to the squad's deficient firepower. Third, the exercise proved that the seven-man squad lacked the personnel to absorb casualties and remain an effective fighting force. The report did not indicate how many casualties would cause the squad to cease functioning as an effective force; however, given its small size it could not afford to have too many of its members either wounded or killed. The exercise report concluded that the U.S. Army should adopt a ten-man squad but did not state whether such a squad should be organized around fire teams.

Later that same year, the Third Infantry Division conducted yet another test, Exercise Sagebrush. The test was sponsored by the division's commander but it was not a scientific test and did not come up with any original recommendations or findings. It merely stated that the Army nine-man squad was too small to be conduct fire and maneuver. The report concluded that the U.S. Army should return to the 12-man squad so that it would be endowed with considerable firepower and be able to form three fire teams.

In 1956, the U.S. Army's Combat Operations Research Group decided to conduct a rigorous, scientific, and impartial evaluation of the dynamic relationship between the infantry squad's size, organization, and weapons needs. The project, A Study of the Infantry Rifle (Table of Organization and Equipment), ASIRS, was implemented by a contractor, the Psychological Research Associates. The study began by posing the question: How do changes in squad structure, size, weapons inventory, and leadership affect squad performance? The answers or findings would then enable the U.S. Army to create the most effective squad possible within existing technological capabilities.[39]

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39. See Dean Havron et al. *A Study of the Infantry Rifle Squad (ASIRS)*, Fort Monroe, VA: Headquarters Continental Army Command, 1956; Major Paul Melody, *The Infantry Rifle Squad: Size is not the only Problem,* School of Advanced Military Studies, United States Army Command and General Staff College, KA: Fort Leavenworth, 1990, p.20.

ASIRS used a more rigorous methodology than the previous evaluations that had been conducted by military personnel. First, the study looked at various squad organizations and addressed the firepower, command and control, attrition effects, and maneuverability of each. Second, the project team compared six variations in the following areas:

- **Squad size:** What impact does attrition have on squads and what does squad size do to maneuverability? To address these issues, the project team tested squads ranging in size from four to 11 men.
  - — With respect to attrition rates, notwithstanding the scientific basis of the test, the findings here were obvious. A squad of seven or fewer men could survive as a cohesive entity as long as a squad of eight to 11 men.
  - — The testers discovered that maneuverability was a function of the BAR fire team, rather than of **squad size.** For example, a small squad of four to seven men with a BAR was no more maneuverable than an eight-man squad with one or two BARs.
- **Squad weapons:** How does firepower fit in the scheme of things within a squad? A squad's fire capability or firepower lies in is crew-served weapons. They varied the number of BARs from zero to three as a percentage of all the weapons inventory of each squad size. The testers came up with some interesting findings with respect to the relationship between the squad and its fire capability. No matter what size the squad was, the volume and accuracy of its firepower was maximized when 50 percent of the personnel were equipped with BARs. Adding more BARs did not add to firepower in any significant way. However, more firepower (as embodied in the BARs) ultimately affected the squad's other functions after the assault (clearing trenches or houses) because of the insufficient number of riflemen. Increased firepower is not necessarily a panacea. This was an important finding. It continues to be relevant now and should be so well into the future as the infantry squad evolves. Too many armies, particularly the U.S. Army, are obsessed with the

importance of firepower and believe that having effective firepower means having more weapons that provide such firepower. The testers concluded that BARs should constitute only 30 percent of a squad's actual strength.

- **Squad leadership:** With respect to leadership, the testers were concerned with control. Since leadership deals with human psychology, it is one of the most intangible and difficult issues to address. A squad leader's ability to lead is based partly on his personal character (strong or weak), style of leadership (tight or decentralized control), and training (how well his military training has prepared him for leadership). Nonetheless, no matter how strong or well trained a leader is, he cannot command and control more than a bounded number of men. Determining that number constitutes a critical issue in addressing leadership at the small-unit level. The project team decided to see how well a squad leader was able to perform his tasks alone in squads ranging in size from four to ten men. Assistant squad leaders were provided only for the 11-man squad. Because of the difficulty of addressing this issue, the project team could not come to conclusions that they felt they could generalize. They did say that the best leader to led ratio was 1:5. However, they also added that in open terrain in broad daylight, one man could command seven men without difficulty.[40] This was not very helpful since the testers knew that it was neither logical nor feasible for a squad to vary its size in the field according to terrain and environmental conditions.

- **Squad structure:** All squads ranging from four to ten men were organized along a base of fire team, grouped around the BAR, and had one leader, the squad leader. The testers concluded that the Army's current nine-man squad and the possible 11-man squad (divided into two teams as proposed by Marshall) were the most effective. In terms of organization, one was not necessarily better than the other; however, the 11-man squad could execute fire and maneuver, whereas the former could not.

40. *ASIRS,* pp.64-67.

The project team concluded that if the U.S. Army wanted its infantry squads to engage in fire and maneuver, then it should change the structure and increase the squad size from nine to 11-men, in a two-fire-team squad. Not long after the study appeared the U.S. Army suddenly adopted the 11-man squad structure. Given the short timeframe between the appearance of the report and the adoption of the new structure, it is safe to conclude that ASIRS had little impact. Indeed, the Army seems to have been influenced by the findings of Marshall and MG Fry. The new eleven-man squad was implemented as part of the sweeping changes known as the Reorganization of the Current Infantry Division (ROCID), or the Pentomic Reorganization. The new squad consisted of a squad leader and two fire teams, Alpha and Bravo. Each team had a team leader, an automatic rifleman, and three riflemen.

Studies of the 1960s: OCRSP

ASIRS was followed by a more rigorous and comprehensive evaluation five years later. In 1961, the U.S. Army decided to conduct a sweeping evaluation of both squad and platoon sizes and organizations. The Army Combat Development Experimentation Command (CDEC) sponsored the Optimum Composition of the Rifle Squad and Platoon (OCRSP) test primarily because of critical developments in the field of infantry weapons. The U.S. Army was on the verge of introducing the M14 rifle, the M60 light machine-gun, and the M79 grenade launcher into its infantry units. It wanted to know what constituted the best size and organization for these new weapons. The test employed live opponents and implemented a wide variety of scenarios to make the test as realistic as possible.

The OCRSP study tested two types of squads: a fire-team-based squad and a less complex one organized around a squad leader and an assistant. The squads were varied in the mix of weapons they were allowed: some were equipped with only one M60 LMG, others with two LMGs, and some only with rifles and grenade launchers.[41]

41. *OCRSP,* pp.15-23.

The following constitutes the most significant findings of this important test:

- Firepower is important. The testers noted that squads with organic M60 LMGs were able to generate greater firepower than those that were not equipped with the new weapon. Furthermore, a squad equipped with LMGs could suppress enemy targets far more effectively than those equipped only with rifles or with a mix of rifles and automatic rifles and rifles. However, the testers did not challenge the assertion of ASIRS that beyond a certain point the increase in the quantity of weapons designed to increase firepower can ultimately lead to diminishing returns.

- The larger the squad, the better it is able to sustain casualties and still continue with the mission. In this context, the 11-man squad is better than the eight-man squad. However, serious casualties within the 11-man squad invariably led to the collapse of the fire team structure. The OCRSP testers concluded that a fire-team-based squad needed to maintain a minimum of ten men and three non-commissioned officers, to avoid jeopardizing its tactical employment as a dual-fire-team based structure. In theory, the 11-man squad was not supposed to suffer casualties.

- The presence of crew-served weapons (i.e,. fire support) could have a detrimental effect on the squad. This phenomenon was first addressed by the ASIRS testers. The OCRSP testers addressed it in some detail. They noted that the greater the number of LMGs in a squad, the greater the chances of the squad losing its combat effectiveness, *particularly as the firefight progressed towards the close-quarter engagement*. For example the 11-man squad with two LMGs requires a crew of four soldiers. Casualties in the LMG crew were often immediately replaced by available riflemen. In the tests, it was found that squad leaders usually wanted to keep the LMGs manned so that the squad would retain its firepower. However, this tendency had a negative impact on the squad's ability to maneuver towards the enemy to engage in close-quarter fighting, due to loss of riflemen to casualties and to the crew-served weapons.

The OCSRP report was characterized by fence-sitting. It stated that, in theory, the best squad organization was made up of one LMG, a squad leader, an assistant squad leader and six or seven riflemen. This meant, in effect, a squad of ten to 11 men (the LMG required two men). But it did not recommend a fire-team-based structure. In this respect, the OCRSP study did not differ greatly from the conclusions of the Infantry Conference of 1946. The testers believed that this squad type lacked sufficient firepower because it only had one LMG. However, the testers felt that an additional LMG would result in the diminution of the squad's ability to engage in close quarters combat, as was remarked upon above.

The testers did recommend that the U.S. Army maintain the 11-man squad that it had already adopted; however, the 11-man squad would be equipped with two of the new LMGs. Despite having recommended this structure as the most practical course of action, the testers believed that a fire-team-based squad would not survive intact once casualties mounted beyond a certain level. Why then did the team recommend the adoption of a fire-team-based 11-man squad? The OCRSP team may have felt compelled to go along with the evolving Army doctrine, which argued that the emerging squad of the 1960s could and should be able to execute fire and maneuver. It took the experiences of the Vietnam War to show up the weaknesses of U.S. Army thinking of the 1960s. The result was more testing and evaluation.

Studies of the 1970s: IRUS

Between 1966 and 1972, the U.S. Army ordered the most comprehensive and scientific study to date on squad and platoon size and organization. This was known as the Infantry Rifle Unit Study (IRUS). The IRUS methodology is noteworthy for three reasons. First, it sought to critically and rigorously analyze U.S. Army combat experiences from World War II, Korea, and Vietnam. Second, it made extensive use of electronic devices to measure the effect of firepower during play. Third, it sought to reduce the impact of prejudice and preconceived notions about squads and fire teams by not using the terms in the course of the study. Instead, the project team introduced the term Basic Infantry Element or BIE.

The project's findings were subdivided into several categories:

- Size and command and control of the BIE: What was the optimal size of a BIE to ensure the most effective command and control? Once again, as with previous studies, IRUS concluded that it was virtually impossible to determine size using command and control as the key variable. Some of the tests showed that one man could easily command and control five men, while others showed that one man could command and control up to ten men *under certain conditions*. It depended on the mission, terrain, and the leadership qualities of the BIE leader. Ultimately, the testers concluded that if the "extraneous" variables were controlled or factored out, evidence showed that it was easier to control six or fewer men than to control more than six. Problems of command and control accumulated when one man tried to command and control more than eight men.

- Attrition rates and their impact: The historical record showed that infantry squads have an average attrition rate of 30 percent. Once a squad fell to five or fewer men, it was combat-ineffective. Furthermore, the testers reinforced the conclusion reached by previous studies that attrition had a severe impact on the effectiveness of fire-team-based squads. The evidence came not from the tests but from small-unit actions in the Vietnam War. Infantry squads invariably dropped the fire team structure once unit strength fell below nine men.

- Firepower and weapons mix: IRUS tests proved the importance and superiority of the LMG in small-unit actions. It was more effective than massed rifle fire and grenade launchers at suppressing both point and area targets in the attack and defense. A curious phenomenon was also noted: the effectiveness of the LMG as a weapon was greater the further away it was from the target. The LMG was not effective as a close quarter weapon; rather, it was effective in suppressing enemy units from a distance and in covering the movement of its own BIE (squad).

- Firepower is important but more crew-served weapons did not necessarily increase firepower: IRUS supported the 1946 Infan-

try Conference's call for the adoption of a LMG. However, the IRUS testing that two LMGs in a squad is not a panacea. First, another LMG adds yet another layer of complexity to the BIE. Second, the BIE leader has to divide his energies between two LMGs and his attention is not focused on ensuring the most effective utilization of one crew-served weapon. Third, two LMGs require twice as much ammunition as does one LMG. The IRUS testers concluded that a BIE should have one LMG and one grenade launcher. Together these two weapons gave the BIE enough firepower for the attack or the defense.

- Size and command and control of a BIE: the testers concluded that a BIE should not be smaller than six men.
- Fire teams and "fire and maneuver": The testers believed that the BIE could not do both.

IRUS was a two-part experiment. The first part, which was extensively discussed above, ended in 1972. The last major comprehensive study of squad organization undertaken by the U. S. Army. However, this did not stop the U.S. Army from continuing with its experiments in squad size and organization. In 1973, the Army increased the size of the squad from nine to 11 men. The infantry experience in Vietnam was the contributing factor in the increase in squad size. Small-unit actions in the Vietnam War were often extremely bloody affairs in which excessive casualties threatened the integrity of the nine-man squad. Furthermore, the nine-man structure did not permit the squad to both fire and maneuver. In 1975, the second IRUS study recommended that the U.S. Army retain an 11-man squad with two five-man fire teams.

In the 1980s, at the height of a renewed Cold War, the U.S. Army began fielding a whole new generation of weaponry and equipment. At the same time, it began implementing organizational changes from the level of the division to the squad. The mechanized infantry squad was reduced in size from 11-men to nine because of three factors: (a) the considerable augmentation in firepower due to new weapons allowed a cut in the number of squad personnel; (b) the new Bradley Infantry Fighting Vehicle that was introduced in the mid-1980s could only carry nine soldiers; and (c) the Army was in the pro-

cess of creating light infantry divisions. These divisions required manning, and some personnel had to come from the infantry squads of the heavy mechanized divisions. The key issue here is that the return to the nine-man squad was not mandated by any test or evaluation that called for such a reduction. As one observer has noted, "The 11-man squad died because the Army designed airframes and armored fighting vehicles that would not accommodate its size, *not because of its inability to operate on the modern battlefield."*[42] This point clearly highlights the fact that sometimes changes in squad size and organization are determined not by technological innovations (such as the machine-gun), doctrine, or even social changes but by mundane factors such as personnel and resource constraints, bureaucratic preferences, and even technological oversight or developments that mandate changes (the introduction of the Bradley Infantry Fighting Vehicle).

The current structure of the USMC squad

By way of contrast, the USMC squad has been a paragon of stability. Except for the acquisition of more modern weapons, the Marine squad of 2000 remains essentially the same as in March 1944, when the 13-man triangular squad was officially adopted. This squad size and organization has not been without its vehement critics, including by those who have argued for a reduction to an 11-man squad for a variety of reasons. First, some Marine officers believe that a squad leader has serious problems controlling more than ten men. Second, most military establishments around the world employ squads that have from nine to 12 men. As for the U.S. Marine Corps, real-life "experience with 13-man squads is questionable, as there is little evidence that we have ever maintained such a large size in sustained combat. Indeed, our squad wartime strengths appear also to vary between 9 and 11 men."[43] The historical evidence does actually show that in the aftermath of casualties suffered in amphibious assaults, a full-strength Marine infantry squad has almost never regained its full complement of 13 men. Most have remained combat effective and

42. Brian Mennes, "United States Army Infantry Squad: Year 2015," p.38.

43. Major Robert Work, "Improving Combat Control: The Case for an 11-Man Triangular Rifle Squad," *Marine Corps Gazette,* August 1990, p.103.

cohesive with between nine and 11 men. Third, a number of Marine officers have come to conclude that it is not the size of the Marine infantry squad that accounts for the squad's formidable fighting qualities, but rather its organization into a triangular fire team structure, which promotes better command and control and greater primary unit cohesion.

Conclusions: past, present and future

This section will summarize the salient points of the historical analysis, the key drivers in squad size and organization, and possible future developments.

The infantry has been, is, and will continue to be a key component of the combat environment. Until the 20th century, infantry went into battle in large unwieldy formations. The reasons were largely technological and socio-cultural. However, from the mid-19th century on, important technological changes (the invention of the rifle) and socio-cultural changes (greater dispersion in the battlefield which forced officers to trust their soldiers in battle) allowed practitioners and theorists of the art of warfare to explore and experiment with smaller and more dispersed fighting formations.

Many theoreticians and practitioners came close to the creation of the squad, but the heavy weight of the past died hard. Several factors, such as the persistence of traditional socio-cultural attitudes, and a singular inability on the part of military bureaucracies to make the leap in thinking that would have allowed them to see the squad as a rational and logical solution in the evolution of warfare acted to prevent the institutionalization of the squad as the smallest fighting formation. Based on their experiences in the Civil War and in fighting the Indian nations, the Americans came closest to the institutionalization of the squad. However, American impact on the global stage of world military powers was limited in the 19th century. The Europeans did not see fit to follow the American lead.[44] Furthermore, the Americans did little justice to Emory Upton's concept of the eight-man squad, which was created in the late 1860s and lasted until the 1940s. Upton's squad was created as a combat element but was increasingly

44. During the latter stages of WWI the Imperial German Army developed the squad based on their own experiences in trench warfare.

used as an administrative tool until the outbreak of WWII, when it was reorganized into a 12-man, three-fire-team entity.[45]

Since the emergence of the squads as the logical smallest fighting unit, historical evidence does not indicate that a any one factor has had a decisive impact on the squad size and organization in either the U.S. Army and the U.S. Marine Corps, or indeed other fighting forces. As a result of experiments, studies, and combat experience, it can be concluded that the following criteria stand out as the key drivers, whether explicitly or implicitly:

- Firepower: This can be seen as the "measure of suppression potential (of the squad) based on the numbers and types of weapon systems carried by the squad." Firepower is integral to the overall success of the squad mission, its ability to engage in fire and maneuver, and its ability to ultimately dominate the enemy in the close fight. The firepower of the squad lies in its organic light machine-gun. U.S. Army infantry squads suffered for a long time from a deficiency of firepower, because the BAR was not an adequate substitute for a light machine-gun. During the Vietnam War, veterans insisted that the M-60 be integrated into the squad in order to ensure the fire superiority of the U.S. Army infantry squad vis-a-vis the enemy. However, many of the studies and experiments added a word of caution: that there comes a point beyond which adding more weaponry does not lead to a commensurate increase in firepower. Furthermore, firepower tends to slow down the squad. There is an old saying in the infantry, that the squad can only move as fast as its slowest member(s): the machine-gunner and his assistant. In this context, as we look to the future and the development of exotic and advanced infantry combat weapons, we must heed this point. Armies, such as the U.S. Army, are in the process of developing exotic small arms for the infantryman that will go a long way to increasing the firepower of each individual soldier. What will

45. See Brian Mennes, *The United States Infantry Squad: Year 2015*, United States Army Command and General Staff College, Fort Leavenworth, KA, 1999, pp.30-31.

this do to the machine-gun? Will it remain key or be superseded by the individual combat arm of the coming years?

- Resiliency: This is the ability of the squad to sustain combat losses without losing its identity, cohesion, and, above all, its ability to continue with the mission. Naturally, the larger the squad, the greater the resiliency. Vietnam showed that once a squad fell to seven or fewer men, it was unable to conduct fire and maneuver and its cohesion begins to unravel. Will resiliency be important for the future? All evidence points to the continued importance of resiliency in the combat of the future, where the asymmetric, non-linear warfare environment will play a determining role. Classic small-unit warfare-cum-science fiction novels, such as Robert Heinlein's *Starship Troopers* and Joe Haldeman's *The Forever War,* stress the importance of resiliency in the squad.

- Maneuverability: The other term for this is "control." More accurately, it is the ability of the squad leader to control the movements of his squad under fluid and dynamic combat conditions. It is affected by the size of the squad—the larger the squad, the more difficult it is to maneuver—and by the ability of the squad leader to communicate with his squad members. The adoption of an inter-squad radio in the coming years may reduce the problems associated with communication.

- Mobility: This is not the same as maneuverability. It is the measure of the squad's ability to move towards an objective dismounted and the physical ability to conduct movement, particularly under fire. While maneuverability depends more on the squad leader's abilities and on communications, mobility is dependent upon the entire squad in the sense that it requires physical and psychological conditioning to be at a high level.

At the present (i.e., mid-2000), there is no evidence that either the U.S. Army or the U.S. Marine Corps is about to conduct major studies or tests to evaluate the performance of its respective squad size. The current U.S. Army nine-man squad has not been seriously tested in combat in recent memory. The actions in Panama in 1989, Desert

Storm in 1991, and Somalia in 1994 did not warrant an interest in addressing the effectiveness of the current squad size and organization. However, a number of U.S. Army officers have voiced their concern about the current squad structure. In 1997, the then Chief of Infantry declared that the nine-man squad was inflexible and not able to withstand attrition as well as the 11-man squad.[46] Nor has the 13-man triangular USMC squad been extensively challenged in recent combat. So far, any concerns are personal opinions that have not yet generated a groundswell for officially mandated changes. U.S. combat troops may find themselves engaged in a wide variety of combat environments that range from "normal" firefights between opposing small units (as was the case historically in the 20th century) through intense urban combat against both professional and irregular forces, to operations other than war.[47] In this context, the USMC may find itself engaged in chaotic and rapidly changing small unit combat environments in the coming decades. If so, history shows that the lessons derived from these experiences could bring about changes in the size and organization of the USMC squad.

46. Major General Carl Ernest, "The Infantry Squad: How Much Is Enough?" *Infantry,* January-February 1997, pp.1-2.

47. See Edward Anderson, III, "The New High Ground," *Armed Forces Journal International,* October 1997, pp.66-70.

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