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PREPAREDNESS FOR COUNTERFIRE

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A thesis presented to the Faculty of the U.S. Army  
Command and General Staff College in partial  
fulfillment of the requirements for the  
degree

MASTER OF MILITARY ART AND SCIENCE

by

JOSEPH A. ADELMAN, MAJ, USA  
B.S., United States Military Academy, 1971  
M.B.A., Pepperdine University, 1981

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THESIS APPROVAL PAGE

Name of candidate MAJ Joseph A. Adelman

Title of thesis Preparedness for Counterfire

Approved by:

John M. Pickler, Thesis Committee Chairman  
LTC John M. Pickler, M.S.

Edward F. Kedzierski, Member Graduate Faculty  
LTC Edward F. Kedzierski, B.S.

William R. Larson, Member, Consulting Faculty  
COL William R. Larson, PH.D.

Accepted this 16<sup>th</sup> day of May 1984 by Philip J. Broder,  
Director, Graduate Degree Programs.

The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

## ABSTRACT

PREPAREDNESS FOR COUNTERFIRE, by Major Joseph A. Adelman, USA, 122 pages.

This study examines the capability of the field artillery of the United States Army to deliver effective counterfires. The Army's preparedness for counterfire is evaluated in five areas: history, the threat, doctrine, resources, and training.

The study concludes that as a result of the cumulative effect of weaknesses in all areas, but particularly in training, the United States Army must be judged as not being prepared to deliver effective counterfire.

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## CHAPTER 1

### INTRODUCTION

#### Statement of the Problem

The purpose of this thesis is to examine the capability of the field artillery of the United States Army to deliver effective counterfires. The problem can best be stated as: "Is the field artillery adequately prepared to deliver counterfires on the air-land battle-field?"

#### Background

FM 6-20, Fire Support in Combined Arms Operations, defines counterfire as the

...attack [of] enemy indirect fire systems, to include mortar, artillery, air defense, missile, and rocket systems. Observation posts and field artillery (FA) command and control facilities are also counterfire targets. Counterfire is accomplished with mortars, guns, and aircraft and is not a separate artillery battle. These fires are planned and executed for offensive and defensive operations, or they respond to an immediate request from a maneuver commander.<sup>1</sup>

The delivery of these fires is considered to be an important function of the field artillery. When questioned, field artillery officers almost invariably agree that this is the case.<sup>2</sup> Also, doctrinal manuals repeatedly state that one of the roles of the field artillery is to deliver counterfires against enemy indirect firing systems.

Counterfires have been utilized in each of the major conflicts in which the Army has fought in this century. Extensive counterfire operations have not been required, however, since World War II. In Korea and Vietnam the indirect fire threat was not as great as in other conflicts. Consequently, counterfire efforts were smaller and usually decentralized. As a result, the counterfire lessons of World Wars I and II had been largely forgotten by the end of the Vietnam conflict.

The mid-1970s saw a renewal of counterfire interest within the Army which led to a major doctrinal change. During this period, responsibility for counterfire was shifted from the corps to the division. This renewed emphasis was soon superseded by other priorities, and by 1980 counterfire had lost its position as a priority field artillery delivery of fires task.

In future mid to high intensity conflicts the United States can once again expect to face a significant indirect fire threat. The Soviet Army, for example, considers fire support to be the most decisive element in modern combat.<sup>3</sup> Soviet artillery fires will be directed not only against maneuver elements, but also against such diverse organizations and units as nuclear delivery systems, artillery, mortars, anti-aircraft weapons, command and control elements, and anti-tank weapons.

To assist in fulfilling the numerous demands for fire support, the Soviet Army plans on the employment of large numbers of artillery weapons. It is the Soviet doctrinal belief that

Artillery has become the basis of firepower of the ground forces. It has the decisive role of creating the preponderance of power over the enemy which frequently determines the outcome of battle.<sup>4</sup>

In light of current Soviet doctrine and equipment levels, NATO forces in Central Europe can expect their artillery to be outnumbered by a ratio of 4 to 1.<sup>5</sup>

Whether the U.S. Army's field artillery is prepared to meet such a threat is open to conjecture and will be the focus of this study.

### Hypothesis

The tentative hypothesis of this thesis is that the United States Army's field artillery is not adequately prepared to deliver counterfires.

### Significance

The significance of this thesis problem is twofold. If the Army is not prepared to deliver counterfires, then:

- \*in peacetime, units may be training improperly, and
- \*in wartime, we risk costly failures and possible defeat.

### Methodology

The nature of this problem requires a detailed analysis of the current counterfire posture. The strategy to accomplish this task is divided into five parts:

- \*historical lessons,
- \*knowledge of the threat,
- \*adequacy of doctrine,
- \*adequacy of resources, and
- \*adequacy of training.

The method used in evaluating each of these areas will be described in Chapter 3. This chapter will examine why each is important.

### History

Clausewitz tells us, "The knowledge which is basic to the art of war is empirical."<sup>6</sup> Thus, through historical experience the nature of war can be revealed to us.<sup>7</sup> By looking at the history of counterfire, an understanding of its complexity and an awareness of its recurring themes can be gained as well as seeing how its characteristics have changed over time.<sup>8</sup>

### Threat

We must know and understand our enemy if we are to defeat him. As Jomini has stated, "How can any man say what he should do himself if he is ignorant of what his adversary is about?"<sup>9</sup> Knowing one's opponent helps in making decisions on how to defeat him. If one does not understand his enemy, he is apt to assume that the enemy will employ doctrine similar to his own. This may lead to faulty or improper training and fighting techniques.

## Doctrine

According to Ardant du Picq, "The instruments of battle are valuable only if one knows how to use them."<sup>10</sup> Doctrine is the essential element that makes this possible.

Doctrine represents the "tried and true" the one best way to do the job which has been hammered out by trial and error, officially recognized as such, and then taught as the best way to achieve optimum results.<sup>11</sup>

It spells out, "Fundamental principles by which the Army guides its forces in support of objectives."<sup>12</sup> This can also include tactics, techniques and procedures for fighting.<sup>13</sup>

## Resources

According to FM 100-5, Operations, "Potential enemies of the United States will probably field large quantities of high-quality weapons systems...."<sup>14</sup> Defeating such an enemy will require superior combat power. While many factors go into the equation that creates such power, equipment and personnel play an essential role. Both must always be adequate to undertake the task at hand.<sup>15</sup>

## Training

The importance of adequate military training has been long recognized. Confucius wrote, "To lead an untrained people to war is to throw them away."<sup>16</sup> Soldiers will employ in combat the tactics, techniques, and procedures that they have practiced in training. If they have been poorly or improperly trained, the results can be disastrous.

reference. This could be in the form of a separate manual, chapter or appendix. This will eliminate the possibility of the user having to search through an excessive number of publications in order to obtain the essential information that is needed.

This should in no way be construed as meaning that other manuals should be devoid of information on subjects such as counterfire. Quite the contrary. Some discussion of counterfire is appropriate in a combined arms field manual, for example, to assist the maneuver commander in understanding his role in counterfire. As previously indicated, these discussions do not have to contain the detail, technical and otherwise, of the primary counterfire reference. They should, however, make reference to the appropriate manual containing the detailed information on counterfire.

It is essential that counterfire doctrine identify the command relationships necessary for the successful delivery of counterfires. This necessitates that the manual should identify the organization responsible for controlling counterfire and the personnel and elements within that organization who must make decisions on, or provide information needed for, the delivery of counterfires. The particular responsibility of these individuals and elements must be clearly stated. In addition, the procedures for processing and disseminating information within the command organization must also be clearly spelled out.

In providing guidance that will assist in the decision-making process, counterfire doctrine must provide information that will enable the commander to:

weapons,  
unit organization and employment,  
command and control, and  
strengths and vulnerabilities.<sup>2</sup>

Since counterfire is concerned with indirect fire, the threat discussion in this case must cover all types of indirect fire weapons - mortars, cannons, rockets and missiles. It must state how these weapons are organized into tactical organizations, where on the battlefield these weapons and their associated organizations are likely to be employed, and the tactics that these systems will utilize. A description of the command structure of the fire support system, as well as the information flow within this system, must also be described. The discussion of strengths and vulnerabilities must provide information that will assist in attacking the indirect fire threat.

#### Adequacy of Doctrine

In accomplishing its task of countering the indirect fire threat, doctrine must also incorporate several complementary objectives. It must:

- \*Be readily accessible.
- \*Provide guidance for command, control, and communications.
- \*Provide guidance that will assist in decision making.
- \*Provide for commonality of thought.

To permit ready accessibility, doctrine that relates to a single subject, such as counterfire, should be contained within a single

The remainder of this chapter will outline the criteria by which each area will be subjectively evaluated.

### Historical Lessons

The evolution of counterfire in the United States Army will be traced from its beginnings in the late nineteenth century down to the present time. This review will provide the basis from which the remainder of the thesis evolves by:

- \*Showing the lessons learned and how they were applied.
- \*Showing how historical lessons can be relevant today.
- \*Providing a basis for comparison with current doctrine.<sup>1</sup>

Because the U.S. Army was slow in developing its own counterfire doctrine, many of its early practices were taken from French and British procedures that had been developed during World War I. Consequently, considerable emphasis will be placed upon these procedures.

### Knowledge of the Threat

Comprehensive information on the enemy threat should be contained in a single manual or family of manuals. While detailed threat information need not be contained in every doctrinal manual, reference should be made to the more appropriate manuals for comprehensive coverage of the likely threat.

Any explanation of a threat must cover:

value of between one and five inclusive will be assigned to each discriminator so that statistical data may be computed for these questions. The frequency distribution will be the basis for evaluating each question. The discriminator or discriminators with the largest percentage of responses will be chosen to describe the opinion of the respondents. In those cases where there is no clear majority of opinion, then an evaluation of borderline will be made.

Question ten asks the respondents to choose between two different levels of responsibility. The level with the largest number of responses will be chosen as the one which best expresses the opinion of the respondent.

The subjective evaluation will be made by reviewing documents and literature pertaining to each area and judging them against the criteria established later in this chapter. The degree to which each of the criteria is met will be based on the opinion of the writer and may not agree with the objective evaluation. When this occurs, an explanation as to why the writer disagrees will be provided.

Based on these evaluations, the degree of preparedness in each area, except history, will be judged as very satisfactory, satisfactory, borderline, unsatisfactory, or very unsatisfactory. The overall level of preparedness to deliver counterfire will be the same as the lowest rating received in any area or areas. This stems from the fact that the consequences of being unprepared in any one area can cause ineffective delivery of counterfires.

Question one of the survey summarizes the background of the respondents by asking for information on rank, time in service, and command experience.

Questions two, three, six, and nine allow the respondents to express an opinion via a numerical scale of zero to five. Statistical data to include the mean, standard deviation, median, mode, range, frequency distribution and confidence interval will be calculated for each question. The mean, tempered by the standard deviation, will be used as an indicator of the level or degree of adequacy of an area as described below.

\*A mean greater than 4 will result in a rating of very satisfactory or very important.

\*A mean greater than 3 up to and including 4 will result in a rating of satisfactory or important.

\*A mean from 2 up to and including 3 will result in a rating of borderline.

\*A mean from 1 up to but not including 2 will result in a rating of unsatisfactory or unimportant.

\*A mean less than 1 will result in a rating of very unsatisfactory or very unimportant.

When the standard deviation indicates a wide range of opinion, the frequency distribution and the confidence interval will be examined to see if an adjustment to the rating is needed. An explanation of such an adjustment will be provided.

Questions four, five, seven, and eight provide specific discriminators for the responses. These are self-explanatory. A numerical

## CHAPTER 3

### METHODOLOGY

As indicated in Chapter 1, the Army's preparedness for counter-fire will be evaluated in five areas: history, the threat, doctrine, resources and training.

#### Evaluation

Each area, except the historical overview, will be evaluated both quantitatively and subjectively. The historical overview, which will only be evaluated subjectively, will serve as a basis for analysis as described later in this chapter.

The quantitative evaluation will be based on the results of a survey distributed to members of the following groups: field artillery students and faculty of the U.S. Army Command and General Staff College; the Field Artillery Section of V Corps; commanders and staff officers of three field artillery brigades and six division artilleries; and the Artillery Tactics Division, Tactics and Combined Arms Department, U.S. Army Field Artillery School. Ninety-two responses were received. While this is a small number, the experience of the officers surveyed gives the results validity. It should be noted that some respondents did not answer all questions. A copy of the survey and a summary of the results can be found at Appendix A.

## ENDNOTES

<sup>1</sup>U.S. Army Field Artillery School, Fire Support Mission Area Analysis, Phase 1 Report, (1980), cover letter.

<sup>2</sup>Robert Blum and Lynn Bancroft, Allocation and Distribution of Fires on the Airland Battlefield (n.p.: Vector Research, Incorporated, 1982), p. 1-1.

<sup>3</sup>Ibid., p. 1-2.

<sup>4</sup>F. Niedenfuhr et al., Counterfire Campaign Analysis, Volume I, Main Report (McLean, VA: The MITRE Corporation, 1979), p. iii.

<sup>5</sup>Ibid., p. iii.

<sup>6</sup>U.S. Army, FM 6-1, Field Artillery Fire Direction System TACFIRE Operations, (1979), p. i.

<sup>7</sup>U.S. Army, FM 6-20, Fire Support in Combined Arms Operations, (1983), p. i.

<sup>8</sup>U.S. Army, FM 6-20-1, Field Artillery Cannon Battalion, (1983), p. ii.

<sup>9</sup>U.S. Army, FM 6-20-2, Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps), (1983), p. iii.

<sup>10</sup>U.S. Army, FM 6-121, Field Artillery Target Acquisition, (1980), p. v.

<sup>11</sup>U.S. Army, FM 6-161, Field Artillery Radar Systems, with change 1, (1978), p. i.

<sup>12</sup>U.S. Army, FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, (1977), p. i.

<sup>13</sup>U.S. Army, FM 71-3, Armored and Mechanized Brigade Operations, (1980), p. i.

<sup>14</sup>U.S. Army, FM 71-100, Armored and Mechanized Division Operations, with change 1, (1978), p. i.

<sup>15</sup>U.S. Army, FM 90-10-1, An Infantryman's Guide To Urban Combat, (1982), p. i.

<sup>16</sup>U.S. Army, FM 100-5, Operations, (1982), p. i.

Air Assault; FM 7-10, The Infantry Rifle Company (Infantry, Airborne, Air Assault); FM 7-20, The Infantry Battalion (Infantry, Airborne, Air Assault, Ranger); FM 7-30, Infantry, Airborne, and Air Assault Brigade Operations; FM 17-95, Cavalry; FM 71-1, The Tank and Mechanized Infantry Company Team; FM 71-101, Infantry, Airborne, and Air Assault Division Operations; FM 90-3, Desert Operations; FM 90-4, Airmobile Operations; FM 90-5, Jungle Operations; FM 90-6, Mountain Operations; FM 90-10, Military Operations on Urbanized Terrain; and FM 90-13, River Crossing Operations.

Many of these manuals are currently under revision. Where possible the drafts were reviewed for background information, but except for the FM 100-2 series, these were not used as references since they do not represent approved doctrine.

Several articles from the Field Artillery Journal were also used in the analysis. These include: LTC M.J.H. Hudson's "Survive to Fight" from the January-February 1981 issue; LTC William W. Breen's "Survivable, Affordable, and Lonely" from November-December 1977; MAJ William R. Calhoun's "Let's Take Another Look...GS in the Defense" from September-October 1977; and MAJ Keith W. Dayton's "Field Artillery Survivability: The Soviet Perspective" from September-October 1981.

Finally, two Army Training and Evaluation Programs (ARTEP) were examined. These were ARTEP 6-200, Airborne Corps Field Artillery Section, Division Artillery, and Field Artillery Brigade and ARTEP 6-300, Corps Field Artillery Section, Division Artillery, and Field Artillery Brigade.

\*FM 6-20, Fire Support in Combined Arms Operations, outlines the maneuver commander/fire support coordinator relationship and illustrates how to integrate all fire support into combined arms operations.<sup>7</sup>

\*FM 6-20-1, Field Artillery Cannon Battalion, describes how cannon battalions are organized and how they support combined arms operations.<sup>8</sup>

\*FM 6-20-2, Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps), describes field artillery operations in support of division and corps combined arms efforts in the air-land battle.<sup>9</sup>

\*FM 6-121, Field Artillery Target Acquisition, describes the doctrine, tactics, organization and procedures which support target acquisition equipment and systems.<sup>10</sup>

\*FM 6-161, Field Artillery Radar Systems, provides guidance for employing field artillery radar systems.<sup>11</sup>

\*FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, describes how a battalion task force is organized and how it fights.<sup>12</sup>

\*FM 71-3, Armored and Mechanized Brigade Operations, describes how armored and mechanized brigades are organized and how they fight.<sup>13</sup>

\*FM 71-100, Armored and Mechanized Division Operations, describes how a division is organized and how it fights.<sup>14</sup>

\*FM 90-10-1, An Infantryman's Guide to Urban Combat, describes infantry doctrine, tactics, and techniques for urban combat at battalion level and below.<sup>15</sup>

\*FM 100-2 series describes Soviet operations, tactics, organizations and equipment.

\*FM 100-5, Operations, provides operational guidance for commanders.<sup>16</sup>

Other manuals which were reviewed but not cited include:

FM 6-40, Field Artillery Cannon Gunnery; FM 7-7, The Mechanized Infantry Platoon/Squad; FM 7-8, The Infantry Platoon/Squad (Infantry, Airborne,

Numerous articles in The Field Artillery Journal and the United States Combat Forces Journal have been reviewed for the historical overview. The most important include:

\*\*Field Artillery: Past, Present, and Future," by General Fredrick G. Herr which discusses the development of French artillery.

\*\*Counterbattery in the A.E.F.," by Colonel Conrad H. Lanza which deals with U.S. counterbattery during World War I.

\*\*Counterbattery: Organizing and Conducting It," which deals with counterbattery procedures used in World War II.

Shelford Bidwell and Dominick Graham's book Fire Power: British Army Weapons and Theories of War 1904-1945 and the series of articles by Lieutenant Colonel A. F. Brooke in The Journal of the Royal Artillery are the primary sources of information on counterbattery in the British Army during World War I.

From the Vietnam War to the present the two most important sources were Major General David E. Ott's Vietnam Studies: Field Artillery 1954-1973 and Training Circular 6-20-4, Field Artillery Counterfire. An article entitled "Counterfire" which closely parallels TC 6-20-4 appeared in the November-December 1975 and January-February 1976 issues of the Field Artillery Journal.

For the analysis a number of field manuals were reviewed. Those cited are listed below:

\*FM 6-1, Field Artillery Fire Direction System TACFIRE Operations, provides information and guidance on the tactical employment of the tactical fire direction system, TACFIRE.<sup>6</sup>

## CHAPTER 2

### REVIEW OF THE LITERATURE

The starting point for any study relating to fire support should be the Fire Support Mission Area Analysis. As stated in the cover letter, the purpose of this report is "...to identify problems, deficiencies or gaps that currently exist in doctrine, material, force structure or training that adversely affect the fire support system's ability to provide continuous and timely target servicing, counterfire and interdiction of second echelon forces."<sup>1</sup> While the report is classified, it provides essential background information.

Two other documents of general interest are Allocation and Distribution of Fires on the Airland Battlefield and Counterfire Campaign Analysis, Volume I, Main Report. The former is the first phase of an effort to develop doctrine for the allocation and distribution of fires in support of a combined arms force in battle.<sup>2</sup> It attempts to analyze target attack terms of the target value and the payoff to the friendly force.<sup>3</sup>

The latter report provides the methodology and results of a counterfire campaign by the U.S. Army in central Europe.<sup>4</sup> It concludes that with "...1986 technology the U.S. Field Artillery would be capable of reducing the Soviet artillery contribution to the central land battle by more than half."<sup>5</sup> This report is also classified.

<sup>16</sup>Confucius quoted in U.S. Army, FM 6-20, (1977), p. 7-15.

<sup>17</sup>Douglas MacArthur quoted in U.S. Army, FM 6-20, (1977),  
p. 7-11.

## ENDNOTES

<sup>1</sup>U.S. Army, FM 6-20, Fire Support in Combined Arms Operations, (1983), p. 1-3.

<sup>2</sup>See Appendix A, question 2.

<sup>3</sup>U.S. Army, FM 100-2-1, Soviet Army Operations and Tactics, Coordinating Draft, (1982), p. 8-5.

<sup>4</sup>U.S. Army Intelligence and Threat Analysis Center, Soviet Army Operations, (Washington, D.C.: 1978), p. 5-20.

<sup>5</sup>The International Institute for Strategic Studies, The Military Balance: 1982-1983 (London: 1982), p. 132.

<sup>6</sup>Carl von Clausewitz, On War, ed. and trans. by Michael Howard and Peter Paret with introductory essays by Peter Paret, Michael Howard, and Bernard Brodie and a commentary by Bernard Brodie (Princeton, N.J.: Princeton University Press, 1976), p. 170.

<sup>7</sup>Bernard Brodie, "A Guide to the Reading of On War," in Clausewitz, op.cit., p. 655.

<sup>8</sup>Harold R. Winton and Hartmut H. Lau, "History and the Professional Soldier," Military Review 54 (April 1974):33.

<sup>9</sup>Antoine Henri Jomini quoted in U.S. Army, FM 6-20, Fire Support in Combined Arms Operations, (1977), p. 2-2.

<sup>10</sup>Ardant du Picq quoted in U.S. Army, FM 6-20, (1977), p. 1-2.

<sup>11</sup>I. B. Holley, Jr., "The Doctrinal Process: Some Suggested Steps," Military Review 59 (April 1979):4-5.

<sup>12</sup>U.S. Army, Training and Doctrine Command Regulation 11-7, (1982), p. 17.

<sup>13</sup>Telephonic conversation between General William R. Richardson, Commander, U.S. Army Training and Doctrine Command, and the Army school commandants, 28 March 1983.

<sup>14</sup>U.S. Army, FM 100-5, Operations, (1983), p. 1-2.

<sup>15</sup>Ibid, p. 1-5.

General Douglas MacArthur has written, "In no other profession are the penalties for employing untrained personnel so appalling or so irrevocable as in the military."<sup>17</sup>

#### Summary of Remaining Chapters

Chapter Two will contain a review of the literature examined in preparing this thesis. Chapter Three will detail the methodology to be used in examining the problem. Chapter Four will trace the evolution of counterfire in the United States Army. Chapter Five will analyze the field artillery's preparedness for delivering counterfire. Finally, Chapter Six will contain conclusions that are based upon the analysis and will make recommendations for improvement.

\*determine the significance of a counterfire target relative to other targets,

\*determine when and where to attack a target, and

\*determine the amount and type of ammunition to be used in the attack.<sup>3</sup>

Specific techniques and procedures to be used to determining this information must be provided. A knowledge of the threat, as already discussed, is essential in the decision-making process.

The final objective of doctrine is to provide for the commonality of thought. This will permit the effective utilization of combat units in a variety of field situations without the possibility of operational misunderstanding at any level of command.

To accomplish this, counterfire doctrine must utilize common definitions, terms, missions, explanations, and examples. It must also establish a standard combat organization for counterfire units. In accomplishing this, recognition must be made of the need for some variation to accommodate the requirements of different types of combat units. For example, an airborne division might not possess the capability to employ the range of equipment that a heavy division does. In dealing with these variations, as much doctrinal standardization as possible must be the goal.

Adequate counterfire doctrine will also standardize counterfire techniques and procedures while, at the same time, retaining proven combat principles.<sup>4</sup> Any deviation from these standards must be highlighted as such, and supported by an adequate justification.

### Adequacy of Resources

The resource requirements of counterfire can be divided into three categories - target acquisition assets, weapons and ammunition and personnel. The former provide for "the timely detection, identification, and location of targets in enough detail, and with enough accuracy, to permit their attack by fire support means."<sup>5</sup> To achieve this, it is essential that these systems possess the capability of laying down effective first-round counterfires from any of the Army's indirect fire systems. This is a vital requirement as a result of both "the fleeting nature of today's targets and the limited number of fire support weapons."<sup>6</sup>

Weapons and ammunition used in counterfires must possess three characteristics - range, lethality, and quantity. The range of any counterfire system must be sufficient to permit attacking enemy systems to be reached. Ammunition must have sufficient lethality to achieve the desired results - suppression, neutralization, or destruction. The availability of counterfire weapons must be in sufficient quantity to enable counterfires to be delivered when needed.

Finally, there must be a sufficient number of adequately trained personnel to man counterfire equipment and organizations during sustained combat operations.

### Adequacy of Training

The first requirement of any good training program is realism. Combat conditions must be duplicated to the fullest extent possible.

Next, the entire counterfire system must be exercised as a complete unit. While the training of individual elements of the system possesses value, it is only when the entire system is exercised together that realism of combat utilization is achieved. This level of training cannot be accomplished by exercising the field artillery in isolation from the other elements. The maneuver commander, his maneuver units, and any other organizations likely to receive enemy indirect fires must also be involved. Also, those intelligence sources which can provide counterfire target information are necessary elements.

The final element in a good counterfire training program is frequency. Unless the entire system is exercised both frequently and regularly, proficiency will be lost. At least one exercise a quarter is considered to be the minimum requirement if proficiency is to be gained and retained.

## ENDNOTES

<sup>1</sup>Michael J. Dormeyer, "Adequacy of Doctrine for Armor in MOUT" (M.M.A.S. thesis, U.S. Army Command and General Staff College, 1983), p. 14.

<sup>2</sup>U.S. Army, FM 100-5, Operations, (1982), p. 2-5.

<sup>3</sup>U.S. Army, FM 6-20, Fire Support in Combined Arms Operations, (1983), pp. M-6 and M-10.

<sup>4</sup>Huba Wass de Czege, "Answering the Army's Critics: Doctrinal Reforms," in The Defense Reform Debate: Issues and Analysis (Baltimore: The John Hopkins University Press, forthcoming), p. 165.

<sup>5</sup>U.S. Army, FM 6-20, p. C-2.

<sup>6</sup>Ibid.

## CHAPTER 4

### HISTORICAL OVERVIEW

#### COUNTERFIRE IN THE UNITED STATES ARMY

##### Pre-World War I Period

From its ancient origins until the nineteenth century the artillery followed a slow evolution. The gunners at Agincourt would have had little trouble adapting to the guns of Waterloo.<sup>1</sup> In both battles the cannon was a smooth bore, muzzle-loaded weapon employed in a direct fire role. Although the mid-nineteenth century saw the introduction of the rifled, breech-loading cannon with a greatly increased range capability, this was not accompanied by any significant change in artillery tactics.

Counterfire during the nineteenth century and into the early part of the twentieth century consisted of an artillery duel. This was usually a prelude to the infantry battle. The opposing artillery forces would position themselves on ridges facing each other. Firing would begin with the goal of eliminating the other side's artillery. Whoever was successful was then free to fire on the opposing infantry.<sup>2</sup> Many commanders and military theorists regarded this duel as the artillery's primary mission.<sup>3</sup>

The Franco-Prussian War served to reinforce the concept of the direct fire artillery duel. Because of the overwhelming victory of the Prussians, their doctrine was held in high esteem by other armies. When

one Prussian artillerist stated that a battle should always open with an artillery duel, he was not questioned.<sup>4</sup>

In 1897, the French introduced a new weapon that was to revolutionize artillery tactics - the 75mm rapid-fire gun. Prior to this weapon, recoil was a major problem faced by the artillery. The force of the exploding powder drove the gun backward several feet. It then had to be moved back into position before it could be refired. This significantly reduced both rate of fire and accuracy.

The "French 75" employed a hydro-pneumatic buffer and recoil system which took up the recoil and returned the gun tube to a firing position, leaving the gun carriage stationary and the gun aligned on its target.<sup>5</sup> This gun also had a quick acting breech mechanism, used fixed ammunition, had a shield for crew protection, and employed an improved fire control system.<sup>6</sup> The immediately recognized advantage of these improvements was the gun's high rate of fire. The potential to perform other fire missions would, however, take time to evaluate and assess. The most important of these would subsequently prove to be the ability to deliver indirect fires.

It was the Japanese who were the first to depart from the traditional artillery duel and to employ indirect fire.<sup>7</sup> At the battle of Sha-ho, on 1 September 1904, they placed their guns on reverse slopes concealed from the Russians. The Russians deployed their guns in keeping with traditional tactics and in full view of the Japanese who, employing forward gunfire observers for the adjustment of their fires, quickly silenced the Russian artillery and machine guns.

The Russians, unable to see the Japanese guns, were powerless to counter the Japanese tactics through return fire.

Although the United States and the major European nations had observers in Manchuria, only the Germans immediately recognized the potential of this new method of fire. By 1911, the German Drill Regulations for the Field Artillery had been amended to incorporate a preference for concealed positions and indirect fire.<sup>8</sup> Moreover, the Germans had now come to believe that infantry could not advance when opposed by modern fire power, especially artillery.<sup>9</sup> Therefore, they felt that a battle should begin with a systematic effort to eliminate their opponents' artillery, and they found heavy guns and howitzers particularly well suited for this mission.<sup>10</sup>

The French and the British, on the other hand, entered World War I with their artillery either employed in the traditional direct fire role, or, at best, in semi-concealed positions. French military thinking prior to World War I stressed the importance of maneuver and the offensive over firepower.<sup>11</sup> The preface to the French Field Service Regulations of 2 December 1913 stated:

It has been assumed until recently that the first mission of the field artillery in combat was to gain superiority of fire over the enemy field artillery and that then its role consisted of preparing infantry attacks by bombarding the objectives assigned to these attacks before the infantry entered into action.\* Today it is recognized that the

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\*"The Field Service Regulations of 1895 made the artillery duel a special phase of the battle and was previous to the actions of the infantry."

essential role of the field artillery is to support the infantry attack by destroying everything which can oppose these attacks; seeking superiority over the enemy field artillery has no object than to insure its ability to act with maximum power against the infantry objective....<sup>12</sup>

Thus, artillery was looked upon as being an auxiliary arm of the infantry which the French believed possessed the inherent ability to successfully fight a battle.<sup>13</sup> The role of the artillery was strictly confined to supporting the infantry by attacking any targets which impeded its advance.

The Regulations of 1913 further stated that artillery was not an effective weapon against sheltered or masked targets.<sup>14</sup> Counter-battery fires\* were therefore relegated to a position of secondary importance.<sup>15</sup>

Finally, the importance that the French placed upon the new 75, and its influence upon their doctrinal and artillery development, must be noted. The belief that the 75 could successfully carry out any artillery mission virtually stifled any heavy artillery development in the French Army.

The British, although possessing excellent weapons including some heavy artillery, also lacked an adequate doctrine for their general employment, let alone for their use in counterbattery. The ability to maneuver was also viewed as being more important than the ability to deliver concentrated firepower by the British. This resulted in

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\*Counterbattery was the term coined to describe the indirect fire attack on the enemy's artillery.

artillery being viewed as an accessory to battle rather than a necessity. The British manual Field Artillery Training 1914 ignored the difference between direct and indirect fire and continued to direct attention to the artillery duel.<sup>16</sup>

In the United States, the Drill Regulations for Field Artillery of 1911 recognized the vulnerability of artillery to counterbattery fire.<sup>17</sup> In actuality, however, American thinking tended to follow French doctrine.<sup>18</sup> Further, limited resources and the lack of a threat made counterbattery training non-existent.

### World War I

Although most nations treated counterbattery fire lightly prior to the outbreak of World War I, they had come to accept its need by the end of 1914.<sup>19</sup> Indeed, they had come to view it as an indispensable element to success in battle. Firepower, particularly from artillery and machine guns, was now recognized as the dominate factor on the battlefield. Attacking infantry frequently found itself decimated by the use of overwhelming firepower.<sup>20</sup> Even objectives that had been captured often had to be abandoned prior to counterattack because of the effectiveness of hostile artillery in shelling lost positions.<sup>21</sup>

The destructive and demoralizing effect of artillery soon made evident the advantages of quickly silencing it.<sup>22</sup> Many obstacles had to be overcome, however, before effective counterbattery equipment and tactics were developed.

The French found that their light guns were outranged and overpowered by German heavy artillery. Since the French had built their doctrine entirely around the concept of the light gun, they had little heavy artillery with which they could retaliate. Those heavy weapons that were available were usually sited too far to the rear of the battle area to be effective.<sup>23</sup> The British fared little better.

The shortage of heavy weapons posed a problem that could not be resolved in the near term. This made it essential that those guns that were available be protected. From this requirement evolved the importance of concealing battery positions.

Concealment, in turn, introduced a second problem - the difficulty and importance of locating hidden batteries.<sup>24</sup> There was no organization trained in the collection and processing of data and in the control of counterbattery fires. At first, the only source of information was a battery observer who had to estimate enemy locations based upon visual observation of gun flashes and smoke. The observer's task was further complicated by the fact that artillery doctrine at this time still required visual sighting of the impact of friendly rounds. Without this visual sighting the guns would not fire.<sup>25</sup> Thus, the better a battery position could be concealed, the less likely it was to receive counterbattery fires.

Throughout 1915, counterbattery fire remained in a rudimentary state. Because resources were limited, most counterbattery work was carried out at division level.<sup>26</sup> As more corps level artillery became

available, counterbattery fire began to be carried out on this level as well. Frequently, however, this duplicated the effort of the divisions. From this a perception for the need for centralized control of counterbattery fire evolved.

The first employment of sound and flash ranging equipment in locating hostile batteries was seen in 1915.<sup>27</sup> Aerial observation also began to be used to locate hostile batteries during this year.

By 1916, the French had implemented a doctrine that established the control of counterbattery fire at corps.<sup>28</sup> This was based upon the corps:

- \*being viewed as having the proper types of guns and howitzers for counterbattery,

- \*being best able to control the sources of counterbattery intelligence, and

- \*having a frontage large enough for efficient control.<sup>29</sup>

A counterbattery staff officer was assigned to the corps to coordinate the intelligence collection effort and the delivery of fires.<sup>30</sup> Frequently, this officer controlled a number of batteries whose only mission was counterbattery. He also possessed the authority to supplement corps' guns with those of the divisions when needed. The efficiency of this new system varied widely for reasons that can be readily imagined. These included inexperience, poor staff work, and communications problems.<sup>31</sup>

By 1917, the British had adopted a counterbattery organization

similar to that of the French.<sup>32</sup> The counterbattery effort was centered at corps and was controlled by a counterbattery staff officer.

The year 1917 also saw the perfection of sound and flash ranging techniques which provided the ability to accurately locate even the best concealed or most distant hostile firing units. The work of the sound and flash ranging teams was useless, however, without firing data corrections which took into account nonstandard firing conditions.<sup>33</sup> It had long been known that temperature, humidity, wind, and certain other variables affected the trajectory of a shell. Since most fires prior to the war had been observed, it was not necessary to make pre-firing corrections for these conditions - the observer made the appropriate adjustment based on the location of the impact. As concealment techniques improved and firing ranges increased, unobserved fires became necessary. This led to the perfection of the techniques for the determination of firing data corrections. These were accomplished and in use by 1917.<sup>34</sup>

It was in 1917 that the United States entered the war. Its army had learned few, if any, counterbattery lessons from the fighting in Europe. The Provisional Drill and Service Regulations for Field Artillery of 1916 said no more about counterbattery than the 1911 version.<sup>35</sup> Officers went to France expecting to fire on visible targets with the battery commander adjusting the fires from a position near his guns.<sup>36</sup> They quickly learned upon their arrival in France that hostile batteries could be seen on only rare occasions.<sup>37</sup>

U.S. Army officers were subsequently attached to both the French and the British armies for counterbattery training.<sup>38</sup> The system that they ultimately adopted was based primarily upon the French organization. This made it logical that the United States would also assign responsibility for counterbattery to the corps.

The corps counterbattery officer was the staff intelligence officer (S-2) of the Corps Chief of Artillery.<sup>39</sup> He was responsible for determining hostile battery locations and for arranging fire plans to cover:

\*General counterbattery of all hostile batteries whenever a battle took place.

\*Special "shoots" for daily firing, against selected enemy targets.<sup>40</sup>

The S-2 was assisted in these tasks by the operations and intelligence sections of the corps artillery staff and the Artillery Information Service (AIS).

The function of this latter organization, which evolved during the course of the war, was "to furnish the artillery with all necessary information in regard to the enemy" with emphasis on counterbattery targets.<sup>41</sup> An AIS was usually established at all levels from army down to battalion. At corps level the AIS controlled the sound and flash ranging sections. Other information sources included aerial observation, other AISs, the intelligence sections of other units, and shelling reports.<sup>42</sup>

The first major counterbattery effort undertaken by the United States was in the St. Mihiel campaign of September 1918.<sup>43</sup> As this had been a quiet sector for some time, a large quantity of counterbattery intelligence was on hand, and it contributed to the success of the effort.<sup>44</sup> The same cannot be said of the Meuse-Argonne campaign several weeks later. In spite of a twelve hour bombardment, German artillery was not effectively neutralized prior to the attack.<sup>45</sup>

The limited success achieved in the Meuse-Argonne sector was determined by several factors. Since the American units had been in the area for only a short time prior to the attack, little target information was available. During the artillery preparation counterbattery fire was delivered based upon a map analysis.<sup>46</sup> It was hoped that during the course of the battle observation posts, balloons, and airplanes would provide accurate hostile battery locations.<sup>47</sup> This information failed, however, to materialize.<sup>48</sup>

During the war, counterbattery fires were delivered either for destruction or neutralization.<sup>49</sup> The former, aimed at destroying enemy guns and other equipment, required huge quantities of ammunition.<sup>50</sup> For example, 500 rounds being used against one hostile battery was typical.<sup>51</sup> Neutralization fires, on-the-other-hand, aimed at preventing the hostile unit from firing by keeping its gunners off the guns. This could be accomplished by firing a limited number of guns and required far less ammunition. Often, smoke and gas projectiles were employed to further reduce the requirement for high explosive ammunition.<sup>52</sup> In the early part of the war, destruction fires predominated, while at the end, neutralization was more common.

<sup>17</sup>U.S., War Department, Drill Regulations for Field Artillery (Horse and Light) United States Army (Provisional) - 1911, (Washington, D.C.: Government Printing Office, 1911), p. 275.

<sup>18</sup>Meyer, "Evolution of Field Artillery Tactics," pp. 209-210.

<sup>19</sup>Ibid., p. 217.

<sup>20</sup>Herr, "Field Artillery," pp. 240-241.

<sup>21</sup>Major J. M. Eager, "Counter-Battery in the Italian Army During the World War," The Field Artillery Journal 14 (September-October 1924):476-477. Extracted from a series of articles by Colonel Eltore Ascoli, G.S., Royal Italian Artillery, which appeared in the 1923 and 1924 numbers of the Rivista di Artiglieria e Genio.

<sup>22</sup>Herr, "Field Artillery," p. 243.

<sup>23</sup>Ibid., pp. 240-241.

<sup>24</sup>Edger, "Counter-Battery in the Italian Army," p. 476.

<sup>25</sup>Lieutenant Colonel A. F. Brooke, "The Evolution of Artillery in the Great War: II. Factors Affecting the Evolution of Artillery," The Journal of the Royal Artillery 51 (April 1924-January 1925):371.

<sup>26</sup>Lieutenant Colonel C.N.F. Broad, "The Development of Artillery Tactics, 1914-1918: Part I," The Field Artillery Journal 12 (September-October 1922):384.

<sup>27</sup>Lieutenant Colonel A. F. Brooke, "The Evolution of Artillery in the Great War: III. The Evolution of Artillery Equipment," The Journal of the Royal Artillery 52 (April 1925):48-49.

<sup>28</sup>General Frederick G. Herr, "Field Artillery: Past, Present, and Future," trans., The Field Artillery Journal 17 (July-August 1927):336.

<sup>29</sup>Lieutenant Colonel A. F. Brooke, "The Evolution of Artillery in the Great War: IV. The Evolution of Artillery Organisation and Command," The Journal of the Royal Artillery 52 (October 1925):380.

<sup>30</sup>Broad, "Development of Artillery Tactics," p. 384.

<sup>31</sup>Ibid., p. 387.

<sup>32</sup>Brooke, "Evolution of Artillery: IV," p. 380.

<sup>33</sup>Bidwell and Graham, Fire-Power, p. 109.

<sup>34</sup>Brooke, "Evolution of Artillery: III," p. 50.

## ENDNOTES

<sup>1</sup>Ian Hogg and John Batchelor, Artillery (New York: Charles Scribner's Sons, 1972), p. 6.

<sup>2</sup>Colonel Aubrat, "Evolution of Ideas in the Method of Preparing Artillery for Battle," trans. Lieutenant N. Pendleton Rogers, The Field Artillery Journal 4 (April-June 1914):244.

<sup>3</sup>Brigadier General Dwight E. Aultman, "Counter-Battery Work," The Field Artillery Journal 9 (July-August 1919):245.

<sup>4</sup>Lieutenant Colonel John E. McMahon, "The Field Artillery of the United States Army: Its Organization and Tactical Use," The Field Artillery Journal 2 (January-March 1912):100.

<sup>5</sup>Shelford Bidwell and Dominick Graham, Fire-Power: British Army Weapons and Theories of War 1904-1945 (London: George Allen & Unwin, 1982), pp. 8-9.

<sup>6</sup>Hogg and Batchelor, Artillery, p. 14.

<sup>7</sup>Bidwell and Graham, Fire-Power, p. 10.

<sup>8</sup>*Ibid.*, p. 18.

<sup>9</sup>General Frederick G. Herr, "Field Artillery: Past, Present, and Future," trans., The Field Artillery Journal 17 (May-June 1927): 228-229; Major Vincent Meyer, "Evolution of Field Artillery Tactics During and as a Result of the World War," The Field Artillery Journal 22 (March-April 1932):210.

<sup>10</sup>*Ibid.*

<sup>11</sup>Herr, "Field Artillery," p. 222.

<sup>12</sup>*Ibid.*, pp. 223-224.

<sup>13</sup>Meyer, "Evolution of Field Artillery Tactics," p. 209.

<sup>14</sup>Herr, "Field Artillery," p. 223.

<sup>15</sup>*Ibid.*

<sup>16</sup>Bidwell and Graham, Fire-Power, pp. 19-21.

The second lesson is that an organization which provides centralized control is a key element in the delivery of effective counterfires. The key tasks of this organization have been the gathering, processing, and dissemination of targeting information. These must be done in a timely manner. In the past, the failure to provide a timely response to enemy fire has given the enemy time to change his position.

The necessary timeliness is largely a function of training. Failure to have a permanent, well trained organization has resulted in several shortcomings. These have included unnecessary exposure of friendly artillery to enemy collection assets, duplication of effort, and waste of ammunition.

The next lesson is that the most frequent initiator of counterfire is often the receipt of a shelling report from a unit under fire. This has required that all units, including maneuver ones, be trained in the proper counterfire reporting procedures.

Another lesson is that counterfires delivered for destruction are usually not worth the expenditure of time and ammunition. It has usually been better to deliver fires for neutralization.

Finally, counterfires have been controlled by the level of command which:

- \*has the appropriate weapons for counterfire, i.e., range and lethality;

- \*is best able to control the intelligence collection effort; and

- \*has a large enough front for efficient control.

counterfires, it became doctrine that corps units would either be attached to divisions or given the mission of reinforcing the division artillery.<sup>117</sup>

These changes caused an initial flurry of excitement over counterfire. After several years this interest once again began to drop, although not to previous lows. The development and fielding of new sound ranging equipment and new artillery and mortar locating radars were factors in preventing this. The major problem that evolved was the lack of attention given to training the counterfire system as a whole.

In 1982, the Army published a revision of its basic operations manual, FM 100-5. The new field manual implemented the so-called air-land battle doctrine. All other doctrine had to be reevaluated in light of this new concept. Although the new concept has not affected counterfire doctrine as much as the 1975 changes, it has resulted in a reexamination as fire support manuals are revised. Whether or not these revisions will be beneficial is open to question.

### Lessons

From this historical overview several lessons can be learned. The most important is that counterfire is critical to success in battle. Whenever the enemy has possessed a significant indirect fire threat, it has been necessary to organize a major counterfire effort to neutralize it. This effort had to be made, however, without other types of fires being neglected.

Nevertheless, corps was still viewed as having primary counterbattery responsibility, since it was still the only organization authorized a counterbattery officer and a target acquisition battalion.

The Arab-Israeli War of October 1973 greatly accelerated the process of change within the Army. This war was seen as the prototype of the modern battlefield -- fast and violent. Doctrine and equipment were rapidly reevaluated to incorporate the lessons of this war. The Army's attention now focused upon the possibility of a high-intensity European conflict against the Soviet Union.

The impact of this reevaluation on counterbattery operations was profound. In a major doctrinal change, responsibility for counterbattery was shifted in 1975 from the corps to the divisions.<sup>114</sup> It was felt that

...greatly increased corps frontages, over-extended communications, and the expected density of targets on the next battlefield, coupled with recent major reductions in corps artillery headquarters...

no longer made it possible to control counterbattery at the corps level.<sup>115</sup> The term counterfire was coined to describe the division's new responsibility. This term was used to incorporate both the counterbattery and countermortar missions of previous wars.

If it were to accomplish its new mission, the division now needed additional assets. A counterfire officer and a target acquisition battery were therefore authorized in its organization, while the corresponding positions were eliminated at corps.<sup>116</sup> Although the divisions were not given any additional artillery units with which to deliver

In southeast Asia, corps continued to be, at least nominally, the coordinator of the counterbattery effort. It was the only level authorized a full-time counterbattery intelligence officer.<sup>105</sup> In actual practice it was found, however, that neither corps nor division could exclusively conduct all counterbattery activities.<sup>106</sup> A unit which acquired a counterbattery target fired on it if it had the means.<sup>107</sup>

A new technique developed in Vietnam was the use of counterbattery status. This term referred to the artillery commander's guidance on the attack of hostile artillery.<sup>108</sup> A unit's status could be active, semiactive, or silent.<sup>109</sup> When active, the unit had to deliver counterbattery fire as soon as a target location was confirmed, and suspect targets were fired upon depending on the commander's guidance.<sup>110</sup> During silent status, no counterbattery fires were delivered.<sup>111</sup> A semi-active status was a compromise between the other two.<sup>112</sup>

#### Vietnam to the Present

After the withdrawal from Vietnam, the Army slowly began to turn its attention away from low-intensity conflict. The concept of shared counterbattery responsibility which had developed during the Vietnam conflict did, however, become institutionalized. The 1973 revision of FM 6-20, Field Artillery Tactics and Organizations, stated

Responsibility for counterbattery operations is not assigned any one field artillery echelon but is based on the premise that the most appropriate means available will be employed to locate and attack enemy weapons.<sup>113</sup>

This tactic required, however, an ammunition expenditure and a number of artillery weapons that would not be available in a large scale war.<sup>95</sup>

Following the Korean conflict, counterbattery training once again became a forgotten issue. Doctrinally, however, counterbattery was once again recognized as a task of the field artillery, and greater emphasis was placed on the role of the division in delivering counterbattery fires.<sup>96</sup>

In 1965 the United States began its military buildup in Vietnam. Initially, the hostile indirect fire threat was from mortars.<sup>97</sup> By 1967, the enemy had also begun to use rockets and some artillery.<sup>98</sup> In comparison with the other wars of this century this threat was insignificant. Nevertheless, steps were taken to counter it.

The counterbattery procedures developed for use in Southeast Asia frequently mirrored those of previous wars.<sup>99</sup> In a technique reminiscent of World War I, counterbattery fires were often preplanned and unobserved.<sup>100</sup> A field artillery forward observer or liaison officer would choose likely enemy weapons positions from a map reconnaissance and from what intelligence was available to him.<sup>101</sup> Firing data would be computed to these locations, and the fire plan could be executed upon request.<sup>102</sup>

As in World War II, shelling reports formed an important part of an effective counterbattery and countermortar program.<sup>103</sup> Radar was also extensively relied upon for target location information because of its speed and accuracy.<sup>104</sup>

of the Army as units were deactivated. The vast pool of counterbattery knowledge and experience that was built up during the war began to disappear. By 1947, there were no longer any counterbattery officers and FM 100-5, Operations, had eliminated counterbattery as a specifically mentioned task of the artillery.<sup>87</sup> This caused concern within the artillery community which felt that it was still important "to gain supremacy over the hostile artillery."<sup>88</sup> As one artilleryman put it:

The establishment of counterbattery technique during World War II didn't just happen. Why should such an important subject have been so neglected prior to the war? But that's water over the dam. God forbid, but the next war may come as quickly and with such impact that the necessary time to develop our counterbattery process will not be available. Therefore, we must prepare now.<sup>89</sup>

There is little evidence that this plea was heeded. The only counterbattery advance was a technological one. Radar began to be used to locate hostile artillery.<sup>90</sup>

#### Korea to Vietnam

During the summer of 1950, the United States once again found itself at war. In the first year of the war on the Korean peninsula, the U.S. forces had such a dominance in firepower that there was little need for counterbattery fires. As the front stabilized in 1951, the Communist forces began to employ more indirect fires.<sup>91</sup> To avoid U.S. counterbattery fires, the Communists usually placed their guns in caves or tunnels.<sup>92</sup> This made both target location as well as the delivery of effective counterbattery fires increasingly difficult.<sup>93</sup> To counter the Communist guns the U.S. attempted the use of massed artillery fires.<sup>94</sup>

report from units under fire.<sup>81</sup> This report contained among other things such information as when and where shells landed and the direction from which they came.<sup>82</sup>

During the course of the war, improvements in equipment and refinements in techniques enhanced the Army's ability to conduct counterbattery fire. For example, the ability to insure the rapid dissemination of counterbattery information frequently made it necessary to reserve certain radio and wire nets solely for that purpose.<sup>83</sup> Also, it was found that an ammunition mix of white phosphorous and high explosive was an excellent counterbattery tactic.<sup>84</sup> The smoke obscured the enemy's aiming stakes, and the burning particles produced incendiary effects and combined with the high explosive to produce casualties.<sup>85</sup>

Another example was the introduction of crater analysis late in the war. This technique provided another method of obtaining the direction to a hostile battery, and the examination of shell fragments made it possible to determine the type of unit firing.<sup>86</sup>

As a result of experience, improved equipment, and more sophisticated techniques, the Army possessed an effective counterbattery capability at the end of the war. More importantly, the need for counterbattery had been once again fully recognized and accepted as a primary element of battle.

#### Post World War II Period

With the end of World War II came a rapid demobilization of the Armed Forces. Counterbattery organizations suffered along with the rest

deductions, the premature assignment of counterbattery missions which unnecessarily exposed friendly artillery to enemy collection assets, the installation of unneeded communications nets, a waste of ammunition, and friction between the counterbattery staff and the executing unit.<sup>75</sup>

As in World War I, counterbattery remained the responsibility of the corps.<sup>76</sup> This was an important doctrinal principle since the corps controlled the majority of the weapons that were suitable for counterbattery fire.<sup>77</sup>

This responsibility did not, however, totally remove from the division the ability to perform certain counterbattery missions. Indeed, in certain situations the division carried out its own counterbattery operations.<sup>78</sup> At the same time, divisions were capable of augmenting corps counterbattery operations and in a number of tactical situations did so as necessary.

In one significant doctrinal change made during World War II, divisions were given responsibility for the conduct of countermortar fire.<sup>79</sup> This development proved extremely effective.

The Corps Artillery Officer was given a staff adequate to the task of coordinating the counterbattery effort. A typical staff consisted of six officers and six enlisted men.<sup>80</sup>

The information that the counterbattery section used to carry out its missions came from a variety of sources. The most frequent initiator of counterbattery operations was the receipt of a shelling

When 155-mm guns were finally brought ashore they were immediately employed in a counterbattery role.<sup>66</sup> From that time onward, Japanese artillery posed much less of a threat.<sup>67</sup> Eventually, with the help of naval gunfire and air support, the threat was eliminated.<sup>68</sup>

In the II Corps actions at El Guettar and Mateur in North Africa, counterbattery led the list of missions fired.<sup>69</sup> Writing in The Field Artillery Journal, one artilleryman stated that counterbattery was the most important mission fired in North Africa.<sup>70</sup> In the same publication another officer wrote, "Corps artillery missions are (1) counterbattery; (2) more counterbattery, (3) some more counterbattery...."<sup>71</sup>

These early experiences once again acted to focus the Army's attention on the importance of counterbattery. In addition to spelling out the need for counterbattery, suitable weapons, and sound and flash units, several other lessons were also highlighted.

The first of these was that counterbattery fires had to be timely.<sup>72</sup> Failure to provide a timely response to enemy fire gave the enemy the opportunity to change his location. More important however was the realization of the need for the training of counterbattery personnel.<sup>73</sup> This training produced the aggressiveness that was necessary in the collection and evaluation of targeting information.<sup>74</sup>

Failure to have a well-trained, permanently assigned counterbattery section resulted in serious shortcomings. Whenever the counterbattery staff was improvised, the results were improper intelligence

the time of this country's entry into World War II, six sound and flash observation battalions had been organized.<sup>60</sup>

### World War II

The United States entered World War II largely unprepared for the task it faced. A string of defeats culminated with the surrender of Corregidor in May 1942. It was not until the August amphibious assault on Guadalcanal that ground forces were able to go over to the offensive. In the Atlantic theater, the ground offensive was resumed in November 1942 with the landings in North Africa. In both campaigns the importance of counterbattery had to be relearned.

Japanese artillery on Guadalcanal, in addition to attacking ground maneuver and support units, fired on naval shipping and on aircraft as they attempted to take off or land.<sup>61</sup> Although the Marine assault force had anticipated the need for counterbattery, it had to land without any suitable counterbattery weapons. Its 75-mm and 105-mm howitzers lacked the range necessary to strike the Japanese guns.<sup>62</sup> Naval gunfire and carrier air support were initially fully occupied by other missions and were unable to provide counterbattery support for some time.

The problem was exacerbated by the lack of a sound and flash unit.<sup>63</sup> With no means of accurately determining hostile artillery locations, observers had to guess at target positions.<sup>64</sup> While aerial observers were available, they could not be effectively employed without suitable counterbattery weapons.<sup>65</sup>

Throughout the interwar period there was much discussion about the role of counterbattery during World War I. Articles by both American and foreign authors appeared in various military oriented publications. Discussions centered around such topics as the histories of units and campaigns, the importance of aerial observation, destruction versus neutralization, and the proper number of guns to fire. While many of the articles were limited to the successes attained in the war, others were innovative in their thinking. This latter type article became more prevalent as World War II approached. Authors discussed the proper level for control of counterbattery, counterbattery in mobile versus static warfare, types of counterbattery targets, and the need for improved target acquisition and speedy dissemination of target information. A common theme in all writings, however, was the importance of counterbattery to success in battle.

Interesting as these discussions were within the artillery community, they did not lead to any doctrinal changes. Counterbattery remained based on the World War I experience until after the United States entered World War II.<sup>58</sup> In fact, the Army had little experience upon which to base changes. Until the outbreak of World War II, manpower and monetary constraints limited counterbattery practice to map exercises.<sup>59</sup> The only significant advance during the interwar period was in the area of target acquisition.

In 1927, the field artillery took over control of sound and flash ranging functions from the Army Chief of Intelligence (G-2). By

### Interwar Period

As World War I drew to a close, the importance of counterbattery fire had been recognized by the United States. Medical reports indicated that eighty percent or more of the infantry's losses had been due to enemy artillery fire.<sup>53</sup> This figure not only indicated the need for counterbattery fires, but also for a more effective control system to ensure their accurate and timely delivery.

Several postwar studies dealt with counterbattery techniques. Both the Superior Board and the Caliber Board recommended that responsibility for counterfire be retained at the corps level.<sup>54</sup> While it was recognized that divisional artilleries may need to assist in the counterbattery effort on occasion, their primary purpose was seen as infantry support.<sup>55</sup> The Superior Board called for continuation of an organization for locating enemy guns and for numbers of guns at the corps level which could dominate enemy artillery.<sup>56</sup>

By 1922, several counterbattery principles had been established as doctrine. These were:

- \*Counterbattery is one of the most important tasks of the artillery and is essential if an attack is to succeed.

- \*As important as counterbattery is, other types of fires cannot be neglected.

- \*Counterbattery is a function of corps assisted by army and division artilleries.

- \*The Artillery Information Service plays an indispensable role in counterbattery.<sup>57</sup>

<sup>35</sup>U.S., War Department, Provisional Drill and Service Regulations for Field Artillery (Horse and Light)-1916, vol. 4, corrected to December 31, 1917, (Washington, D.C.: Government Printing Office, 1918), pp. 8-12.

<sup>36</sup>Colonel Conrad H. Lanza, "Counterbattery in the A.E.F., "The Field Artillery Journal 26 (September-October 1936):454.

<sup>37</sup>Ibid.

<sup>38</sup>Ibid., p. 455.

<sup>39</sup>Ibid., p. 456.

<sup>40</sup>Ibid.

<sup>41</sup>The Artillery Information Service (General Headquarters, American Expeditionary Force, 1918), p. 1.

<sup>42</sup>Ibid., pp. 1-4.

<sup>43</sup>Lanza, "Counterbattery," p. 459.

<sup>44</sup>Ibid.

<sup>45</sup>Ibid., pp. 460-461.

<sup>46</sup>Ibid.

<sup>47</sup>Ibid.

<sup>48</sup>Ibid.

<sup>49</sup>The Artillery Sub-Section, The General Service Schools, Tactics and Technique: Artillery, 2 vols. (Fort Leavenworth, KS: The General Services Schools Press, 1922), 1:83.

<sup>50</sup>Ibid.

<sup>51</sup>Ibid., p. 82.

<sup>52</sup>Ibid., p. 83.

<sup>53</sup>Lanza, "Counterbattery," p. 477.

<sup>54</sup>Report of Superior Board on Organization and Tactics, (France: General Headquarters, American Expeditionary Force, 1919), p. 39; A Study of the Armament, Calibers and Types of Material, Kinds and Proportion of Ammunition, and Methods of Transport of the Artillery to be Assigned to a Field Army, (Washington, D.C.: U.S. War Department, 1919), p. 9.

<sup>55</sup>Superior Board, p. 39.

<sup>56</sup>Ibid., pp. 40 and 115.

<sup>57</sup>The Artillery Sub-Section, Tactics and Technique, pp. 67, 81, & 85.

<sup>58</sup>"A Plan for Counterbattery in an Attack of a Position," The Field Artillery Journal 30 (1940):416-417.

<sup>59</sup>Lanza, "Counterbattery," p. 459; Lieutenant Colonel John S. Wood, "Counterbattery in War of Movement," The Field Artillery Journal 28 (May-June 1938):228.

<sup>60</sup>Department of Observation, The Artillery School, "The Field Artillery Observation Battalion," The Field Artillery Journal 38 (1948):252.

<sup>61</sup>Brigadier General P. A. del Valle, "Marine Field Artillery on Guadalcanal," The Field Artillery Journal 33 (October 1943):730.

<sup>62</sup>Ibid.

<sup>63</sup>Ibid.

<sup>64</sup>Ibid.

<sup>65</sup>Ibid.

<sup>66</sup>Ibid.

<sup>67</sup>Ibid.

<sup>68</sup>Ibid.

<sup>69</sup>Brigadier General A. J. Rance, "Corps Artillery - How It Was Employed," The Field Artillery Journal 33 (1943):886-888.

<sup>70</sup>Ibid.

<sup>71</sup>Brigadier General John E. Lewis, "Remarks on Corps Artillery," The Field Artillery Journal 33 (December 1943):282.

<sup>72</sup>Ibid.

<sup>73</sup>"Counterbattery: Organizing and Conducting It," The Field Artillery Journal 33 (November 1943):829.

<sup>74</sup>Ibid.

<sup>75</sup>Ibid.

<sup>76</sup>Colonel John J. Burns, "The Employment of Corps Artillery: Part I," The Field Artillery Journal 33 (March 1943):209.

<sup>77</sup>U.S. Army Field Artillery School, Field Artillery Elementary Tactics (Fort Sill, OK: Field Artillery School, 1942), pp. 169-170.

<sup>78</sup>"Counterbattery: Organizing and Conducting It", p. 829.

<sup>79</sup>Major Arthur J. Peterson, "Countermortar Operations," The Field Artillery Journal 35 (May 1945):302.

<sup>80</sup>Brigadier General Charles E. Hart, "Extracts From the First Army Artillery Information Service (WW II)," The Field Artillery Journal 39 (September-October 1949):266.

<sup>81</sup>Ibid.

<sup>82</sup>Ibid.

<sup>83</sup>"Counterbattery: Organizing and Conducting It," p. 830.

<sup>84</sup>Ibid., p. 831.

<sup>85</sup>Ibid.

<sup>86</sup>Major Lee O. Rostenburg, "Shell Crater Analysis for Location and Identification of Enemy Artillery," The Field Artillery Journal 34 (November 1944):739.

<sup>87</sup>"Artillery Tactics," The Field Artillery Journal 37 (1949): 245.

<sup>88</sup>Ibid.

<sup>89</sup>Colonel H. P. Storke, "The Counterbattery Officer," The Field Artillery Journal 37 (November-December 1947):361.

<sup>90</sup>Major Sydney Combs, "Radar," The Field Artillery Journal 36 (January 1946):6-10.

<sup>91</sup>Brigadier General John J. Kenney, "Counterfire," Artillery Trends, no. 42 (December 1968), p. 29.

<sup>92</sup>Captain Richard Jennings, "Overhead Cover for Artillery," United States Army Combat Forces Journal 4 (August 1953):28.

<sup>93</sup>Ibid.

<sup>94</sup>Major Mark M. Boatner III, "Countering Communist Artillery," United States Army Combat Forces Journal 4 (September 1953):24.

95Ibid.

96U.S. Army, FM 6-20-1, Field Artillery Tactics (Washington, D.C.: United States Government Printing Office, 1961), pp. 4, 15 & 61.

97Major General David E. Ott, Vietnam Studies: Field Artillery, 1954-1973 (Washington, D.C.: United States Government Printing Office, 1975), p. 11.

98Ibid.

99Kenney, "Counterfire," p. 29.

100Ott, Vietnam Studies, p. 61.

101Ibid.

102Ibid.

103Ibid., p. 85.

104Ibid., p. 104.

105Kenney, "Counterfire," p. 23.

106Ibid., p. 106.

107Ibid., p. 107.

108Ibid., p. 24.

109Ibid.

110Ibid.

111Ibid.

112Ibid.

113U.S. Army, FM 6-20, Field Artillery Tactics and Organizations, (Washington, D.C.: United States Government Printing Office, 1973), p. 8-5.

114U.S. Army, TC 6-20-4, Field Artillery Counterfire (Fort Sill, OK: United States Army Field Artillery School, 1975), p. 4.

115Ibid.

116Ibid., p. 5.

117Ibid., p. 20.

## CHAPTER 5

### ANALYSIS

This Chapter will analyze the field artillery's readiness to deliver counterfires in accordance with the methodology outlined in Chapter 3. As a necessary prelude to this it must be established that the Army still recognizes counterfire as an important artillery task.

In keeping with the dictates of the Army's concept based requirement system for doctrinal development, an operational concept must be established before any doctrine can be written. An operational concept

...is a general idea that describes the performance of one or more combat, combat support or combat service support functions. It must define what, why, how, where, and when it needs to be done and who does it.<sup>1</sup>

Counterfire falls under the fire support concept which states that fire support involves

...efforts directly related to the generation of indirect fire combat power for the purpose of destroying, disrupting, suppressing, or neutralizing enemy forces. This encompasses...counterfire of enemy indirect fire systems....<sup>2</sup>

An interim step between an approved operational concept and doctrine is a mission area analysis (MAA). This is

...an assessment of the capability of a force to perform within a particular battlefield or functional area.<sup>3</sup>

The Fire Support MAA states that counterfire

...must be accomplished correctly. Failure to do so allows the enemy to use his numerically superior field artillery to suppress our direct fire systems, deny our maneuver elements...tactical mobility...and silence our field artillery.<sup>4</sup>

The Army's doctrinal field manuals contain frequent references which recognize the need for, and the importance of, counterfire.

Examples are listed below:

FM 6-20, Fire Support in Combined Arms Operations:  
"Fire support facilitates maneuver by...

suppressing...indirect fires  
....."<sup>5</sup>

FM 6-20-1, Field Artillery Cannon Battalion: "In support of the field artillery mission, the field artillery cannon battalion provides...

Counterfire against enemy indirect fire systems.  
....."<sup>6</sup>

FM 6-20-2, Division Artillery, Field Artillery Brigade and Field Artillery Section (Corps): "A division artillery can provide:

Counterfires to attack enemy indirect fire weapons systems  
....."<sup>7</sup>

FM 71-2, The Tank and Mechanized Infantry Battalion Task Force: "Fire support enhances maneuver by...

Reducing the effect of enemy artillery by active counterfires."<sup>8</sup>

FM 71-3, Armored and Mechanized Brigade Operations:  
"...[field artillery] is most often used to suppress or destroy enemy direct-and indirect-fire weapons systems..."<sup>9</sup>

FM 71-100, Armored and Mechanized Division Operations:  
"...important to the division commander is suppression of enemy field artillery which can slow or stop the division attack and interfere with command post and combat service support operations."<sup>10</sup>

These examples spell out that current Army doctrine clearly recognizes the importance of counterfire. In keeping with this doctrine, any failure to deliver effective counterfires could bring serious loss or even defeat to the engaged forces.

If a capability to deliver effective counterfire is to be achieved, the Army's field artillery must be proficient in four areas. It must know and understand any potential enemy, and it must be supported by adequate doctrine, resources, and training.

#### Knowledge of the Threat

The survey question which asked how well the threat was defined resulted in a mean of 2.82468 which dictates a rating of borderline. The confidence level for this rating is only 75%, however, and along with a median and a mode of 3 this indicates that many officers were satisfied with the current threat information. In spite of this, significant reservations were noted, and these will be brought out in the subjective evaluation.

In satisfying the need for threat information the first requirement is that it should be contained in one manual or series of

manuals. While this is presently not the case, efforts are being made to rectify this problem. The Army is developing a series of manuals, currently in draft form, to describe the Soviet threat: FM 100-2-1, Soviet Army Operations and Tactics; FM 100-2-2, Soviet Army Specialized Warfare and Rear Area Support; and, FM 100-2-3, Soviet Army Troops, Organizations and Equipment. Unfortunately, there are no manuals known to be currently under development that deal with threats other than that of the Warsaw Pact.

A major shortcoming of the draft manuals on the Soviet Army is the lack of cross-references to either classified or other information sources. Such cross-referencing would be beneficial to anyone who needs or desires additional information.

Part of the requirement for a single source of threat information stems from the fact that doctrinal manuals should contain only a very brief description of the threat. This should include a reference to the source manuals for detailed information. There are three reasons for this.

First, when each doctrinal manual provides its own detailed threat assessment, the possibility of conflicting and misleading information becomes greater. This is the result of different authors and proponents, and, at times, different information sources. These differences can lead to divergent interpretations and assessments of the threat by the users of various manuals. Divergency of this type is not conducive to the doctrinal requirement for commonality of thought.

A second reason for using only a brief description is the space limitation in doctrinal manuals. A complete threat description would balloon the size of the manuals beyond practicality. As a consequence, abbreviated descriptions are now used. These do not contain sufficient information to permit an adequate understanding of the enemy threat.

The final point is the requirement for constant updating of threat information as the threat itself changes. When every doctrinal publication contains detailed threat information, each one must be changed as the threat is revised. Having a single source both limits the number of changes to be made and facilitates promulgation.

Many recently published field manuals and the coordinating drafts of manuals under revision have significantly reduced the amount of threat information they contain. This is apparently in anticipation of the new threat manuals. Two of the revised fire support manuals which contain counterfire doctrine - FM 6-20, Fire Support in Combined Arms Operations and FM 6-20-1, Field Artillery Cannon Battalion - do not, however, contain references to any additional information sources. In addition, FM 6-20 still contains some very specific threat data which may require updating.

The next requirement of threat information is that it must cover all types of indirect fire weapons against which counterfires must be delivered. The new series of manuals on the Soviet Army does this. FM 100-2-3 lists the unclassified characteristics, capabilities,

and limitations of Soviet mortars, cannons, rockets, and missiles. It also shows how these weapons are organized into units.

The employment and command and control of indirect fire weapons are covered in FM 100-2-1. There are also chapters on the principles of both fire support and artillery support. Topics covered include: command and control, ammunition, tactics, methods of fire, norms, and fire planning.

A notable weakness of the new Soviet threat manuals is their failure to contain information on the strengths and vulnerabilities of anything other than specific weapon systems.

#### Conclusions

Currently, threat information of varying quality and quantity can be found in a considerable number of Army field manuals. There is no approved single source of threat information. The series of manuals now being developed on the Soviet threat is a step toward overcoming this deficiency. As has been stated, however, these manuals are limited solely to the Soviet threat; they do not provide references to additional information; and they do not contain adequate information on strengths and vulnerabilities. Additionally, current field manuals have inadequate references to detailed threat information. Equally, the threat information the manuals contain is frequently too detailed.

Based upon these conclusions, it is felt that the overall threat information contained in the Army's field manuals is generally

inadequate, frequently duplicated, and on occasion conflicting. The area of threat knowledge is, therefore, given a rating of borderline.

#### Adequacy of Doctrine

The primary requirement of adequate doctrine is that it be readily accessible. The survey results show 56% of those surveyed did not feel that counterfire doctrine was accessible. Of the 34% who stated that the doctrine was accessible, many felt that this was true only for artillery officers. Frequent concern was expressed that a non-artilleryman would have difficulty finding essential information. Almost all of those surveyed (86%) felt that the idea of placing all counterfire doctrine into a single manual was a good one.

Currently, such a source does not exist. One must look through at least five manuals to obtain all of the necessary basic counterfire doctrine.

Since there is no current central source of counterfire doctrine, the question as to whether other manuals refer to it or not is a moot point.

The second requirement of doctrine is to provide guidance on command, control, and communications (C<sup>3</sup>). With a mean of 2.32857 the survey question on C<sup>3</sup> indicates that counterfire doctrine is borderline in this area.

The first step in providing this guidance is to establish which organization is responsible for controlling counterfire. When asked

which this currently is, most people reply, "The division." There is not, however, any clear-cut doctrinal statement that this is the case.

FM 6-20-2, Division Artillery, Field Artillery  
Brigade, and Field Artillery Section (Corps) states:  
"A division artillery can provide..."

Counterfire to attack enemy indirect fire systems.<sup>11</sup>  
.....

The term "can provide" does not establish or define responsibility. A far more positive term such as "controls" or "is responsible for" would have to be used to accomplish this.

FM 6-121, Field Artillery Target Acquisition states, "The division artillery TOC [Tactical Operations Center] is responsible for supervising the counterfire effort of the division...."<sup>12</sup> Again, definite responsibility is not established. The phrase "counterfire effort of the division" can be interpreted to mean that there are other non-divisional counterfire efforts controlled by other organizations.

When asked which level should control counterfire, 58% of those responding said the division. The main reason given for this reply was that the corps was too far removed from the battle to provide a timely enough response. The 37% who felt that corps should control counterfire did not feel that the division had adequate resources with which to do the job. The remaining 5% felt that counterfire responsibility should be shared between the division and corps.

The counterfire responsibilities of personnel and organizations within the division are more clearly defined. FM 6-20 states that the

division artillery commander is "the manager of the division's... counterfire effort...."<sup>13</sup> The counterfire roles of other division artillery personnel, division intelligence sources, and the corps artillery section are also identified. The role of the maneuver commander as it specifically applies to counterfire is not, however, addressed. This role is discussed only in general terms as a part of the overall subject of fire support.

Information on counterfire responsibilities is currently scattered throughout at least three different manuals. Additionally, materiel in one reference frequently contains something at variance with another reference, even though both are dealing with the same subject. For example, in describing the responsibilities of the counterfire officer,

FM 6-20 states that he:

...gives technical and tactical advice to the assistant S-3 (plans) for the employment of target acquisition assets.<sup>14</sup>

FM 6-21 states that the counterfire officer:

...supervises the targeting element, establishes target selection standards, directs and coordinates the engagement of targets, and insures compliance with the commander's attack guidance.<sup>15</sup>

FM 6-20-2 contains another list of eight duties.<sup>16</sup>

While none of these descriptions can be said to be in error, the fact that they are at variance and are found in different manuals

can lead to confusion. Unless considerable time is taken to examine all the manuals involved, a complete understanding of the counterfire officer's duties and responsibilities cannot be gained.

Another weakness of current doctrine is the lack of a line diagram or explanation showing how all the individuals and organizations having a role in counterfire are linked together. In addition to clarifying command and control relationships, the availability of such a diagram or explanation should show how, and through what channels, counterfire data enters the command and control system. Currently, this is done in general fire support terms only.

The final step in providing command, control and communications is to establish techniques and procedures for processing counterfire information. FM 6-121 contains a general discussion of manual targeting procedures and the flow of this information within the artillery and intelligence system.<sup>17</sup>

FM 6-1, Field Artillery Fire Direction System TACFIRE Operations contains amplifying instructions for TACFIRE (Tactical Fire Direction System) equipped units.<sup>18</sup> TACFIRE is an automated fire control system now being introduced into the current equipment inventory.

The third requirement of doctrine is that it provides assistance in the decision-making process. The survey indicates that current counterfire doctrine does not provide sufficiently firm guidelines to assist the commander and his staff in making combat decisions. The

levels are adequate to support sustained combat operations. The other concern voiced was that since counterfire is misunderstood and is a low priority, counterfire positions are frequently filled with less qualified soldiers than can be found in other fire support areas.<sup>65</sup>

It is interesting to note that the first point has some doctrinal basis. With regard to sound ranging, FM 6-121 states, "... the platoons lack the personnel to operate all equipment indefinitely."<sup>66</sup>

### Conclusions

The United States possess some excellent target acquisition systems, types of ammunition, and artillery weapon systems. They are accurate, lethal, and have the potential to be fast. The target acquisition assets currently lack the necessary speed of response, however, and stocks of ammunition and numbers of artillery weapons are insufficient. In addition, personnel strength and quality may not be adequate. These problems have resulted in the resources posture being rated borderline.

### Adequacy of Training

The first requirement established for a good training program was realism. The survey question asking how well current training simulates a realistic threat resulted in a mean of 1.25 or a rating of unsatisfactory.

Currently the firing of hostile artillery on friendly units must be simulated by controllers throwing artillery simulators and

as a counterfire weapon. Its range and lethality have caused many officers to view it, however, as a general purpose weapon. Its use as such will further reduce the firepower available for counterfire. Additionally, while most officers understand MLRS's capabilities, few have bothered to learn its limitations.

The new light infantry divisions (LID) now being organized by the Army will not be able to deliver effective counterfire against long range artillery and rocket systems. The limited number of 105-mm howitzers in the division lack the range and lethality for this task. In addition, the LID will not have a target acquisition battery.

The problem of a lack of howitzers in the divisions, both heavy and light, is supposed to be alleviated having artillery brigades attached to divisions or given missions of reinforcing division artillery.<sup>64</sup> These brigades belong to the corps commander, however, and he is thus free to do with them as he determines. Consequently, there is no guarantee that a division will receive or retain a brigade even if it has established a habitual peacetime relationship with one. In addition, in a non-European environment, it may be some time before artillery brigades can be brought into the battle.

The question dealing with counterfire personnel resources had a mean of 2.81061. The mean and the mode were both 3, however, which indicate that most artillerymen were satisfied with the current personnel organization. Nevertheless, two concerns were expressed.

First, a sizeable minority did not feel that current manning

Second, the MLRS round is a free-flight rocket. If its accuracy could be increased, then more submunitions could be placed on the target.

Two additional points need to be made about DPICM. First, while it is an excellent round for counterfire, it is also highly effective against many other types of targets. Our current stocks of this round are probably inadequate for all the demands that would be placed upon it. Secondly, its range is less than that of HE or HERA rounds. These factors mean that it will be necessary to supplement DPICM with high explosives and other types of ammunition for counterfire.

The "sense and destroy armor" (SADARM) ammunition currently under development promises to be effective in a counterfire role. SADARM expels three terminally guided submunitions that fire a self-forging fragment into targets such as tanks and self-propelled artillery that they detect during their descent.<sup>63</sup>

The most frequently expressed concern about firepower was that the number of artillery weapons available is insufficient to meet all the demands that will be placed on them. It is felt by many artillerymen that the proposed removal of the 203-mm howitzers from the heavy division will exacerbate the problem and further limit the delivery of counterfires.

Another frequently expressed opinion is that the number of MLRSs being fielded is insufficient. MLRS was originally developed

TABLE 1

## FIELD ARTILLERY WEAPON SYSTEM RANGES

| System                 | Range (Meters)                                                                                         |
|------------------------|--------------------------------------------------------------------------------------------------------|
| 155-mm, M198           | 17,500 (DPICM <sup>a</sup> )<br>18,150 (HE, M107 <sup>b</sup> )<br>22,400 (HE, M795)<br>30,000 (HERAC) |
| 155-mm, M109A1, A2, A3 | 17,500 (DPICM)<br>18,100 (HE, M107)<br>23,500 (HERA)                                                   |
| 203-mm, M110A2         | 22,700 (DPICM)<br>22,900 (HE)<br>30,000 (HERA)                                                         |
| MLRS                   | 30,000 (DPICM)                                                                                         |

<sup>a</sup>Dual Purpose Improved Conventional Munitions

<sup>b</sup>High Explosive

<sup>c</sup>High Explosive, Rocket Assisted

SOURCE: U.S. Army, FM 6-50, The Field Artillery Cannon Battery, (1983), pp. 11-9, 11-10, and 11-12.

is also a borderline area. The question on adequacy of firepower resulted in a mean of 2.21711.

As shown in Table 1, current U.S. artillery weapons have sufficient range to engage most counterfire targets. If these ranges could be increased, however, it would facilitate the attack of deep counterfire targets, such as rocket launchers, and provide more flexibility in positioning friendly artillery.

In addition, it is important to note that no division possesses all of these weapons. The M198 howitzer is found only in the infantry division and some artillery brigades. The heavy divisions have both the M109 and M110 howitzers. A decision has been made, however, to remove the M110s from the divisions and to make them a corps asset. The MLRS is still being fielded, and there are no firm plans to include it in the organization of the light division.

The best type of ammunition available for counterfire is dual purpose improved conventional munitions (DPICM).<sup>59</sup> The effectiveness of these rounds is proportional to the number of submunitions placed on the target.<sup>60</sup> This is relevant to two areas.

First, the 155-mm round with only eighty-eight submunitions is not highly effective in a counterfire role.<sup>61</sup> The 203-mm round with 195 submunitions is better. The best round is, however, the one for the multiple launcher rocket system (MLRS) which has over six-hundred submunitions.<sup>62</sup>

system can detect, recognize, and identify targets and assist artillery engagement out to 20 km forward of the line of contact.<sup>50</sup> The system, however, is still a number of years away from being operational.

Due to the fleeting nature of counterfire targets, the information provided by these intelligence sources is only valid if it can be acted on quickly. For example, the agility and high rate of fire of rocket launchers allow them to employ "shoot-and-scoot" tactics which make them practically invulnerable to active detection and subsequent enemy counterfire.<sup>51</sup>

The mobility of self-propelled cannon artillery also allows it to move quickly. The Soviets believe that enemy target acquisition capabilities allow their artillery batteries to be acquired and fired upon within four minutes of the time the first Soviet round is fired.<sup>52</sup> To reduce vulnerability to this threat, the Soviets try to reduce mission times to under four minutes<sup>53</sup> and to then relocate to new positions 300-400 meters away.<sup>54</sup>

Under optimum conditions FIREFINDER with a TACFIRE interface can return counterfire within one minute of acquisition.<sup>55</sup> Such conditions will seldom exist, however, on the battlefield. A more realistic time for return counterfire is six minutes.<sup>56</sup> Reducing this time to two minutes can result in a significant increase in enemy weapons killed.<sup>57</sup> "Time can be saved by automating fire control functions at the battery level"<sup>58</sup> and through practice.

Weapons and ammunition are the providers of firepower, and this

azimuth determining system which eliminates the need to survey a base and by using radio data links which eliminate the need to connect the elements of the base by wire.<sup>48</sup> Most other problems which may have caused sound ranging to be viewed as a marginally effective system can be attributed to misunderstanding the capabilities of the system or a lack of combined arms training with sound ranging elements.

Crater analysis also remains available as means of locating hostile artillery. While it is slower and less accurate than other assets, it can help to orient these toward targets. Crater analysis techniques, however, are seldom practiced.

The above systems are only capable of locating active, or firing, hostile artillery. The division artillery is not equipped to locate passive, or non-firing, counterfire targets. These can be acquired only by the military intelligence units and the all-source intelligence centers of the division and corps.

These two assets are supposed to be able to collect, sort, collate, sanitize, and process counterfire target information in a timely manner. To assist in the effort an artillery intelligence officer (AIO) is authorized in the all-source intelligence center.<sup>49</sup> Personnel constraints, however, at times prohibit the AIO position from being filled. Also, the ability to provide timely counterfire targets is often deficient because it is given a low priority and is not practiced.

The fielding of a remotely piloted vehicle (RPV) should enhance the division's ability to acquire passive counterfire targets. "This

detection.<sup>42</sup> The visual signature of the system can be overcome by careful use of terrain and camouflage techniques.<sup>43</sup> The electromagnetic signature can be reduced by controlling emission through cueing, by radio discipline, and by placing the radars behind a screening crest.<sup>44</sup>

A screening crest can, however, limit the ability of FIREFINDER to locate cannons firing at short ranges (four to six kilometers) and low angle trajectories.<sup>45</sup> This is because the rounds will travel under the radar beam.

Finally, the radar-TACFIRE interface is not automatic. The radar operator must feed the target information to TACFIRE by entering it on a digital message device. This slows the information flow.

Despite these limitations FIREFINDER is a formidable asset. With its accuracy and single round locating capability it provides the division with a more than adequate target acquisition facility.<sup>46</sup>

Another indirect fire locator in the division is the sound ranging platoon. Unfortunately, a decision has been made to delete it from the division organization.

While sound ranging is neither as fast or accurate as radar, it has the advantage of not having a large electronic signature. This makes it difficult to detect. In the past sound ranging has proven inflexible because of the time required to emplace a sound base.<sup>47</sup> This problem has been overcome, however, by fielding the position and

thought. As a result, neither fire support nor maneuver personnel have a clear understanding of counterfire, what it does, and how it is obtained. The overall rating for counterfire doctrine is, therefore, borderline.

### Adequacy of Resources

Three categories of resources will be looked at - target acquisition assets, weapons and ammunition and personnel. The survey question on the adequacy of target acquisition resources resulted in a mean of 3.16892 which gives a rating of satisfactory. A frequently expressed reservation, however, was that these resources were adequate only with the fielding of the FIREFINDER system.

FIREFINDER consists of two different weapons locating radars and is currently being issued to division artilleries. The AN/TPQ-36 radar provides locations of artillery and mortars out to a range of fifteen kilometers and of rockets out to a range of twenty-four kilometers.<sup>36</sup> The AN-TPQ-37 radar provides locations of artillery and rockets at ranges from three to fifty kilometers depending on the type of weapon.<sup>37</sup> These ranges allow FIREFINDER to cover the area in front of friendly troops where most counterfire targets will be found.<sup>38</sup>

FIREFINDER is fully automatic, fast, and accurate.<sup>39</sup> It allows single round target location and simultaneous tracking of multiple targets.<sup>40</sup> In addition, FIREFINDER can interface with TACFIRE.<sup>41</sup> Still, the system does have limitations and vulnerabilities.

FIREFINDER is vulnerable to imagery and electromagnetic

Secondly, direct support of maneuver is not limited to targets that can be seen. Counterfires, by keeping enemy artillery from firing on maneuver forces, provide direct support.<sup>31</sup>

Next, the Soviets have a formidable target acquisition capability for locating artillery; they devote nearly half of their available ammunition to counterbattery; and their preponderance of weapons makes their artillery a serious threat not only to maneuver forces, but also to artillery.<sup>32</sup> One way to ensure that enough friendly artillery survives to support maneuver is counterfire.

Fourth, while there may be times when large quantities of artillery will be devoted to counterfire, such as during a preparation, usually there will be sufficient fire support assets available to provide direct support for the maneuver forces.<sup>33</sup>

Finally, since the suppressive effects of counterfire do not persist, and an enemy with a large indirect fire capability will have ample weapons available for firing, counterfire cannot be a sometimes thing.<sup>34</sup> "It is necessary to conduct counterfire as a continuous operation in battle."<sup>35</sup>

### Conclusions

Current counterfire doctrine was found to be borderline in meeting each of the objectives which were established for it. It is not sufficiently accessible; it does not provide firm enough guidance for C<sup>3</sup> or decision making; and it does not enhance commonality of

pointed out in the section on command and control, there is no one place, however, where all of the elements involved in counterfire are tied together. As a result, there are probably as many ways to control counterfire as there are divisions in the Army.

Commonality of thought is enhanced by the retention of proven combat principles. Those principles which have stood the test of time are usually understood by everyone. Two principles that seem to be neglected at best and ignored as a worst case are those of the importance of counterfire to success in battle and of the need for an organized effort to defeat the threat of an enemy possessing a significant indirect fire capability. In fact, many officers within the field artillery community play down the importance of counterfire. These officers would like to see counterfire treated as just another mission with no special emphasis or organization.

The reason for this point of view appears to be the belief that "...DS must...always be the priority mission of the artillery supporting a maneuver force."<sup>29</sup> As a result, there is a concern that an organized counterfire effort will result in an artillery dual, a separate phase of the battle which does not support maneuver. This overlooks several significant points.

First, experience has shown that direct support fires are not always the most important type. During the 1973 Arab-Israeli War, the Israelis frequently found that general support fires were more beneficial.<sup>30</sup>

most glaring example of this is found in the fact that there are no less than five different definitions for counterfire itself. One of two in FM 6-20 was quoted in Chapter 1. FMs 6-121, Field Artillery Target Acquisition, 71-2, The Tank and Mechanized Infantry Battalions Task Force, and 100-5-1, Operational Terms and Graphics each contain a different definition. FM 90-10-1, An Infantryman's Guide to Urban Combat even goes so far as to use the term counterbattery.<sup>26</sup>

Another example of the inconsistency of descriptions relating to counterfires is found in discussions of the role of the field artillery in the offensive. In FM 6-20, the second of eleven tasks is:

Destroy and suppress enemy direct/indirect fire weapons.<sup>27</sup>

FM 6-20-1 lists as the third of eleven tasks:

Destroy, suppress, and/or neutralize, enemy direct and indirect fire weapons.<sup>28</sup>

Not only do the various manuals fail to provide common descriptions (although admittedly they are similar), they also do not agree upon the order of priority for various tasks. FM 6-20-2 avoids this problem by failing to provide any list of tasking or priority.

If commonality of thought is to be achieved, standardization of unit organization and of operational procedures and techniques is also essential. Current doctrine standardizes the organization of the target acquisition battery and the targeting element. It also standardizes some procedures to be used by the targeting element. As has been

valuable information on determining the type and amount of ammunition to be used in attacking a specific target. This includes a discussion of the Joint Munitions Effectiveness Manuals (JMEM) and the FM 6-141 series of manuals. The former provide effectiveness data, while the latter provide "doctrine for target analysis procedures and the employment of weapons systems."<sup>21</sup>

In discussing these manuals, FM 6-20 points out that the information contained therein has been included in TACFIRE software programs. This enables TACFIRE to recommend a "solution for the volume and type of fire required to meet the commander's criteria and other input data."<sup>22</sup>

If these manuals can only be used manually, their effectiveness "is limited by their volume, by the lack of easy accessibility, and by the difficulty of comparing ammunition or weapons systems."<sup>23</sup> FM 6-20 advises that the solution to this problem is to use the Graphical Munitions Effects Tables (GMET).<sup>24</sup> These devices are similar in appearance to a slide rule and provide quick access to information on the amount and type of ammunition required. Unfortunately, since they can only be used for personnel targets, they are of no value for counterfires.<sup>25</sup>

The final objective of doctrine is to create commonality of thought. According to the survey this is another borderline area. The question on this topic had a mean of 2.21759.

It has already been pointed out that current counterfire doctrine fails to provide common job descriptions. Many other examples of dissimilar definitions and descriptions can also be found. Perhaps the

survey question on decision-making resulted in a mean of 2.32609 which makes this another borderline area.

FM 6-20 does show what guidance the division commander should give to his FSCoord for the attack of counterfire targets. The guidance should include:

- \*priority of targets and fires,
- \*extent of damage desired,
- \*ammunition constraints, and
- \*friendly fire support survivability considerations.<sup>19</sup>

Having shown what guidance should be provided, the manual then drops the subject without explaining how to arrive at it.

A system called Target Value Analysis (TVA) is now available, however, that will assist in determining the relative value of a target and when and where it should be attacked. Although this system is outlined in FM 6-20,<sup>20</sup> its availability is not widely known. Furthermore, since much of the information dealing with the TVA is classified, little unclassified information is available for publication and general usage.

The value and employment of target value analysis is also limited by the fact that it is primarily a manual system. Until such time as it can be automated and incorporated into the TACFIRE system, it will probably lack the timeliness needed to enable many targets to be attacked.

In addition to describing the TVA, FM 6-20 also contains

smoke. This does not provide sufficient realism to make soldiers react properly, and it does not exercise target acquisition systems. Efforts to develop a realistic training device are being made. They are, however, hampered by safety and environmental restrictions.

Target acquisition assets can be realistically trained and FM 6-121 provides excellent guidance on how to do this, even when training facilities are limited. Unfortunately, it does not appear that such training is carried out on a frequent or routine basis. As a result, the ability of target acquisition assets to provide timely and accurate targeting information in a fast moving, hostile environment is highly questionable.

Admittedly, there are target acquisition batteries that are exceptions to the above generalization. Even those batteries that train in every facet of their mission are limited, however, by the fact that they are training in isolation. One survey question asked to what degree counterfire training was adequate in terms of exercising the entire system - maneuver units, target acquisition units, processing sections, decision makers, and firing units. Another question asked how often this was done. With means of .938272 and .910448 respectively, both areas must be rated as being very unsatisfactory.

Training the fire support system for counterfire requires the involvement of all headquarters elements. Unfortunately, higher level headquarters - division artillery, division, and corps being the most important - seldom deploy to the field. Consequently, when they do get the opportunity to train with their subordinate elements, there are so

many areas needing emphasis that counterfire training becomes a relatively low priority. In exercises without troops, counterfire suffers a similar fate. If it is even considered in these latter exercises, it is seldom taken seriously or dealt with realistically.

Guidance for the training of these higher headquarters is not lacking. Army Training and Evaluation Programs (ARTEP) provide

...unit trainers and training managers with a list of critical tasks the unit must perform to standard to survive and accomplish its mission in the air land battle....<sup>67</sup>

Both of the ARTEPs for division artilleries, artillery brigades, and corps artillery sections include counterfire tasks. For example, ARTEP 6-300 states that the division artillery must, "Maintain a continuous capability to deliver...counterfires...."<sup>68</sup> Other counterfire tasks include:

\*Process and coordinate the delivery of counterfire.<sup>69</sup>

\*Establish and maintain a counterfire reference grid (CGR)....<sup>70</sup>

\*Establish target categories to facilitate the order to fire on specific targets when counterfire is received.<sup>71</sup>

### Conclusions

The lack of effective training is the biggest weakness that must be overcome in preparing to deliver effective counterfire. Current training is too limited in both scope and frequency. As a result, it is not possible to identify strengths and weakness, to develop

timeliness and better operating procedures, or to completely exercise the combined arms team. While many factors contribute to this unsatisfactory training situation, the most important is the inability to simulate a realistic hostile indirect fire threat. Without this there is the lack of a sense of urgency toward counterfire.

## ENDNOTES

- <sup>1</sup>U.S. Army, TRADOC Reg 11-7, (1982), p. 4.
- <sup>2</sup>Ibid., p. 7.
- <sup>3</sup>Ibid., p. 9.
- <sup>4</sup>U.S. Army Field Artillery School, Fire Support Mission Area Analysis, Phase I Report, (1980), p. 3-9.
- <sup>5</sup>U.S. Army, FM 6-20, Fire Support in Combined Operations, (1983), p. 1-6.
- <sup>6</sup>U.S. Army, FM 6-20-1, Field Artillery Cannon Battalion, (1983), p. 1-2.
- <sup>7</sup>U.S. Army, FM 6-20-2, Division Artillery, Field Artillery Brigade, and Field Artillery Section (Corps), (1983), p. 1-2.
- <sup>8</sup>U.S. Army, FM 71-2, The Tank and Mechanized Infantry Battalion Task Force, (1977), p. 7-2.
- <sup>9</sup>U.S. Army, FM 71-3, Armored and Mechanized Brigade Operations, (1980), p. 2-10.
- <sup>10</sup>U.S. Army, FM 71-100, Armored and Mechanized Division Operations, (1978), p. 4-3.
- <sup>11</sup>U.S. Army, FM 6-20-2, p. 1-2.
- <sup>12</sup>U.S. Army, FM 6-121, Field Artillery Target Acquisition, (1980), p. 4-3.
- <sup>13</sup>U.S. Army, FM 6-20, p. B-1.
- <sup>14</sup>Ibid., p. B-8.
- <sup>15</sup>U.S. Army, FM 6-121, p. 7-5.
- <sup>16</sup>U.S. Army, FM 6-20-2, p. C-8.
- <sup>17</sup>U.S. Army, FM 6-121, pp. 7-1 to 7-18 and 3-7.
- <sup>18</sup>U.S. Army, FM 6-1, Field Artillery Fire Direction System TACFIRE Operations, (1979), pp. 1-8 and 1-9.

- <sup>19</sup>U.S. Army, FM 6-20, p. J-9.
- <sup>20</sup>Ibid., pp. M-5 and M-8.
- <sup>21</sup>Ibid., pp. M-13 and M-14.
- <sup>22</sup>Ibid., p. M-13.
- <sup>23</sup>Ibid., p. M-14.
- <sup>24</sup>Ibid.
- <sup>25</sup>U.S. Army, FM 90-10-1, An Infantryman's Guide to Urban Combat, (1982), p. 4-21.
- <sup>26</sup>Interview with Jim Matts, U.S. Army Material Systems Analysis Activity, Aberdeen Proving Ground, Maryland, 4 April 1984.
- <sup>27</sup>U.S. Army, FM 6-20, p. 4-3.
- <sup>28</sup>U.S. Army, FM 6-20-1, p. 6-2.
- <sup>29</sup>Major William R. Calhoun, Jr., "Let's Take Another Look... GS In The Defense," Field Artillery Journal 45 (September-October 1977): 40.
- <sup>30</sup>Ibid.
- <sup>31</sup>Briefing by the U.S. Army Field Artillery School to the U.S. Army Command and General Staff College, 1980.
- <sup>32</sup>Lieutenant Colonel M.J.H. Hudson, "Survive to Fight," Field Artillery Journal 49 (January-February 1981):32, Reprinted from the Journal of the Royal Artillery; Lieutenant Colonel William W. Breen, "Survivable, Affordable, and Lonely," Field Artillery Journal 45 (November-December 1977):22.
- <sup>33</sup>Niedenfuhr et al., Counterfire Campaign Analysis, Volume I, Main Report (McLean, VA: The MITRE Corporation, 1979), p. xxiii.
- <sup>34</sup>Ibid., p. 167.
- <sup>35</sup>Ibid.
- <sup>36</sup>U.S. Army, FM 6-161, Field Artillery Radar Systems, (1978), with change 1, p. 6-6.
- <sup>37</sup>Ibid., p. 7-2.
- <sup>38</sup>Niedenfuhr, Counterfire Campaign Analysis, p. 2.

- 39 U.S. Army, FM 6-161, p. 1-1.
- 40 U.S. Army, FM 6-20, p. 73.
- 41 Ibid.
- 42 U.S. Army, FM 6-161, p. 1-3.
- 43 Ibid.
- 44 Ibid., pp. 1-3 and 7-7.
- 45 Niedenfuhr, Counterfire Campaign Analysis, p. 167.
- 46 Ibid.
- 47 U.S. Army, FM 6-20, p. B-2.
- 48 Ibid.
- 49 Ibid., p. 3-29.
- 50 Ibid., p. 7-4.
- 51 Niedenfuhr, Counterfire Campaign Analysis, pp. xxxiii and 164.
- 52 U.S. Army, FM 100-2-1, Soviet Army Operations and Tactics, Coordinating Draft, (1982), p. 9-54; Major Keith W. Dayton, "Field Artillery Survivability: The Soviet Perspective," Field Artillery Journal 49 (September-October 1981):44-45.
- 53 Ibid.
- 54 Ibid., p. 9-32.
- 55 U.S. Army, FM 6-20, p. 7-3.
- 56 Niedenfuhr, Counterfire Campaign Analysis, p. xxxiii.
- 57 Ibid.
- 58 Ibid.
- 59 Ibid., p. 167.
- 60 Ibid.
- 61 Ibid.
- 62 Ibid.

<sup>63</sup>U.S. Army, FM 6-20, p. 7-9.

<sup>64</sup>U.S. Army, TC 6-20-4, Field Artillery Counterfire (Fort Sill, OK: United States Army Field Artillery School, 1975), p. 5.

<sup>65</sup>Besides the survey, additional support for these points is found in - Colonel Arthur R. Hercz, "Viable Counterfire Is the Answer," Field Artillery Journal 47 (March-April 1979):34-36.

<sup>66</sup>U.S. Army, FM 6-121, p. 8-9.

<sup>67</sup>U.S. Army, ARTEP 6-300, Corps Artillery Section, Division Artillery, and Field Artillery Brigade, (1981), p. 1-1.

<sup>68</sup>Ibid., p. 3-24.

<sup>69</sup>Ibid., p. 3-57.

<sup>70</sup>Ibid., p. 3-70.

<sup>71</sup>Ibid.

## CHAPTER 6

### CONCLUSIONS AND RECOMMENDATIONS

#### Conclusions

The cannoneers are squatting close to the caissons. The drivers take shelter behind the horses. One is waiting for the burst. One-two-three seconds. Hours! I bend my back; I tremble. I feel that an instinctive desire of running away is surging from my whole being.... Here it comes! It seems that lightning struck at my feet....!

The above quote describes the terrifying the demoralizing effects of receiving hostile indirect fires. The two ways of avoiding indirect fire are to move out of its way after it starts falling and to reduce the enemy's ability to deliver indirect fires by one's own counterfire. While the former may not always be possible, history has shown that the latter is an essential element to success in battle.

This study has examined to what degree the field artillery of the United States Army is prepared to deliver counterfire. Unfortunately, the level of preparedness must be judged as unsatisfactory.

In arriving at this conclusion, four areas have been examined: knowledge of the threat, doctrine, resources, and training. The first three areas have been given a borderline rating. Where there is considerable room for improvement, the task can probably be accomplished in these areas with adequate practice. Counterfire training is, however, lagging far behind other capabilities. It is without doubt the

weakest of the four areas and must be rated unsatisfactory.

As a result of the cumulative effect of these weaknesses, the United States Army must be judged as not being prepared to deliver effective counterfires. As occurred in World Wars I and II, a method for dealing with hostile indirect fire will have to be developed on an ad hoc basis in any future conflict unless corrective action is taken now.

### Recommendations

To overcome the shortcomings and failures that have been uncovered the following corrective actions should be taken at once:

#### Knowledge of the Threat

(1) Develop a series of non-Soviet threat manuals. These could either be oriented toward specific countries or types of threats.

(2) Insure that functional area field manuals contain references to the appropriate threat manuals. These should be contained in the text of the manual as appropriate to the topic being discussed.

(3) Functional area field manuals should be limited to a minimum of basic threat information. Technical data should be particularly avoided. Specifically, the charts showing the organization of Soviet units in FM 6-20 should be eliminated.

(4) Include in the threat manuals information on enemy strengths, vulnerabilities, and countermeasures. If the information is classified, provide necessary references in order that personnel with appropriate clearances and a valid need-to-know can locate it

without difficulty.

(5) Threat manuals should contain classified references for more detailed and accurate information beyond that recommended in (4) above, particularly enemy order of battle.

### Doctrine

(1) A single source document should be developed for counterfire doctrine within the fire support series of field manuals. This could be a separate manual or a chapter or appendix of another manual. The source should:

- \*Define counterfire. This definition should be used in all other manuals.

- \*Explain that the primary purpose of counterfire is to eliminate opposing artillery direct support activity which affects friendly maneuver forces rather than protecting friendly artillery.

- \*Identify all personnel, organizations, and systems necessary for counterfire operations.

- \*Define the roles and responsibilities of these personnel, organizations, and systems.

- \*Show the interface and information flow channels between these personnel, organizations, and systems.

- \*Standardize counterfire organizations and procedures.

- \*Provide training guidance.

(2) Other manuals, particularly those with a maneuver orientation, must, however, still provide sufficient counterfire information so that the maneuver commander understands what counterfire is, its purpose and how it can be of benefit, and the consequences of not

having it available. In addition, the maneuver commander must understand his role in the delivery of counterfire and where detailed counterfire information and techniques can be found. The definitions, descriptions, and priorities used in these other manuals must not be at variance with those in the source document.

(3) The responsibility for counterfire should be retained at the division. The division is able to provide a more timely response than the corps, and the smaller size of the division front makes command and control of counterfire assets easier than at corps.

(4) The counterfire role of the field artillery brigade must be clarified. Specifically, techniques and procedures must be provided which will allow the brigade to assume the counterfire mission from the division artillery when appropriate, e.g., when the brigade is operating as the force artillery headquarters for a covering force.

(5) Establish procedures for the attack of counterfire targets by non-artillery assets (e.g., mortars, air force, army aviation, electronic warfare, naval gunfire, and naval close air support).

(6) Clarify the roles and procedures for the location of counterfire targets by non-artillery target acquisition resources.

(7) Emphasize that the suppressive effects of counterfire are not lasting and that a continuous counterfire effort is essential to success in battle.

#### Resources

(1) Retain sufficient firepower and target acquisition assets at the division for counterfire. The decisions to remove the 203-mm

howitzers and the sound ranging platoon from the division should be rescinded.

(2) Establish a MLRS battalion at corps that can be used to influence the counterfire effort in the corps' most vulnerable sector. The batteries in this battalion should be capable of, and train for, attachment to the divisions.

(3) Develop a MLRS round with a forty kilometer range and an inexpensive terminal guidance system.

(4) Develop software for TACFIRE which incorporates TVA.

(5) Automate the TACFIRE - FIREFINDER interface.

(6) Continue efforts aimed at further automation of fire control at the battery level. This includes the fielding of the battery computer system and a radio link between the fire direction center and the guns.

(7) Continue efforts to field a remotely piloted vehicle.

(8) Ensure that all counterfire officer (CFO) positions are manned by trained and qualified officers possessing extensive knowledge of target acquisition and counterfire systems.

### Training

(1) Counterfire training must be emphasized and practiced by the organizations responsible for its control - the divisions and the division artilleries. Batteries, companies, and battalions training by themselves can neither exercise all the organizations involved in counterfire nor achieve a fully satisfactory operational capability. The division is the smallest unit capable of exercising the entire

system, and it must do so frequently.

(2) Because history has shown that counterfire often stems from a shelling report from maneuver forces, these units must be trained in procedures for submitting such reports. This training should also include crater analysis techniques.

(3) Army Training and Evaluation Programs for maneuver units must evaluate fire support utilization, including counterfires. As a minimum, the unit should be tasked to develop a counterfire plan and to request counterfires.

(4) Emphasize during counterfire training the need for rapidity of detection of targets and timeliness of delivery of fires. Without these, friendly rounds may impact on positions from which the enemy has already moved.

(5) An effective and safe trainer for simulating the effects of indirect fire must be developed. Training with this device must not only emphasize taking cover, but also requesting counterfire.

(6) Training of target acquisition assets should emphasize setting up, where possible, on the opposite side of the impact area from that which cannon batteries are firing. The cannon batteries could be acquired as though they were hostile units. Once acquired, the firing unit's location could be transferred to a target within the impact area. The new target location could be submitted through appropriate channels as a counterfire target, and the firing unit could be required to fire on it. If the standards for timely and accurate delivery of fires were met, the firing unit will, in effect, have delivered effective counterfire.

(7) Target acquisition batteries (TAB) should be given an allocation of training ammunition. This will allow these batteries to control delivery of fires in a manner that best facilitates their training. This recommendation does not imply that TAB batteries should only train when they control the ammunition. Indeed, they should seize every opportunity to train regardless of who controls the ammunition.

(8) Divisional counterfire personnel and equipment should accompany the maneuver forces which train at the National Training Center. A combined arms training approach will emphasize the reality of wartime counterfire responsibilities for both the maneuver and fire support elements.

(9) Many commanders do not understand the effects of heavy artillery encounters and the resulting actions and decisions that are required. To give them an appreciation of why they should be concerned, battalion and brigade pre-command training should include being placed in a bunker and having an artillery barrage placed as close to the bunker as safety permits. Hopefully, this will stimulate a greater sense of urgency and indicate the need for counterfire training.

(10) Formal training of fire support officers should emphasize what counterfire is, its purpose, and how it is accomplished. These officers must understand and be prepared to explain to maneuver commanders that the primary purpose of counterfire is not to protect friendly artillery, but rather it is to reduce or eliminate opposing artillery direct support activity which affects friendly maneuver forces. Only when maneuver commanders are made to understand that counterfire benefits them directly will they be willing to give it its

proper priority.

Recommendations for Further Study

The survey questionnaire should be distributed among maneuver officers in order to assess their attitudes toward counterfire.

#### ENDNOTES

<sup>1</sup>Paul Lintner, "Pages from the Diary of a French Artilleryman," trans. Lieutenant George Nestler, The Field Artillery Journal 7 (July-September 1917):280.

## APPENDIX A

Pages 93 to 96 illustrate the survey distributed to collect data for this study. Pages 97 to 115 summarize the results of the survey.

### Survey Questionnaire

1. Please provide your:

a. Rank:    CAPT    MAJ    LTC    COL

b. Time in Service (years):

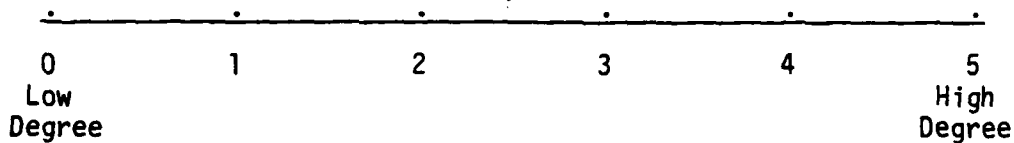
c. Type(s) of Battery/Battalion Command:

8in      155mm      105mm      Lance

Honest John      Pershing      TAB

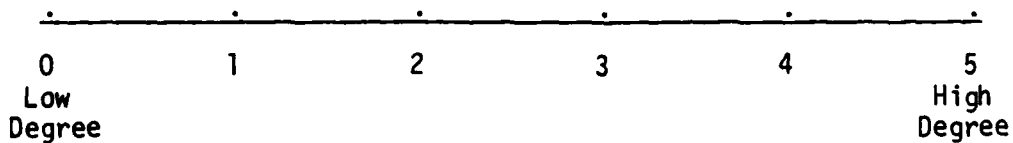
Other (specify)

2. To what degree does counterfire remain an important delivery of fires task for the field artillery?

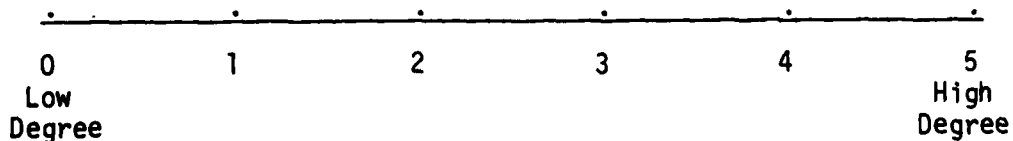


3. To what degree is the division resourced to conduct counterfire in terms of:

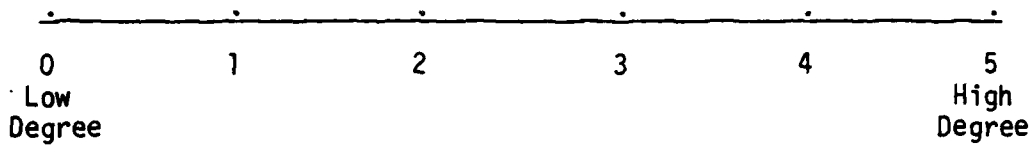
a. Firepower



b. Target Acquisition



c. Personnel



4. An FA brigade should be given a primary mission of counterfire:

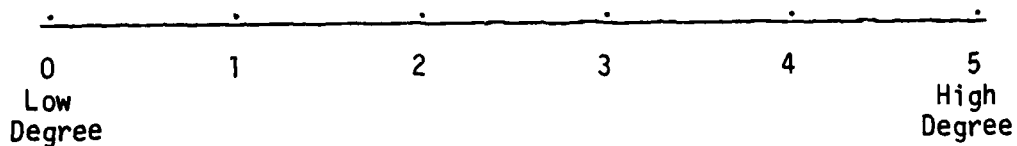
Always      Frequently      Occasionally      Seldom      Never

5. The Army should dedicate FA battalions to counterfire.

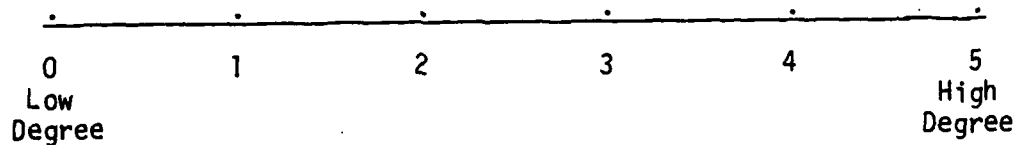
Strongly Agree      Agree      No Opinion      Disagree      Strongly Disagree

6. Doctrine must accomplish several objectives. To what degree does counterfire doctrine:

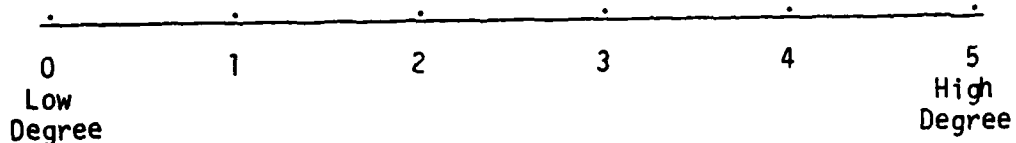
- a. Define the threat



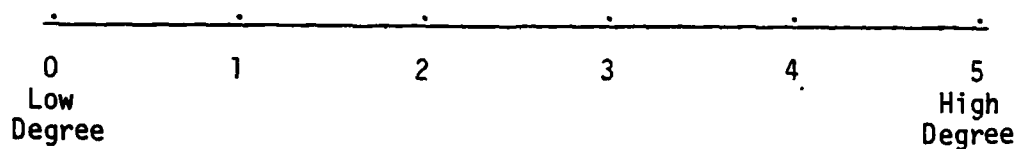
- b. Establish organization for combat



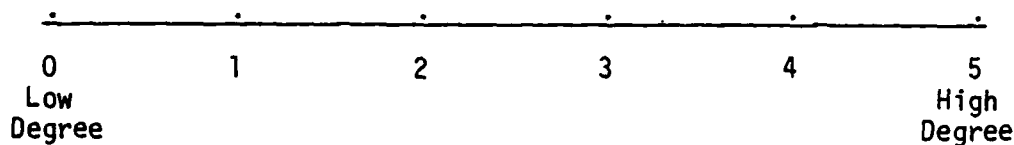
- c. Assign missions



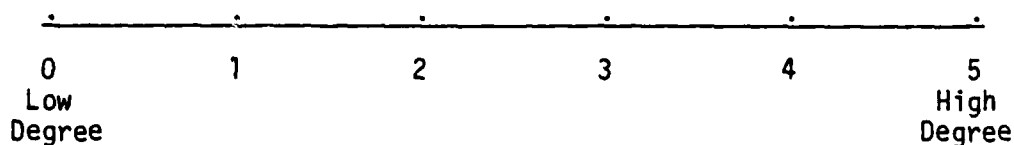
d. Provide guidance for C<sup>3</sup>



e. Provide guidance for decision making



f. Provide for commonality of thought?



7. Counterfire doctrine is readily accessible.

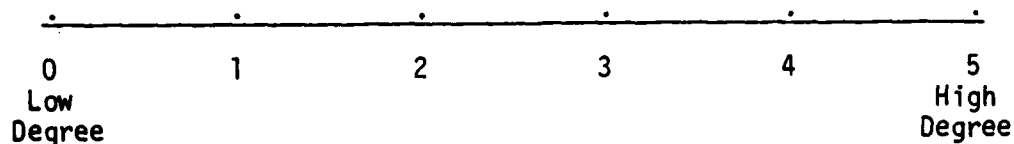
Strongly Agree Agree No Opinion Disagree Strongly Disagree

8. Placing all counterfire doctrine under a single cover would be helpful.

Strongly Agree Agree No Opinion Disagree Strongly Disagree

9. To what degree is counterfire training adequate in terms of:

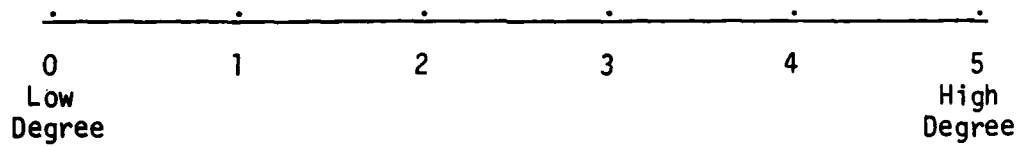
a. Involving the entire system - maneuver units, target acquisition systems, processing section, decision makers, and firing units - in the same training exercise (i.e., exercise the whole system not just parts).



b. Frequency of exercising the entire system



c. Simulating a realistic threat



10. Should the responsibility for the counterfire mission be at division or corps? Explain

11. Please amplify any answers that you wish or discuss any changes you would like to see made to our current counterfire system.

### Survey Results

#### 1. a. Rank

|                    |    |
|--------------------|----|
| Captain            | 7  |
| Major              | 68 |
| Lieutenant Colonel | 14 |
| Colonel            | 3  |

#### b. Time in Service

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 13.4538 | Standard Deviation | 2.70715 |
| Median | 13.5    | Mode               | 12      |
| Range  | 6.5 -20 |                    |         |

#### c. Type(s) of Battery/Battalion Command

|             |    |          |    |
|-------------|----|----------|----|
| 8in         | 16 | 155mm    | 27 |
| 105mm       | 18 | Lance    | 1  |
| Honest John | 5  | Pershing | 4  |
| TAB         | 3  | Other    | 14 |

2. To what degree does counterfire remain an important delivery of fires task for the field artillery?

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 4.41758 | Standard Deviation | .731038 |
| Median | 4.5     | Mode               | 5       |
| Range  | .5 - 5  |                    |         |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 1                | 1.099                        |
| 1           | 2                                  | 0                | 0                            |
| 2           | 3                                  | 1                | 1.099                        |
| 3           | 4                                  | 6                | 6.593                        |
| 4           | 5                                  | 44               | 48.352                       |
| 5           | 6                                  | 39               | 42.857                       |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 4.36561            | 4.46956            |
| 75                | 4.32894            | 4.50623            |
| 90                | 4.29083            | 4.54433            |
| 95                | 4.26655            | 4.56861            |
| 99                | 4.21909            | 4.61607            |
| 99.9              | 4.16402            | 4.67115            |
| 99.99             | 4.11778            | 4.71739            |
| 99.999            | 4.07721            | 4.75796            |

### 3. a. Firepower

|        |         |                    |        |
|--------|---------|--------------------|--------|
| Mean   | 2.21711 | Standard Deviation | .98119 |
| Median | 2       | Mode               | 2      |
| Range  | 0 - 5   |                    |        |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 2                | 2.632                        |
| 1           | 2                                  | 17               | 22.368                       |
| 2           | 3                                  | 34               | 44.737                       |
| 3           | 4                                  | 17               | 22.368                       |
| 4           | 5                                  | 3                | 3.947                        |
| 5           | 6                                  | 3                | 3.947                        |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.14069            | 2.29352            |
| 75                | 2.08677            | 2.34744            |
| 90                | 2.03075            | 2.40346            |
| 95                | 1.99504            | 2.43917            |
| 99                | 1.92527            | 2.50895            |
| 99.9              | 1.84429            | 2.58992            |
| 99.99             | 1.7763             | 2.65791            |
| 99.999            | 1.71665            | 2.71756            |

### 3. b. Target Acquisition

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 3.16892 | Standard Deviation | 1.05995 |
| Median | 3       | Mode               | 4       |
| Range  | 1 - 5   |                    |         |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 0                | 0                            |
| 1           | 2                                  | 4                | 5.405                        |
| 2           | 3                                  | 19               | 25.676                       |
| 3           | 4                                  | 23               | 31.081                       |
| 4           | 5                                  | 21               | 28.378                       |
| 5           | 6                                  | 7                | 9.459                        |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 3.08524            | 3.25259            |
| 75                | 3.02621            | 3.31163            |
| 90                | 2.96486            | 3.37298            |
| 95                | 2.92577            | 3.41207            |
| 99                | 2.84936            | 3.48847            |
| 99.9              | 2.7607             | 3.57714            |
| 99.99             | 2.68625            | 3.65159            |
| 99.999            | 2.62094            | 3.7169             |

### 3. c. Personnel

|        |         |                    |        |
|--------|---------|--------------------|--------|
| Mean   | 2.81061 | Standard Deviation | .88234 |
| Median | 3       | Mode               | 3      |
| Range  | 1 - 5   |                    |        |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 0                | 0                            |
| 1           | 2                                  | 5                | 7.576                        |
| 2           | 3                                  | 22               | 33.333                       |
| 3           | 4                                  | 25               | 37.879                       |
| 4           | 5                                  | 12               | 18.182                       |
| 5           | 6                                  | 2                | 3.03                         |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.73679            | 2.88442            |
| 75                | 2.68471            | 2.9365             |
| 90                | 2.63059            | 2.99062            |
| 95                | 2.59611            | 3.02511            |
| 99                | 2.5287             | 3.09251            |
| 99.9              | 2.45049            | 3.17073            |
| 99.99             | 2.38481            | 3.2364             |
| 99.999            | 2.32719            | 3.29402            |

10. Should responsibility for the counterfire mission be at division or corps?

|          | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|----------|------------------|------------------------------|
| Division | 38               | 58.462                       |
| Both*    | 4                | 4.615                        |
| Corps    | 24               | 36.923                       |

\*Although this response was not asked for, it was provided on three surveys.

9. c. Simulating a realistic threat

|        |       |                    |         |
|--------|-------|--------------------|---------|
| Mean   | 1.25  | Standard Deviation | .937639 |
| Median | 1     | Mode               | 1       |
| Range  | 0 - 4 |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 15               | 25.0                         |
| 1           | 2                                  | 26               | 43.333                       |
| 2           | 3                                  | 14               | 23.333                       |
| 3           | 4                                  | 4                | 6.667                        |
| 4           | 5                                  | 1                | 1.667                        |
| 5           | 6                                  | 0                | 0                            |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 1.16767            | 1.33233            |
| 75                | 1.10958            | 1.39042            |
| 90                | 1.04921            | 1.45079            |
| 95                | 1.01075            | 1.48925            |
| 99                | .935564            | 1.56444            |
| 99.9              | .848322            | 1.65168            |
| 99.99             | .775066            | 1.72493            |
| 99.999            | .710799            | 1.7892             |

9. b. Frequency of exercising the entire system

|        |         |                    |        |
|--------|---------|--------------------|--------|
| Mean   | .910448 | Standard Deviation | .82374 |
| Median | 1       | Mode               | 1      |
| Range  | 0 - 4   |                    |        |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 24               | 35.821                       |
| 1           | 2                                  | 33               | 49.254                       |
| 2           | 3                                  | 7                | 10.448                       |
| 3           | 4                                  | 2                | 2.985                        |
| 4           | 5                                  | 1                | 1.493                        |
| 5           | 6                                  | 0                | 0                            |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | .842058            | .978838            |
| 75                | .793808            | 1.02709            |
| 90                | .743667            | 1.07723            |
| 95                | .711716            | 1.10918            |
| 99                | .649268            | 1.17163            |
| 99.9              | .576801            | 1.24409            |
| 99.99             | .515953            | 1.30494            |
| 99.999            | .46257             | 1.35833            |

9. a. Involving the entire system

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | .938272 | Standard Deviation | .802707 |
| Median | 1       | Mode               | 1       |
| Range  | 0 - 3   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 28               | 34.568                       |
| 1           | 2                                  | 38               | 46.914                       |
| 2           | 3                                  | 12               | 14.815                       |
| 3           | 4                                  | 3                | 3.704                        |
| 4           | 5                                  | 0                | 0                            |
| 5           | 6                                  | 0                | 0                            |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50.               | .87774             | .998804            |
| 75                | .835034            | 1.04151            |
| 90                | .790654            | 1.08589            |
| 95                | .762373            | 1.11417            |
| 99                | .7071              | 1.16944            |
| 99.9              | .64296             | 1.23358            |
| 99.99             | .589103            | 1.28744            |
| 99.999            | .541853            | 1.33469            |

8. Placing all counterfire doctrine under a single cover would be helpful: strongly agree (5), agree (4), no opinion (3), disagree (2), strongly disagree (1).

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 3.94828 | Standard Deviation | 1.05736 |
| Median | 4       | Mode               | 4       |
| Range  | 1 - 5   |                    |         |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 1           | 2                                  | 4                | 6.897                        |
| 2           | 3                                  | 3                | 5.172                        |
| 3           | 4                                  | 1                | 1.724                        |
| 4           | 5                                  | 34               | 58.621                       |
| 5           | 6                                  | 16               | 27.586                       |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 3.85381            | 4.04274            |
| 75                | 3.78717            | 4.10938            |
| 90                | 3.71791            | 4.17864            |
| 95                | 3.67378            | 4.22277            |
| 99                | 3.58752            | 4.30903            |
| 99.9              | 3.48743            | 4.40912            |
| 99.99             | 3.40339            | 4.49317            |
| 99.999            | 3.32965            | 4.5669             |

7. Counterfire doctrine is readily accessible: strongly agree (5), agree (4), no opinion (3), disagree (2); strongly disagree (1).

|        |       |                    |         |
|--------|-------|--------------------|---------|
| Mean   | 2.8   | Standard Deviation | .979796 |
| Median | 2     | Mode               | 2       |
| Range  | 1 - 5 |                    |         |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 1           | 2                                  | 1                | 1.429                        |
| 2           | 3                                  | 38               | 54.286                       |
| 3           | 4                                  | 6                | 8.571                        |
| 4           | 5                                  | 24               | 34.286                       |
| 5           | 6                                  | 1                | 1.429                        |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.72044            | 2.87956            |
| 75                | 2.66431            | 2.93569            |
| 90                | 2.60598            | 2.99402            |
| 95                | 2.56881            | 3.03119            |
| 99                | 2.49617            | 3.10383            |
| 99.9              | 2.41187            | 3.18813            |
| 99.99             | 2.34108            | 3.25892            |
| 99.999            | 2.27898            | 3.32102            |

6. f. Provide for commonality of thought

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 2.21795 | Standard Deviation | .949324 |
| Median | 2       | Mode               | 2       |
| Range  | 0 - 5   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 12               | 2.564                        |
| 1           | 2                                  | 15               | 19.231                       |
| 2           | 3                                  | 37               | 47.436                       |
| 3           | 4                                  | 17               | 21.795                       |
| 4           | 5                                  | 6                | 7.692                        |
| 5           | 6                                  | 1                | 1.282                        |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.14498            | 2.29092            |
| 75                | 2.0935             | 2.3424             |
| 90                | 2.04               | 2.3959             |
| 95                | 2.00591            | 2.42999            |
| 99                | 1.93928            | 2.49662            |
| 99.9              | 1.86196            | 2.57394            |
| 99.99             | 1.79704            | 2.63886            |
| 99.999            | 1.74008            | 2.69582            |

6. e. Provide guidance for decision making

|        |         |                    |        |
|--------|---------|--------------------|--------|
| Mean   | 2.32609 | Standard Deviation | .92009 |
| Median | 2       | Mode               | 2      |
| Range  | 0 - 5   |                    |        |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 2                | 2.899                        |
| 1           | 2                                  | 10               | 14.493                       |
| 2           | 3                                  | 30               | 43.478                       |
| 3           | 4                                  | 22               | 31.884                       |
| 4           | 5                                  | 4                | 5.797                        |
| 5           | 6                                  | 1                | 1.449                        |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.25083            | 2.40134            |
| 75                | 2.19773            | 2.45444            |
| 90                | 2.14256            | 2.50962            |
| 95                | 2.1074             | 2.54478            |
| 99                | 2.03868            | 2.61349            |
| 99.9              | 1.95894            | 2.69324            |
| 99.99             | 1.89198            | 2.7602             |
| 99.999            | 1.83323            | 2.81894            |

6. d. Provide guidance for C<sup>3</sup>

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 2.32857 | Standard Deviation | .913728 |
| Median | 2       | Mode               | 2       |
| Range  | 0 - 5   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 2                | 2.857                        |
| 1           | 2                                  | 10               | 14.286                       |
| 2           | 3                                  | 31               | 44.286                       |
| 3           | 4                                  | 22               | 31.429                       |
| 4           | 5                                  | 4                | 5.714                        |
| 5           | 6                                  | 1                | 1.429                        |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.25438            | 2.40276            |
| 75                | 2.20203            | 2.45511            |
| 90                | 2.14764            | 2.50951            |
| 95                | 2.11297            | 2.54417            |
| 99                | 2.04523            | 2.61192            |
| 99.9              | 1.96661            | 2.69053            |
| 99.99             | 1.9006             | 2.75654            |
| 99.999            | 1.84269            | 2.81446            |

6. c. Assign missions

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 2.35385 | Standard Deviation | .931182 |
| Median | 2       | Mode               | 2       |
| Range  | 0 - 5   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 2                | 3.077                        |
| 1           | 2                                  | 10               | 15.385                       |
| 2           | 3                                  | 25               | 38.462                       |
| 3           | 4                                  | 23               | 35.385                       |
| 4           | 5                                  | 4                | 6.154                        |
| 5           | 6                                  | 1                | 1.538                        |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.27534            | 2.43235            |
| 75                | 2.21995            | 2.48774            |
| 90                | 2.16239            | 2.5453             |
| 95                | 2.12571            | 2.58198            |
| 99                | 2.05402            | 2.65367            |
| 99.9              | 1.97083            | 2.73636            |
| 99.99             | 1.90098            | 2.80671            |
| 99.999            | 1.8397             | 2.86799            |

6. b. Establish organization for combat.

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 2.30882 | Standard Deviation | .958819 |
| Median | 2       | Mode               | 2       |
| Range  | 0 - 4   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 2                | 2.941                        |
| 1           | 2                                  | 14               | 20.588                       |
| 2           | 3                                  | 24               | 35.294                       |
| 3           | 4                                  | 21               | 30.882                       |
| 4           | 5                                  | 7                | 10.294                       |
| 5           | 6                                  | 0                | 0                            |

Confidence Limits

| <u>Conf Limit</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.22982            | 2.38783            |
| 75                | 2.17407            | 2.44357            |
| 90                | 2.11615            | 2.5015             |
| 95                | 2.07924            | 2.53841            |
| 99                | 2.00709            | 2.61056            |
| 99.9              | 1.92337            | 2.69427            |
| 99.99             | 1.85308            | 2.76457            |
| 99.999            | 1.79141            | 2.8264             |

6. a. Define the threat

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 2.82468 | Standard Deviation | .945826 |
| Median | 3       | Mode               | 3       |
| Range  | 1 - 5   |                    |         |

Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 0           | 1                                  | 0                | 0                            |
| 1           | 2                                  | 9                | 11.688                       |
| 2           | 3                                  | 16               | 20.779                       |
| 3           | 4                                  | 39               | 50.649                       |
| 4           | 5                                  | 10               | 12.987                       |
| 5           | 6                                  | 3                | 3.896                        |

Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.7515             | 2.89785            |
| 75                | 2.69987            | 2.94948            |
| 90                | 2.64622            | 3.00313            |
| 95                | 2.61203            | 3.03732            |
| 99                | 2.54521            | 3.10414            |
| 99.9              | 2.46767            | 3.18168            |
| 99.99             | 2.40256            | 3.24679            |
| 99.999            | 2.34544            | 3.30391            |

5. The Army should dedicate FA battalions to counterfire: strongly agree (5), agree (4), borderline (3), disagree (2), strongly disagree (1).

|        |       |                    |        |
|--------|-------|--------------------|--------|
| Mean   | 2.8   | Standard Deviation | 1.6619 |
| Median | 2     | Mode               | 2      |
| Range  | 1 - 5 |                    |        |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 1           | 2                                  | 6                | 7.059                        |
| 2           | 3                                  | 43               | 50.588                       |
| 3           | 4                                  | 5                | 5.882                        |
| 4           | 5                                  | 24               | 28.235                       |
| 5           | 6                                  | 7                | 8.235                        |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 2.71418            | 2.88582            |
| 75                | 2.65363            | 2.94637            |
| 90                | 2.59071            | 3.00929            |
| 95                | 2.55061            | 3.04939            |
| 99                | 2.47224            | 3.12776            |
| 99.9              | 2.3813             | 3.2187             |
| 99.99             | 2.30495            | 3.29505            |
| 99.999            | 2.23796            | 3.36204            |

4. An FA brigade should be given a primary mission of counterfire:  
always (5), frequently (4), occasionally (3), seldom (2), never (1).

|        |         |                    |         |
|--------|---------|--------------------|---------|
| Mean   | 3.16667 | Standard Deviation | 1.27517 |
| Median | 3       | Mode               | 4       |
| Range  | 1 - 5   |                    |         |

#### Frequency Distribution

| <u>From</u> | <u>Up to But<br/>Not Including</u> | <u>Frequency</u> | <u>Percent<br/>Frequency</u> |
|-------------|------------------------------------|------------------|------------------------------|
| 1           | 2                                  | 14               | 17.949                       |
| 2           | 3                                  | 6                | 7.692                        |
| 3           | 4                                  | 21               | 26.923                       |
| 4           | 5                                  | 27               | 34.615                       |
| 5           | 6                                  | 10               | 12.821                       |

#### Confidence Limits

| <u>Conf Level</u> | <u>Lower Limit</u> | <u>Upper Limit</u> |
|-------------------|--------------------|--------------------|
| 50                | 3.06865            | 3.26468            |
| 75                | 2.9995             | 3.33383            |
| 90                | 2.92764            | 3.4057             |
| 95                | 2.88184            | 3.45149            |
| 99                | 2.79234            | 3.54099            |
| 99.9              | 2.68848            | 3.64485            |
| 99.99             | 2.60128            | 3.73206            |
| 99.999            | 2.52477            | 3.80856            |

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Fort Leavenworth, Kansas 66027
5. COL William R. Larson  
35 17th Street, #6  
Hermosa Beach, California 90254
6. CPT Joseph L. Adelman  
P.O. Box 8422  
Norfolk, Virginia 23503