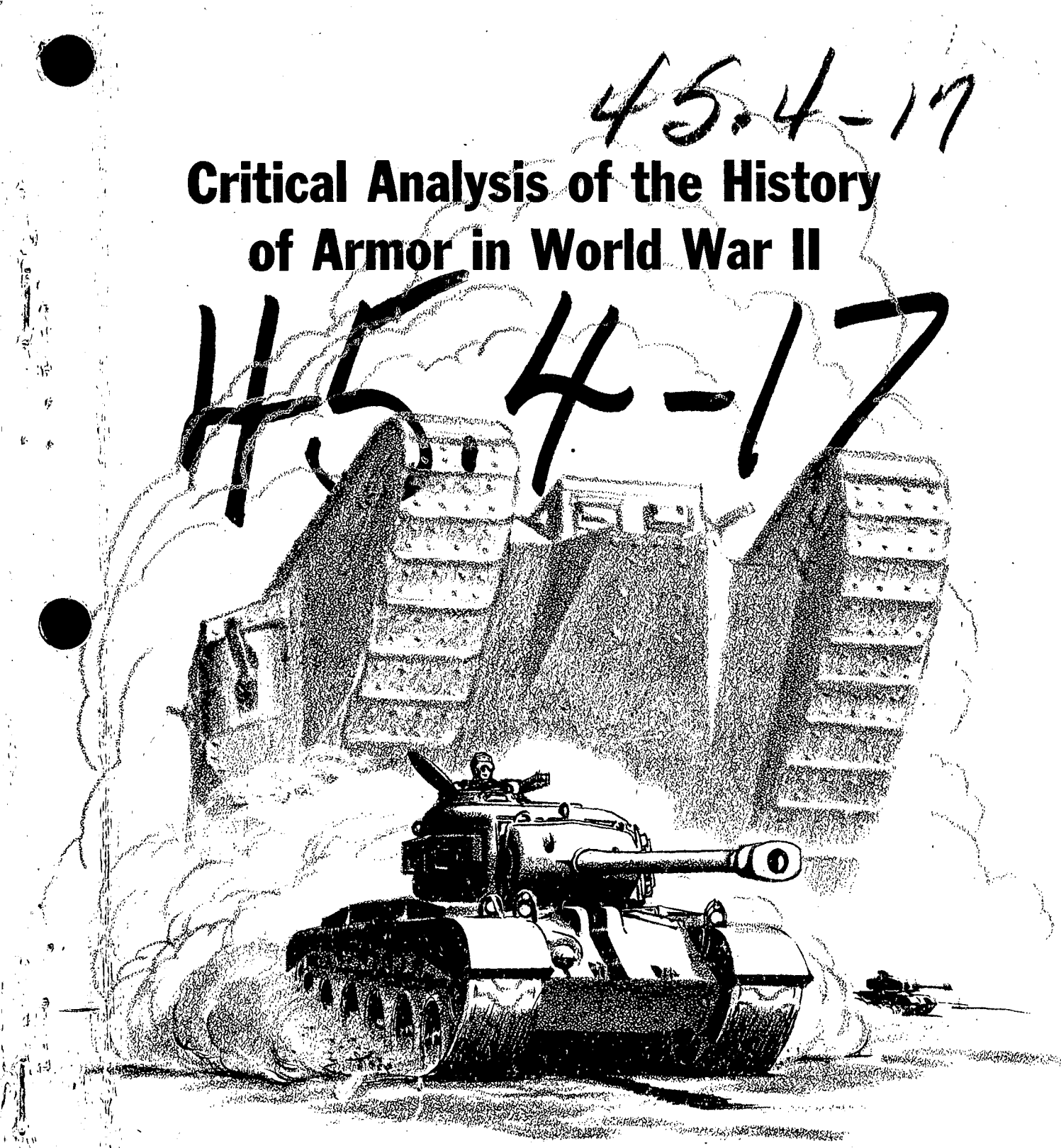
Critical Analysis of the History of Armor in World War II



A RESEARCH REPORT

Prepared at

THE ARMORED SCHOOL

Fort Knox, Kentucky

1952-1953

A CRITICAL ANALYSIS OF THE HISTORY OF ARMOR IN WORLD WAR II

A RESEARCH REPORT PREPARED

BY

COMMITTEE 17

ARMOR OFFICER ADVANCED COURSE

THE ARMORED SCHOOL

1952 - 1953

MAJOR THOMAS K. TANNLER

CAPTAIN DANIEL H. BOONE

CAPTAIN JOHN L. GERRITY

CAPTAIN LEONARD L. NORWOOD, Jr.

1st LIEUTENANT JAMES L. MORRISON, Jr.

Fort Knox, Kentucky

April 1953

TABLE OF CONTENTS

PREFACE

The original purpose of this study was to make a critical analysis of the writing which constitutes the history of Armor in World War II. Now that the analysis has been made and the report completed it is obvious that it will serve two purposes.

First, it will fulfill the mission of providing all individuals, Army levels of command and agencies, and interested civilian organizations with a general criticism of all types of writing which concern Armor in World War II. As such, it may serve as a guide to a more complete coverage of the phases and types of writing which have been neglected. Similarly it may provide inspiration for additional work on the subject.

Second, it is a criticism and evaluation of the written material available at The Armored School on the history of Armor in World War II. Once again, it will serve as a guide to those subjects and areas which have been properly and adequately covered as well as those which have been neglected. For the administration, the report will be a guide toward the future building of the libraries and document center of the School. For the students, it will also be a guide to papers on specific subjects and the material on the subject in general.

The second purpose of the report points to the fact that this analysis of the History of Armor in World War II was made at Fort Knox, Kentucky, and that practically all material pertaining to the subject was found at The Armored School. No attempt was made to include historical writings located in other places. It was felt that The Armored School, by virtue of the missions assigned to it by the Department of the Army, is required to contain an extensive History of Armor in World War II. A survey of this material presents a cross section of the entire field of the history of Armor and provides a sound basis for this critical analysis.

The reader of this report is asked to consider the fact that, in order to have his criticism accepted, the critic must normally possess the experience, background or reputation which establishes him as a critic. In the case of this report the critics have no reputation or experience as such. They are five relatively junior Army officers of varied backgrounds and experience. This has not deterred them. They have established themselves as critics. To replace their relatively shallow historical background and lack of experience in the field, they have introduced the inquisitive mind of the student. Instead of relying on

a large store of knowledge and a broad comprehension of the subject, they have searched history for the answers to specific questions. They have searched to determine if the lessons taught by World War II have been properly recorded for their use. Based on this approach the committee has made its frank, and perhaps somewhat audacious, critical analysis of the writings which constitute the History of Armor in World War II.

The reader is left w ith this thought--perhaps an evaluation of the History of World War II by the junior officer is the most valid and most important, because it is he who is in a position to derive the most from it.

The committee wishes to thank all members of the Research and Evaluation Division, and especially those individuals in The Armored School Library and Document Center, who have been of assistance during the preparation of this report.

CHAPTER 1

INTRODUCTION TO A CRITICAL ANALYSIS OF THE HISTORY OF ARMOR IN WORLD WAR II

As presented to the committee, the objective in the preparation of this report was to make a critical analysis of the writings which constitute the history of Armor in World War II. To define the objective more carefully, it was first decided to limit the field to the armored units of the United States Army. The next device used to define the objective was to ask this question: "If given the hypothetical task of guiding and directing the writing of the history of Armor in World War III, where would you place the emphasis, how would you collect the historical data and what types of writing would you direct?" By considering the project from this viewpoint a decision was made as to what, in the opinion of the committee constituted proper coverage of the subject.

With the full realization that the writing of history never ends and that the topic, as assigned, is extremely broad, it was concluded that the following considerations logically form the basis for a study of historical writings:

1. The degree of coverage of the subject being considered.

2. Where the emphasis has been placed and what phases and types of writing have been treated properly or neglected.

3. The degree to which narrow, yet important, fields have been covered.

4. An analysis of whether the lessons learned have been properly and adequately recorded.

5. The authenticity and relative value of the various types of writing.

6. Conclusions as to the overall effectiveness and value of the papers studied.

7. Recommendations for future planning, organization, direction, study and writing of military history.

After defining the objective the next step was to decide upon a method of approach. Due to the known fact that the study and evaluation of history is an ever-continuing process it was decided to examine a cross section of the available material.

It was felt that this cross section would give a positive indication of the general coverage and content of what has been written, and thereby provide a substantial basis upon which to make a critical analysis.

This cross section was based upon analysis of the material covering ten specific fields which pertain to the history of Armor in World War II. These fields were selected on the basis of their pertinence to subject, importance to the student of history and importance to the history of Armor. Individual committee members were assigned particular fields to analyze.

The fields selected were:

1. Employment of the tank-infantry team in the offense.
2. Employment of the tank-infantry team in the defense.
3. Employment of Armor in forests.
4. Employment of Armor in night operations.
5. Employment of armored units in cold weather operations.
6. Employment of light aircraft in armored units.
7. Organization of armored units.
8. Combat maintenance of armored units.
9. Development of the logistical organization of Armor.
10. The development of Armor during World War II.

Discussion of the writings concerned with these fields forms the body of the report. It also serves as a basis for the summary, conclusions, and recommendations at the close of the paper. The order in which they are listed has no bearing on their relative importance. Each chapter varies according to the amount of material available to the critic, and the manner in which the analysis is presented.

The overall impressions of the individual members of the committee are presented in the final section of the report. Based on the chapters which treat the ten fields of analysis, a summary,

observations, conclusions and recommendations are presented. The summary considers the various types of writing which constitute the history of Armor in World War II, evaluates them relatively and gives the reader a composite picture of the type and amount of material available. The conclusions discuss whether the overall coverage is adequate, where the emphasis has been placed, which subjects or types of writing have been properly treated or neglected and the possible reasons for the deficiencies noted. The recommendations present suggestions as to how the deficiencies may be corrected or prevented in the future.

CHAPTER 2

EMPLOYMENT OF THE TANK-INFANTRY TEAM IN THE OFFENSE

It was felt that in making an analysis of the writing which constitutes the history of Armor in World War II it was necessary to include the important subject of tank-infantry cooperation. It was known that a comparatively large amount has been written on the subject. Research in the field soon disclosed that, contrasted to most specific subjects, which concern Armor in World War II, the material on the tank-infantry team is reasonably well organized. In addition to the extensive data contained in the basic sources, such as the histories being prepared by the Chief of the Office of Military History, it was discovered that there are many other types of historical writing which contain important material on the subject.

The first source investigated was the various types of reports submitted by units during the war. These include after-action reports, operations reports, intelligence reports, unit journals, combat summaries and others. In these reports all phases of an action or operation are recorded in detail. Information on the development, organization and employment is to be found in this extensive mass of material. The data and information is there, but only the experienced historian, researcher, or military student is able to make much use of it. In most cases no specific reference is made to the team as such. It is the responsibility of the reader to use his knowledge and experience to recognize that the team had been organized and to follow its employment through the voluminous and detailed accounts. In addition to being detailed and involved, these reports vary greatly in quality. Some are well written, properly organized and to the point, while others are a conglomerate mass of poorly recorded data. Nonetheless, these reports provide the basic source for other types of writing. They are useful, in fact indispensable, to the historian or other person writing basic history, but are of little value to the average student or casual reader interested in the tank-infantry team.

The second type of writing surveyed was the volumes of history produced by the Office of the Chief of Military History. These histories are based on all of the documents which serve as source material on World War II. The historians have taken from this tremendous mass of material the authentic and specific details of the actions which took place. They have recorded them in a detailed semi-narrative form which provides a splendid basic history of the war. The action is normally recorded at division level with the "big picture" outlined as background material. When significant

to the particular action being described, detailed accounts of the actions of smaller units are described, down to and including the platoon. Within all of this is found material on specific subjects such as the employment of armored units. The information is there, but it is the responsibility of the reader to recognize it. In the case of the tank-infantry team there are numerous actions described in which the team was employed. The casual reader or inexperienced student, however, may never recognize it as such. The histories will teach him little about the team unless he has previous knowledge of its organization, missions and methods of employment. Thus, they represent only the first extremely important step in the recording of the history of World War II. The interpretation of the histories and other basic documents will result in the special studies of particular phases or aspects of the war such as the tank-infantry team in the offense.

Articles prepared for periodicals provide an excellent source of material concerning the tank-infantry team. They appear in the various military and so-called service journals such as "Military Review", "Armor" magazine and the "Combat Forces Journal". These articles are of two types, combat narratives and dissertations on the employment of the team. In both instances combat examples are used as a basis for the articles. It is felt that these articles are a very valuable contribution to the history of Armor in World War II. They give the reader an easily read piece of material based on a particular action or specific subject. Combat examples are provided and, in many cases, conclusions are drawn which the reader is free to accept or reject. In the event the author has interpreted the material in the form of conclusions or lessons learned the reader has something to accept and add to his store of knowledge on the subject. If he does not accept it he will have formed his own conclusions which may be equally as valuable.

Of the many excellent articles which have appeared in the service journals and military periodicals the most significant are discussed below.

Tanks With The Infantry Division by Lieutenant Colonel William D. Duncan, "Military Review", June 1949. This article discusses the tank-infantry team within the infantry division. The proper employment of the team in offensive action is described very clearly in a narrative discussion of an action in Germany during World War II. Diagrams and annotated aerial photographs add much to the value of the article. A valuable section of the paper is the summary. In this the author has complemented the recorded facts with several statements which constitute the lessons learned from the action described.

The American Infantry-Armor Team by Major General John W. O'Daniel, "Cavalry Journal", May-June 1946. This is an important

and significant article because the author is a widely experienced senior commander writing about a specific subject with which he is thoroughly familiar. In most cases such men do very little writing and that which they do produce is on a high level. As a result, the invaluable knowledge of specific subjects which they possess is lost, merely because it is never recorded.

In his article General O'Daniel discusses the entire field of tank-infantry cooperation with a short background on how the team was originally developed. He is specific on the more important aspects of the employment and training of the team. In addition he discusses early experiments with the team and how the chief difficulties encountered were overcome. Throughout the article it is stressed that the success of any tank-infantry team depends, to a large degree, on the completeness of the coordination and cooperation of the members of the team.

Tanks With Infantry by Major William R. Campbell, "Armored Cavalry Journal", September-October, 1947. In this article the author illustrates the employment of the tank-infantry team by a narrative of how the 745th Tank Battalion and 1st Infantry Division learned to fight together. He describes how cooperation was developed and the results of close teamwork. Major Campbell gives an excellent account of how the tanks were attached to infantry units and the special measures which had to be taken to insure proper coordination and cooperation between the two members of the team. In addition, he describes how the tanks were landed on the Normandy beachhead on D/1 and gave support to the infantry units during the ensuing breakout from the beaches. He next touched upon the difficult fighting in the hedgerow country. Here, additional training was required to insure proper employment of the team. Fighting in woods, attacks against fortified positions, river crossings and operations in built-up areas are all discussed with the emphasis on the tank-infantry team. It can readily be appreciated why this article is considered an outstanding contribution to the available material on the tank-infantry team and to the history of Armor in World War II.

Other articles which deal with the tank-infantry team in the offense are:

Captain Doughboy, Infantry-Tank Team Commander by Lieutenant Colonel George B. Pickett, "The Infantry School Quarterly", January 1951.

The Infantry-Tank Team In Jungle Operations by Lieutenant Colonel Wilbur C. Strand, "Cavalry Journal", March-April 1946.

Tanks and Infantry In Northern Luzon by Captain Peter Marusek, "Armored Cavalry Journal", July-August 1946.

Individual Tank-Infantry Communications by Captain James J. Butler, "Armored Cavalry Journal", July-August 1947.

Tanks and Infantry In Night Attacks by Lieutenant Colonel William D. Duncan, "Armored Cavalry Journal", January-February 1946.

Tank-Infantry Team In The Armored Division by Major Edward Boutz, "Cavalry Journal", May-June 1946.

As indicated by the titles, these articles discuss particular phases of the employment of the tank-infantry team. Each is well-organized and written in a manner which makes it a definite contribution to the history of Armor in World War II. These articles serve to give the student a more complete picture of the many special situations in which the team can be used and to broaden his knowledge of the subject as a whole. The casual reader will find them readable, interesting and informative.

There is something, however, which should be noted here. This is the limited number of articles devoted to this basic and important subject. The field is of sufficient breadth and there is ample source material to provide the basis for scores of articles of the type discussed above. It is unfortunate that more of such articles have not been written because they are the type of history which "gets to" the largest group of people. The wide circulation and easy accessibility of the periodicals in which they appear give the reader a ready source from which to gain knowledge on this and many subjects he is interested in. In addition, it is felt that this is one of the most effective ways in which the basic histories produced by the Office of the Chief of Military History can be analyzed and interpreted in a manner which will be of interest and value to the student and casual reader.

In searching for material on the tank-infantry team it was noted that there are literally hundreds of pamphlets which have been produced by the various agencies of the Armed Forces. These pamphlets cover a broad range of subjects and are of particular value in that the material which they record on specific subjects often adds to and enlarges upon that found in the official histories. They have been prepared, for the most part, by experts who possessed knowledge of the technical or detailed aspects of a particular subject. Also there are pamphlets which are the result of observers being sent to witness a particular action or development. An excellent example of this type of pamphlet is discussed below.

The British Capture Of Bardia, Information Bulletin #21, Military Intelligence Service, Washington, 1942. This is one of a series of bulletins produced by the Military Intelligence Service on a broad range of subjects. The subjects were selected for their

pertinence, and were based upon requests for special studies made by the various Army units and headquarters. This particular study was made in 1942 by a group of American observers with the British forces in North Africa. It is based upon their actual observations, comments of British officers and British operations orders. The pamphlet is written as a narrative describing the preparations for and the actual operations involved in the capture of Bardia in North Africa. Included in the sections of the report are: Events leading to the attack, plans for the attack, conduct of the attack, comments on lessons learned, and appendices which give the operations orders issued during the operation. Also included are diagrams of the area which illustrate the various terrain features and routes of attack. It can be seen from the manner in which the report is organized that it is a very well-rounded paper.

This pamphlet represents what is felt to be an outstanding contribution to the history of World War II. It is rather short and covers only one comparatively unimportant operation, but the manner in which the material is presented is exceptional. For the military student, casual reader, civilian and military, this is the most valuable method of recording history. The reader is able to read it as an interesting story and yet gather all of the pertinent facts and details. If he is interested in specific details, the operations orders in the appendix provide them. Upon completion of the reading of the report the reader has an excellent picture of the action involved and no doubt has had an opportunity to consider the proper or improper application of principles and techniques. This is the type of thing that should be done with all of the actions of World War II. Present them in a manner which is attractive and useful to the people who can benefit the most from the lessons contained in them.

The members of most of the armored divisions and many of the regiments and combat teams which participated in World War II have produced so-called unit histories. These histories were published, for the most part, during and shortly after the close of the war. There was no example after which they were modeled. Each unit association or commander made the decision as to the type of history desired. The result is a wide array of unit histories which range in quality from excellent to poor. Generally, they give a rather detailed narrative of the history of the unit which has been taken from the after-action and operations reports and supplemented by personal interviews and diaries.

Within these histories are found accounts of the various operations in which the unit was involved. The accounts generally present only the facts with no attempt being made to discuss the thoughts, ideas and principles involved. Also, little attempt is made to point out, specifically, the operations of a special type

operation such as the employment of the tank-infantry team. Descriptions of actions in which the team was involved are usually not identified as tank-infantry team actions. It remains with the reader to recognize the team and to draw his own conclusions as to the lessons learned. This may seem to be an easy thing to do, but it is not. The histories vary greatly in organization, quality, style and authenticity. In some of them the various operations are described in a factual interesting manner. In others the material is presented in a confused uninteresting way which makes it difficult for anyone, regardless of his knowledge and experience, to determine the lessons to be learned.

In this paper no attempt will be made to present an analysis of the many unit histories. It is felt that the student of Armor in World War II should be aware of the histories and acquainted with the fact that they do vary in quality. It is also important for him to know that some of the histories are being reproduced by experienced historians, and that the revised versions are excellent historical documents.

In The Armored School Library and Document Section there are many reports, documents, and papers which deal with the subject of the tank-infantry team. In almost all of them there is some information on the employment of the team in the offense. These papers include: Reports of boards, combat interviews, reports by combat units, and papers prepared by individuals who were interested in the subject and had the time and ability to put their thoughts in writing. The chief difficulty the reader will encounter in using these documents is the lack of organization of the material. Much of it is repetitious and often there is little or no documentation or authentication. Nevertheless, they do represent a definite contribution to history, and are of definite value to the researcher, historian or student studying a specific subject.

The following documents were found to contain the most valuable information on the employment of the tank-infantry team in the offense:

Facts Bearing On The Problem Of Tank-Infantry Cooperation And Coordination In The American Army In Current War, April 1945. As with many of these papers, no author, editor or responsible agency is given. The document is important, however, because it contains many pertinent comments by individuals who worked in or with the team in the field. The comments were made during the war when the information was still held firmly in the mind of the person interviewed. Most of the information concerns techniques and lessons learned; both of definite value to the student of armored warfare. The weakness of the paper lies, of course, in the lack of organization and authentication. There is no table of contents, chapter

organization, subject title, or index. As a result, the reader is compelled to dig through several pages of material to find what he is looking for. Reorganization of this series of reports would definitely increase their value to the reader.

Seminar On Armor - This report of a seminar held at Fort Knox in December 1949 is in direct contrast to the paper discussed above. It is organized and written in a manner which definitely makes it valuable as a historical document. One of the sections gives an excellent picture of the employment of the tank-infantry team. The comments and observations of experienced and qualified persons have been recorded very carefully, giving the student an excellent source of historical material. It is felt that the reports of the various seminars and conferences held on Armor are extremely important contributions to history. In this report there is material on the tank-infantry team as well as several other subjects concerning armor. This material contains the observations and lessons learned by various individuals during the period when they were actually performing the acts which are now regarded as history. The reports assume added significance when it is considered that the ideas and experiences of the majority of these men will perhaps never be recorded in any other place.

Tank-Infantry Coordination In The Mediterranean Theatre Of Operations - This paper is apparently a consolidation of the reports of subordinate units assigned to MTOUSA during the war. The subject is "combat lessons". There is much valuable material contained in the paper, but it suffers badly from a lack of organization. The person who desires to use the reports must dig through them with the hope that he will find the particular thing he is interested in. There is also a lack of editing. As a result of this, much of the material is repetitious. In spite of all this, the paper has value because it does record history. There is much information to be found in the reports which is of value to those concerned with the tank-infantry team.

Military Encyclopedia, Italian Campaign, Headquarters, 15th Army Group. This document is an outstanding example of a compilation of the lessons learned during combat operations. From the mass of reports submitted by subordinate units during the course of the war the 15th Army Group headquarters produced the excellent summaries contained in the encyclopedia. As its title connotes, the book covers a broad range of subjects which include all phases of the military operations conducted by the army group. It can readily be understood why this book is regarded as a definite contribution to the history of World War II. It does not record events or actions, but it does record lessons learned. This is what the military student needs, lessons based on wartime or combat experiences. It is indeed unfortunate that all of the higher headquarters did not produce a work similar to the 15th Army Group Encyclopedia.

Due to the limited use of armor in the Mediterranean Theatre the section on the tank-infantry team is comparatively brief. In spite of this it contains valuable information on the need for proper coordination and training of the team, standard operating procedures required, reasons for lack of proper coordination during the war and suggestions as to the proper organization and employment of the team. While this information is identical or similar to that found in other papers, it is significant that it appears here because it thereby indicates that certain principles and characteristics of the team were applicable in this theatre of operations as well as in others.

Tank-Infantry Cooperation - This report was written at The Armored School and is based on the documents on file there. No information is given as to which section of the school was responsible for its preparation. The paper is a compilation of a number of documents which contain information on the tank-infantry team. Most of these documents consist of reports by individuals or units who were actually engaged in operations in which the team was used. It covers all theatres of operations in which United States armored units were employed as well as employment of the tank-infantry team in the British, German, Russian and Japanese armies. This comparison of the team in the various armies is unique and quite valuable. As mentioned before in this paper, it is felt that this type of report is of definite value in that it brings together the most important facts contained in the numerous documents on the subject. It is not only of convenience to the reader, but it also gives him the assurance that at least one other person or agency has accepted the information as being pertinent and authentic.

Lessons Learned In Combat - This is a series of notes made by Major Lawrence V. Greene, Lieutenant Colonel Lydon B. Cole, Lieutenant Darwin K. Adams and Captain Carl E. Key, all members of the 1st Armored Division. The notes were made at the time of the Anzio Beachhead operation and were sent by Major Greene to his father, Major General Douglas T. Greene, then commanding the 16th Armored Division. The information contained in the notes is specific, well-organized and positive. It covers various phases and aspects of armored warfare to include the tank-infantry team. No particular organization is apparent, the officers reported on those things which were the most familiar and important to them. This gives a very interesting and pertinent group of notes. The one thing that the officers did make a definite attempt to point out was the need for more training of all types, particularly in operations which require special preparation and training.

The tank-infantry team is an excellent example of the type of training which they had reference to. Perhaps the same information as found in these notes can be found in other places, but the

significant factor lies in the fact that the material was not solicited or called for by a higher headquarters, it was submitted on the initiative of the officers who wrote it. There is very little of such material available. The result is that much of the history which could have been recorded has been lost. This is an unfortunate situation. The only method of preventing it in the future is to institute a program which will stimulate the interest of the soldier and assist him in his efforts to record history.

In addition to the documents discussed above there are many others which contain a limited amount of information on the tank-infantry team in the offense. They are excellent source documents of definite value to the student or researcher interested in a specific phase of the employment of armor. Considering the fact that the tank-infantry team was extensively employed in combat operations for the first time during World War II, it is felt that these documents provide a rather complete coverage of the subject. Also, it should be remembered that this survey has been limited to The Armored School. It is presumed that The Infantry School has an equally complete store of source documents where the emphasis has been placed on the infantry member of the team.

In addition to the more lucrative sources discussed above there are several other types of writing which contain historical data and information on the tank-infantry team. Included among these sources are the copyrighted books which deal with World War II, field manuals, lesson plans, manuscripts, scrapbooks, atlases, and pictorial reviews. The information contained varies from the broad picture to small amounts of unrelated detail. Some of them provide background or sidelight material which is important as an aid to the reader in gaining a well-rounded picture of the subject. The field manuals and lesson plans do not contain historical data or information as such, but when it is considered that these documents are a condensation of all the lessons learned in World War II they take on significance in the field of historical writing. The information contained in books is widely scattered and gives very little detail about specific subjects. The pictorial reviews and atlases, as the other material mentioned here, serve to complement the other types of historical writings and information.

SUMMARY AND CONCLUSIONS

During the years between World Wars I and II the long, and sometimes rather bitter, struggle between the supporters and non-supporters of a strong armored arm was in full swing. The supporters finally won and the foundation of the present Armored Force was laid. During these years of difficult yet extensive development of armored vehicles, tactics and techniques, it appears that only a few of the more visionary leaders of Armor recognized the need for close

cooperation between tanks and infantry. As a result, very little training was scheduled in which proper emphasis was placed on the training of tank-infantry teams.

Soon after the initial commitment of American units in North Africa it was fully realized that tanks and infantry units must work closely together in a fully coordinated team. It was also recognized that tank-infantry teams must have special training in cooperation, coordination, control, communications and various other matters which ensure perfect teamwork. This realization caused a flood of comment and requests for more training of the teams before units entered combat. Along with this came intense interest and great emphasis on the subject.

Inevitably, this emphasis resulted in a comparatively large amount of material being written on the tank-infantry team. At first this was found in the form of combat interviews, observer reports, and reports by field commanders. These documents cover all phases of the employment of the team, including the offense. They were eventually gathered in the various headquarters and schools and, at present, provide invaluable source material for the official histories, articles, unit histories, field manuals and other forms of writing on the history of Armor in World War II. There is little organization within these documents and many of them are repetitious. The student researcher, or historian must "dig" to find his material. An important contribution to history would be made if the various agencies and schools which hold these documents were to initiate projects to consolidate the material found in them.

As soon as the tank-infantry team began to plan an important part in the operations of World War II the fact was reflected by the entries in the various unit journals, operation and after-action reports. It is here that all the details of the various actions are recorded. By the end of the war a tremendous volume of this type of material was available for use as source material for the various types of writing which constitute the history of World War II. Within this is found the history of Armor and the material on the tank-infantry team.

As the war progressed and eventually ended there were various articles written on the team which were intended for publication in the various service journals. These articles are generally excellent. They contribute measurably to the picture of the employment of the team in the offense as well as many phases of its organization and use. It is felt that this type of writing is very important to the casual reader and inexperienced student. It provides him with an accessible source of material which is interesting as well as educational and informative. In addition, the articles generally interpret the segment of history they have recorded. This is done by the

use of background material, summaries, conclusions, recommendations, illustrations, diagrams, pictures and maps.

Since the close of the war the chief contributions to the writing concerning the employment of the tank-infantry team in the offense have appeared in the form of the official histories prepared by the Office of the Chief of Military History, the reports of various boards, and a few articles. The histories are intended to be the official history of the war and thus give a detailed, thoroughly documented account of the various operations and campaigns. By necessity the emphasis is at a high level, usually at the division. It can readily be seen from this that no specific subject or organization such as the tank-infantry team can be emphasized. For the student this is a basic history. If he has the time and ability he will recognize the material which concerns the subject he is interested in. Whether he is able to form a complete and well-rounded picture of that subject depends, once more, on his ability to interpret the basic histories and recognize the lessons to be learned.

The reports of boards which have surveyed the various phases and aspects of the employment of armor provide a contribution to history which cannot be overlooked. In several of these there are sections which deal with the tank-infantry team. The material is factual and detailed. It does not record historical data as such, but the remarks contained are based on the experience and knowledge of the members of the board. These officers were chosen on the basis of their knowledge and experience in the field. Their comments reflect the history which has been written as well as a large amount of that which has not been written.

CONCLUSIONS

In final summary of the material which is available at The Armored School on the subject of the employment of the tank-infantry team in the offense the following conclusions have been drawn:

1. That due to its prime importance in the field of employment of Armor the subject of the tank-infantry team has been comparatively well covered in the various types of historical writing.

2. That the subject is treated in all types of historical writing.

3. That the most valuable contributions are to be found in the official histories produced by the Department of the Army, articles appearing in the service journals and various documents held at the various headquarters and service schools.

4. That there is a definite need for a compilation of the documents held in the files of The Armored School to produce a paper which provides a thorough and complete study of the employment of the tank-infantry team.

5. That there is a need for a special study to be made which will cover all phases and aspects of the tank-infantry team during World War II.

RECOMMENDATIONS

1. That The Armored School initiate a request to the Office of the Chief of Military History for a special study to be made on the employment of the tank-infantry team in World War II.

2. That The Armored School make a study of the employment of the tank-infantry team in special operations.

3. That The Armored School institute a project which will insure the proper organization, editing and compilation of the various documents found in the document center on the subject of the tank-infantry team.

BIBLIOGRAPHY CHAPTER 2

Armor In Europe (Headquarters, 21st Army Group, Europe: 1944).

Armor, Report Of Army Field Forces Advisory Panel On Armor, (Washington: Headquarters, Army Field Forces, 1949).

Boutz, Edward, Major, "Tank-Infantry Team In The Armored Division," Cavalry Journal,LV, No. 6 (May-June 1946).

Butler, James, Capt., "Individual Tank-Infantry Communications," Armored Cavalry Journal, LVI, No. 4 (July-August 1947).

Campbell, Wm. R. Major, "Tanks With Infantry," Cavalry Journal, LVI, No. 5 (Sept-Oct 1947).

Carver, R.M.P., Lt. Col., "Tanks And Infantry," Military Review, XXXII, No. 2 (Feb 1952).

Crockett, James C., Col., "Armored Infantry In Armored Operations," Armored Cavalry Journal, LII, No. 1 (Jan-Feb 1943).

Facts Bearing On The Problem Of Tank-Infantry Cooperation and Coordination In American Army In Current War, (Fort Knox: The Armored School, April 1945).

Fact Sheet, 1st Armored Division, Microfilm File No. 296 Historical Division, Department of the Army (Washington: 1947).

Duncan, W. D., Lt. Col., "Tanks And Infantry In Night Attacks," Cavalry Journal, LVII, No. 1 (Jan-Feb 1948).

Duncan, W. D., Lt. Col., "Tanks With The Infantry Division", Military Review, XXIX, No. 4 (June 1949).

"From Normandy to Germany With The 3rd Armored Division," Cavalry Journal, LIV, No. 2 (March-April 1945).

Hastings, Henry S., Major, "Employment of Armored Infantry," Cavalry Journal, LV, No. 3 (May-June 1946)

History And Combat Experiences Of 6th Armored Infantry Battalion, 1st Armored Division, Microfilm File No. 314-317, Historical Division, Department of the Army (Washington: 1942-45).

"Cooperation Of Tanks With Infantry Divisions," History Of Armored Section, 12th Army Group (Europe: 1944).

Infantry-Tank Team, Lesson Plan CS 13.4001, The Armored School (Ft. Knox).

Infantry-Tank Teams, The Armored School (Ft Knox: 1946).

Marusek, Peter, Capt., "Tanks And Infantry In Northern Luzon," Armored Cavalry Journal, LV, No. 4 (July-Aug 1946).

O'Daniel, John, Maj. Gen., "The American Infantry-Armor Team," Cavalry Journal, LV, No. 3 (May-June 1946).

Picket, George G., Lt. Col., "Captain Doughboy-Infantry Tank Team Commander," The Infantry School Quarterly, XXXV, No. 1 (Jan 1951).

Military Encyclopedia, Italian Campaign, Headquarters 15th Army Group (Italy: 1944).

Small Unit Actions, Historical Division, Department of the Army (Washington: 1942).

Schull, Edson, Lt. Col., First Armored Division Report (February 1945).

Seminar On Armor (Fort Knox: Dec 1949).

Strand, Wilbur C., Lt. Col., "The Infantry-Tank Team In Jungle Operations," Cavalry Journal, LV, No. 2 (March-April 1946).

Swift, Eben F., Lt. Col., "Tanks Over The Mountains," Infantry Journal, LVII, No. 4 (Oct 1945).

Tank-Infantry Coordination In Mediterranean Theatre Of Operations, Headquqrters MTOUSA, 1944.

The Armored Conference, The Armored School (Ft Knox: 1946).

"The British Capture Of Bardia," Information Bulletin #21 (Washington: Military Intelligence Service, 1942).

Ward, Orlando, Maj. Gen., "The Tank-Infantry Section," Infantry Journal, LVII, No. 3 (Sept 1945).

CHAPTER 3

THE EMPLOYMENT OF THE TANK-INFANTRY TEAM IN DEFENSE

The question involved in this chapter is: "Has the data regarding the employment of the Tank-Infantry Team in defense during World War II been properly recorded?" It is felt that it is an important phase of armored warfare in spite of the fact that the role of the Tank-Infantry Team during World War II was in general one of attack, break-through and exploitation. In the future, circumstances may very well dictate that the team be used in the defense. There is a distinct need, therefore, that the lessons learned in this field during World War II be thoroughly and properly recorded. They should and will be used as a basis for instructing and planning for future operations.

In searching the various sources of historical material, it was found that most of the material on the subject is in after-action reports and research reports. Much of the most valuable material is found in the Research Reports prepared by the students of the Advanced Armor Officer's Course at Fort Knox, Kentucky.

"14th Armored Division At Hatten-Rittershoffen" by Committee No. 1, (The Armored School, May 1950). This report covers all phases of combat. The portion dealing with the Tank-Infantry Team in defense is thorough, factual and well-organized. It considers every phase of planning and execution of the defense down to the smallest details. All levels of command down to platoon are discussed, including the assignment of sectors of fire, avenues of approach, preparation of positions, routes of withdrawal, and secondary positions.

"Use of Armor in the Defense" by Committee No. 30, The Armored School (Fort Knox, Kentucky, May 1950). This report gives the reader a complete picture of an armored unit in the defense. It is very complete with all phases of the defense including logistics being considered and discussed. The Armored Commander on all levels of command is given an excellent pattern from which to solve problems involved in the planning, preparation and execution of a successful active defense. While there is little material in the report which deals directly with the Tank-Infantry Team, the reader is given a rather complete overall picture of the employment of Armor in the defense.

"Employment of Land Mines in the Armored Mobile Defense" by Committee No. 36 (The Armored School, Fort Knox, 1951-52). No paper on the Tank-Infantry Team in defense is complete without the mention of the very important phase of defense which deals with the handling of the mines and the laying of the mine fields. In this report all

phases of mine handling, laying and removal, are fully considered. It gives detailed accounts of the different types of patterns used in the laying of the field and the effectiveness of each pattern with regard to the defensive position. The effectiveness and necessity of using this weapon in the defense is brought out very well in this report.

Another rather limited source of material on the Tank-Infantry Team is the various documents which consist of combat interviews, studies made by combat units, and reports from the field. An example is a very short commentary on a single night engagement, which gives an excellent insight into the use of the Tank-Infantry Team in action against a determined attack. The paper points out a major deficiency in our present method of laying a gun on a moving target at night, and recommends a possible solution for overcoming this obstacle.

Lt. Robert M. Gerard's "Tank Fighter Team", gives the reader the opportunity to view the problems involved in a long continuous defensive action as seen through the eyes of the second in command. This illustrates what can happen to the team when it loses contact with the parent organization. The many special problems created by such a situation are fully described. The result is a very interesting and valuable paper on the Tank-Infantry Team.

"The Cooperation of Tanks with the Infantry Division." This paper, which deals with the British concepts of how the Tank-Infantry Team should operate, is an example of the type of paper which should be written by an American about American units. It gives the reader an account of the overall Tank-Infantry operation. The concepts as propounded in the writing are similar to those taught by the United States Armored Force. While this article deals with all phases of operation, the portion of defense is very well written and offers the reader ample opportunity to form his own conclusions as to the specific problems involved in each defense action.

"Report on Combat Experiences and Battle Lessons for Training Purposes." While this document covers all phases of action, one section gives some valuable information on the use of the Tank-Infantry Team in defense and retrograde movements. Each arm of the combined team is given specific missions with the work load being distributed evenly among the different groups.

The paper discusses the advantages of determining the vital areas in a defensive zone and then forming strong points on those areas. In spite of the fact that this paper is relatively short, it is definitely a contribution to the history of the Tank-Infantry Team and Armor as a whole.

SUMMARY

The bulk of the specific material on the subject of the Tank-Infantry Team in the defense is found in reports prepared by committees of students in the Armored Officer's Advanced Course at The Armored School. These reports are complete and well organized. They add materially to the History of Armor in World War II.

The basis for the reports mentioned above is the wide field of histories prepared by the Historical Division, Department of the Army, unit histories, after action reports and unit journals. These sources contain many isolated references to the Tank-Infantry Team which must be 'dug-out' and interpreted by the researcher or student.

In addition there are several documents written by various individuals which are based on combat experiences and interviews. These, too, provided background data for the research reports. The documents vary widely in length, quality and value. Individually they do not add greatly to the picture, but as a whole they are of definite value.

CONCLUSIONS

An analysis of the historical writings of the Tank-Infantry Team in the defense has indicated that the subject has been comparatively well covered. This is primarily due to the existence of reports prepared by committees of the Advanced Classes at The Armored School. These reports make this subject unique in that it is one of the very few specific subjects concerning the History of Armor in World War II which has been properly covered. Of course there are ample opportunities for expansion. A more complete analysis, interpretation, and summary of all the recorded actions which involved the Tank-Infantry Team in the defense would produce a study which would be an invaluable contribution to the history of Armor.

Finally, it must be remembered that the Tank-Infantry Team was first employed in combat during World War II, and that due to the rapid and continued advance of American armored units, it was seldom on the defense. As a result of this, the field is a narrow one and the amount of basic data necessarily limited. It is interesting and comforting to note that, as a result of research directed by The Armored School, the subject has been comparatively well covered.

BIBLIOGRAPHY FOR CHAPTER 3

Employment of Land Mines in the Armored Mobile Defense, a report prepared by Committee No. 36, The Armored School (Fort Knox: 1951-52).

14th Armored Division at Hatten-Rittenshaffen, a report prepared by Committee No. 1, The Armored School (Fort Knox: May 1950).

Gerard, Robert, Lt., Tank Fighter Teams, (Washington: Infantry Journal Inc., 1942).

Gottschall, Richard K., 1st Lt., "Tanks in Static Defense," Cavalry Journal, LIII, No. 5 (September-October 1944).

Notes on the El Alamein Battle, 31 August through 9 September 1942, after action report and battle orders (1942).

Oakes, Ramsay L., Capt., Night Defense Against Enemy Tanks and Infantry, an after action report (undated)

Report of Combat Experiences and Battle Lessons for Training Purpose, (June 14, 1943).

The Cooperation of Tanks with Infantry Division, authors unknown, (Place of publication unknown: May 1944)

Use of Armor in Defense, a report prepared by Committee No. 30, The Armored School (Fort Knox: May 1950).

CHAPTER 4

THE EMPLOYMENT OF ARMOR IN FORESTS

Upon approaching the task of making a critical analysis of the writing concerning the employment of armor in forests, an attempt was made to find the answer to the fundamental question of whether armor can be advantageously employed in forests and heavily wooded terrain. When the available papers treating the subject were assembled it was obvious that very little has been written on this phase of the employment of armor. It appeared that, to date, no attempt has been made to consolidate the available material on the subject and to produce a paper or series of papers which will cover it thoroughly. As a result of this initial observation it was decided that to find the answer to the question stated above, all types of historical writing would have to be searched and evaluated.

During the search it soon became evident that the bulk of the material on the subject is to be found in reports of various types and articles in military periodicals. The most significant of these reports and articles are discussed below. Other writings which give a limited amount of information on the subject, but which are not of particular value are discussed in general terms.

Armor In The Hurtgen Forest - Research Report of Committee Number 7, Officers Advanced Course, The Armored School, 1948-1949. This report is concerned with the operations of the armored units which were engaged in the Hurtgen Forest Campaign. In form it is what can best be described as a combined combat narrative and after-action report. It is written in a manner which gives the reader a complete picture of the action involved. In spite of the fact that the report is detailed and, in places, rather involved, the student will find it an excellent source of material on the subject of the employment of armor in forests. The casual reader will no doubt find the report rather difficult to follow because it is written for the student who is in search of material on a specific phase of the employment of armor.

In addition to the detailed account of the actions involved in the campaign, the report contains sections on the employment of tanks in forests in which specific principles are discussed. In this manner the committee has not only recorded a segment of history, but has listed and discussed the lessons learned. They have interpreted history by using incidents to demonstrate how the various tactical principles and techniques were employed. This is of particular value to the student.

The report also includes a summary of the campaign as well as conclusions drawn on the various phases of the employment of armor in forests. These sections are also of particular value because they are, in actuality, interpretations of the recorded facts which constitute history. These interpretations by a group of officers, some of whom have undoubtedly had combat experience with armored units, are of positive value as a contribution to the history of armor. They have studied this particular subject in detail and have come to conclusions which should be recognized as having authenticity and value.

The appendices of the report include terrain studies of The Hurtgen Forest area, United States order of battle, German order of battle and maps. The value of this supporting material is obvious. It is well presented and serves to round out the paper in a proper manner.

Combat Command "R", 5th Armored Division - Operations In The Hurtgen Forest by Captain Kenneth A. Peters. This is a monograph prepared by an officer while he was a student at The Armored School in 1946. As intended, it is a combat narrative written by an individual who was present during the action described. The reader is given a clear picture of the type of action which took place, the general employment of the units involved and the problems encountered. To round out his paper the author included several conclusions which are of interest to the reader as an interpretation of the small bit of history which has been described. While this monograph is comparatively well-written and properly organized, it is of limited value as a historical paper due to its brevity.

Attack Through Woods by Lieutenant Colonel C. H. Calais. This is a very short paper in which are listed many of the lessons learned by the 3rd Armored Division while operating in forests. No historical examples are discussed, but the paper is definitely of value because the material contained has been based directly on the observations made by various individuals while actually engaged in fighting in forests.

Forest Fighting by Lieutenant Colonel Milton L. Rosen. An excellent article by a combat veteran in which the subject of fighting in forests is covered from an infantry viewpoint. All phases are touched upon with the result that the reader is given an excellent picture of the techniques and problems involved in this type of fighting. In spite of the fact that there is only one short section devoted to the employment of armor, the article is of definite value to the members of armor. It gives a well-rounded picture of this type of action which, by its nature, demands special training and coordination between the various combat arms.

Perhaps the greatest importance of this article is that it serves as an excellent model upon which to write a similar article from the viewpoint of armor.

In addition to the reports and articles discussed above there are several other types of writing which contribute to the history of the employment of armor in forests in World War II. The various unit histories contain copious amounts of data and some narrative covering the engagements which involved fighting in forests. These histories, however, vary greatly in quality of writing, organization and authenticity. It can only be said, then, that they do represent a definite source of data on the subject, but that it is the responsibility of the reader to determine the value of the particular history he is reading.

The official history of World War II which is in the process of being prepared by the Office of the Chief of Military History also contains many excellent references to and accounts of armored units fighting in forests, but, in most cases, the data is rather fragmentary. When the series is completed there will undoubtedly be several detailed accounts of the various actions which took place in the forests of Europe. These accounts make no attempt to summarize or interpret the historical information and data given; that is left to the reader. The histories hold little interest for the casual reader, but they do represent an excellent source of well-organized, carefully edited material for the student of armor and armored warfare whether it be in forests or elsewhere.

Another source of purely factual historical data is the after-action reports, operations reports, intelligence reports, unit journal and combat summaries submitted by armored units during and after the war. It is these documents which form the basis for a large share of the history of the war. They contain large quantities of data on all subjects including the employment of armored units in forests. This data, however, is of value primarily to the historian, researcher or advanced student. To obtain the complete picture of an operation or any particular phase of it requires a large amount of time and considerable knowledge and ability on the part of the researcher.

There are also scattered combat interviews which touch upon the subject of armor in forests. They are of definite value as the recorded impressions of men who have first-hand knowledge of the subject. Many of these reports are, of course, contradictory due to the great variance in the circumstances involved in both the fighting and reporting. As a result, the reader must do his own editing and form his own impressions as to which is the most important and factual information. Unfortunately, many of

these interviews are not documented or authenticated in any way. They are merely pieces of paper found in a file drawer which may or may not have value. Unless edited, compiled and preserved in a more permanent form they will eventually cease to be of any great value as a source of historical data.

All other sources of historical material such as books, pamphlets, atlases and pictorial reviews contain a limited amount of material on the employment of armor in forests. This material serves chiefly as background or incidental information rather than specific data on the subject.

SUMMARY

In attempting to find the answer to the question of whether armor can be advantageously employed in forests it was noted, primarily, that the amount of material available on the subject is rather limited. The most complete paper was found in the form of a report prepared in 1948-1949 by Research Committee Number 7 of The Advanced Officers Course at The Armored School. This report is comparatively well-written, properly organized, factual and complete. It is a valuable contribution on the subject of the employment of armor in forests as well as to the history of armor in World War II.

The monograph on the subject, due to its very nature, is of limited value. A series of such papers, compiled, edited, summarized and evaluated would be of considerable value. Apparently no attempt has been made to exploit this excellent source of historical data.

There are two articles in military periodicals which contribute to the store of material on the subject. Both of these articles are excellent. They are very well written and of interest to the student and casual reader because at the end of each article the material is interpreted in the form of conclusions drawn by the author. Fortunately, in each case, the author is an experienced officer who has recorded a segment of history and has then gone on to point out the lessons learned.

In addition to the types of writing mentioned above, there are many historical writings which give facts and background material on the subject. Included in these writings are: Unit histories, official histories prepared by the Office of the Chief of Military History, various reports submitted by units in the field and intelligence reports. The unit histories vary greatly in quality and value. Each represents a contribution to the history or World War II and most of them contain some information on the employment of armor in forests.

The official histories are excellent overall accounts of the various campaigns and phases of the war. They give the reader a rather detailed picture of the action based, generally, at division level. Information on any specific subject such as the employment of armor in forests must be "dug out" by the interested person.

The various reports are extremely important as the basic source for almost all of the recorded history of the war. For the student or casual reader, however, they are generally too detailed and involved to be of much interest. All of the above sources might be regarded as basic material which records the facts of history, but makes no attempt to interpret it or point out lessons learned.

Field manuals, manuscripts, lesson plans and tactical problems used at The Armored School also contain information on the employment of armor in forests. This information is very limited and general in nature as contrasted to that available on other "special operations." Nevertheless, it is felt that this type of material has historical significance in that it is based almost entirely on the experiences of World War II.

Finally, the various books, pamphlets, pictorial histories and atlases contain a type of historical information which should not be overlooked. This information is of definite value in the rounding out of the complete picture of the war and its various phases and aspects.

CONCLUSIONS

The question of whether armor can be advantageously employed in forests was not fully answered. The material available indicated that it can be employed successfully, but that its use involves much special preparation and precautions. There is a fundamental need for more than the ordinary amount of coordination and cooperation between armor and the other combat arms; especially infantry. It appears, then, that there is a pressing need for a thorough study to be made of this subject.

For some reason, the subject of the employment of armor in wooded areas and forests has been avoided or at least given little significance. It is not within the scope of this paper to determine the reasons for this, but it should be pointed out that this is a type of special operation in which the United States Army may be involved for extensive periods. The fact that success in this type of operation has been limited in the past should not deter the planners from anticipating such action. It simply does not do to assume the position that we will not choose to fight in forests--we may be forced to! Every attempt

should be made to bring about a thorough understanding of the difficulties involved and methods to overcome them. A thorough study of the subject would provide a basis upon which to plan a training program. This program would place the proper emphasis on training of individuals and units for operations in forests. The foresight and preplanning involved in such action might very well be of prime importance during the campaigns and operations of the future.

RECOMMENDATIONS

1. That The Armored School prepare a complete study of the employment of armored units in forests during World War II.

2. That The Armored School initiate a request to the Office of the Chief of Military History for a special study to be made on the employment of armor in forests during World War II.

BIBLIOGRAPHY FOR CHAPTER 4

Armor In The Hurtgen Forest, a report prepared by Committee No. 7, The Armored School (Fort Knox: 1949)

Calais, C. H., Lt. Col., "Attack Through Woods", (Fort Knox: 1946)

"CCR - 5th Armored Division In Hurtgen Forest", (Fort Knox: 1946)

Peters, Kenneth A., Capt., "Combat Command "R", 5th Armored Division Operations In The Hurtgen Forest", (Fort Knox: 1946)

Rosen, Milton L., "Forest Fighting", Infantry Journal, LVI, No. 4 (April 1945).

CHAPTER 5

ARMOR IN NIGHT OPERATIONS

Most officers and non-commissioned officers of Armor rely chiefly on two sources for tactical doctrine concerning their arm. Any information which is found in the "Seventeen Series" field manuals and in the instructional material presented at The Armored School is normally accepted as being the last word on tactical operations with tanks. Because of this it is felt necessary to examine these sources and to compare them with other existing writings on the subject of Armor in night operations. In so doing it should be possible to determine whether or not current field manuals and instructional material are based on battle tested facts learned from World War II.

Tank Platoon And Tank Company, FM 17-32, contains a section devoted to the discussion of night operations with Armor. The writing found here presents a sound but general explanation of the techniques to be used when operating tanks at night. Paragraphs are devoted to the general purposes and characteristics of night attacks, the use of artificial illumination, conduct of the night attack, night attacks during exploitation and night counterattacks. While the manual does not attempt to explain why certain principles should be applied, the techniques it sets forth are in accord with other available information on night attacks with tanks during World War II.

The Armored School presents a unit of instruction on night attacks which consists of a one-hour conference followed by a three-hour practical exercise in the field. The problem is based on the employment of a reinforced tank battalion in a limited objective, night attack. While the tactical principles illustrated by this unit are sound, there are several deficiencies in the method of presentation. First, the conference consists of a general discussion of a highly specialized operation. This could possibly leave students with the impression that night operations with Armor are mere oddities and of slight importance. Secondly, the entire practical exercise is conducted during daylight. This procedure makes it extremely difficult for students to visualize the employment of all those extra control measures which are so vital to the successful execution of a night attack. Apparently The Armored School gives this subject a low priority.

Field manuals and lesson plans are based almost entirely on recorded historical fact and on the experiences of the personnel who write them. These publications, therefore, are excellent sources of doctrine and techniques. The amount of material contained in manuals

and lesson plans is an accurate indication of the amount of information available on any particular subject. A second factor which influences the content of manuals and lesson plans is the importance which current policy makers attach to a particular phase of tactics.

A study of current field manuals and lesson plans indicates that while the available material on night attacks with Armor is accurate as far as it goes, this material is scanty. In addition, it is apparent that current policy makers attach little importance to night operations with tanks. Both these factors are undoubtedly results of the hesitance of American "Tankers" to attack at night during World War II. The following discussion amplifies that lack of knowledge evidenced by American soldiers. It also discloses that other armies are not so prone to overlook the value of night attacks with Armor.

There are several documents on the subject which were written by American authors. Some of them, still highly classified, pertain mostly to technical developments made during and after World War II. Other documents cover principles of employment on various levels of command. Some of these writings are well authenticated and thorough; others are monographs and unidentified combat reports. Typical examples of the material available follow.

Night Fighting With Tanks produced by Hq., 1st U. S. Army in 1945 illustrates, by use of combat examples, the employment of a reinforced tank company in the night attack. The material found in this document is interesting and presents some sound tactical principles. Unfortunately, the author is unidentified, and there is no explanation of the processes he used to gain his information. Since it is impossible to determine whether the lessons set forth are based on eye witness accounts or on hearsay, the validity of this writing is open to question.

Armor In The Night Attack, published in April 1952 by Committee #33, Officers' Advanced Class, The Armored School, is an outstanding example of well documented, valuable writing by American authors. The committee approaches the subject of Armor in night operations by illustrating those principles stated in existing field manuals with combat examples from World War II. In addition, the writers draw conclusions from the historical examples they use and from these conclusions derive tactical lessons. This work is typical of the kind of writing which is needed to formulate a background for doctrine. At present such examples are all too rare.

Apparently the authors of Armor In The Night Attack felt that the role of Armor in night operations has been largely overlooked. They sum up this neglect with the following comment: "Night Attacks with Armor are not a familiar thing to the American 'Tanker' because

they have rarely been employed." This rarity becomes increasingly obvious to the student as he examines both the official and unofficial records of the war. As an example, the 104th Infantry Division, an organization famous for its night operations, apparently never employed its attached tank battalion during those engagements. This is the impression gained when reading the Unit History of that division. The publication fails to mention any after dark operation in which tanks were used.

Night Attacks, The Effect In World War II is a monograph which was prepared by Capt. Albert B. Landis in 1947. He describes several night attacks which were executed by Armor. Among these were operations by CCA, 2nd Armored Division and the 28th Squadron, 6th Cavalry Group. This monograph is constructed generally along the same lines as the committee report described above although it is less detailed. In it the author points out the necessity for the employment of Armor at night during pursuit and exploitation. He emphasizes this necessity with the following quotation:

> "Night attacks by the team should be stressed. If conditions permit, our forces should attack twenty-four hours a day: the necessary rest to be obtained by rotation of units. Rest is relative- food and sleep for the advancing soldier is victories. Once the enemy has been jolted off balance, everything is to be gained by maintaining relentless and unceasing pressure."

While this comment may be a little overdramatic, the author's point is well taken. No pursuit or exploitation is of value if it is to be broken off at sundown. It is unfortunate that more officers do not share Capt. Landis's enthusiasm. His paper, while limited in scope, is of definite value to the student of Armor in the night attack.

While American military authors have been generally reluctant to comment on this subject, the Historical Division, Department of the Army, has not ignored it. The historians in that organization have long realized the importance of collecting and preserving the experiences of the Germans in their battles against the Russians. There is much valuable material to be found in the records of those struggles. The student of Armor will do well to study those publications of the Historical Division which are related to the employment of tanks. A good example of these writings follows.

Russian Combat Methods in World War II devotes several pages to the description of tank battles conducted by the Red Army and the Germans. The depiction of a battle which occurred near Lyobotin shows a Russian tank army in the night attack. The fantastic magnitude of this operation is apparent in the following quotation from a German observer: "The thunderous roll turned into a din like the crescendo

of kettle drums as the two main forces clashed. Gun flashes from all around ripped the darkness at night throughout an extensive area. For miles armor piercing projectiles whizzed into the night in all directions."

Another article in this publication is devoted to a small scale tank-infantry night attack which took place southeast of Uzlovoya. The account of this engagement, while not so vivid as the one above, is of more direct value to the American "Tanker". The action is more nearly on the scale used in American tank attacks at night. It is worthy of note that the techniques employed by the Red Army during this action were identical to those advocated in FM 17-32.

Several of the high commanders of World War II have published memoirs of their campaigns. Since these writings are all on a high level, there is little direct information concerning night attacks to be found in them. Two American commanders, however, did disclose that they realized the need for a thorough understanding of these operations.

War As I Knew It by Gen. George S. Patton, Jr., contains this pointed observation: "Soldiers must be taught to move and fight at night. This is becoming more and more imperative, and it does not mean to make an approach march at night. It means to conduct lethal operations in the dark."

A Soldier's Story by Gen. Omar N. Bradley testifies, through combat example, to the value of making a direct frontal assault during night operations. This maneuver is now accepted doctrine, but apparently its value was not completely understood during the earlier days of World War II. Gen. Bradley tells of a battalion of the 34th Division which, while fighting in North Africa, attempted to make a wide envelopment during a night attack. After several hours of floundering around in the dark, this battalion made a spirited attack on its own assembly area. The moral of this story is equally applicable to Armor.

It is in the field of periodicals that the scarcity of material from American sources is most pronounced. Although both The Military Review and The Cavalry Journal have from time to time published articles on the employment of Armor at night, for the most part the writers of these pieces have been foreign soldiers. Luckily, American editors, if not American authors, have realized the value of such writing. Without foreign contributions the periodicals mentioned above would be practically devoid of any material on the subject.

"Tanks and Infantry in Night Attacks" by Lt. Col. W. D. Duncan, an American officer, is one excellent exception to the scarcity mentioned above. This author is apparently one of the few who fully appreciate the necessity for training in night operations and the advantages to be gained by the judicious use of night attacks. In this

article he expresses his views on the training necessary to achieve proficiency in night operations. Also, by drawing on combat examples, he illustrates the various principles pertaining to the employment of armor at night. Lt. Col. Duncan chooses for his illustration a night attack conducted by units of the 30th Division and the 743rd Tank Battalion.

This is the only article of its type by an American to be found in The Cavalry Journal. Apparently the editor of The Military Review also recognized its importance since it also appeared in that publication. Because of its excellence as well as its rarity, this writing is a splendid example of what is needed. It cannot be overlooked as a contribution to the History of Armor in World War II.

Further examination of periodicals discloses that while American authors have overlooked this subject, such is not the case among foreign military writers. Both The Military Review and The Cavalry Journal contain articles on Armor in the night attack which were written by Russians. Most of these contributions are general in nature and hence of little tactical value. Also, their authenticity is dubious since there is no way of identifying the authors. One article, however, is worthy of special mention in that it illustrates a method of writing which urgently needs exploitation by American military writers.

Tanks in Night Combat by Nicholas Corotneff appeared in The Cavalry Journal in 1943. In it the author describes two night actions: one conducted by a reinforced tank battalion, the other by a reinforced tank platoon. The actions are clearly described and the lessons to be learned from them are discussed in textbook fashion. Making due allowances for national pride and possible injections of propaganda this article retains some value as a contribution to the History of Armor in that it gives a clear picture of the Russian methods of tank employment in night operations. Its greatest value, however, is not in its own content but because it makes an excellent guide for similar types of writing by American authors.

The lack of writing on Armor in night attacks would lose some of its importance if the United States Army could be guaranteed that its future opponents will always be weaker in manpower and airpower than its own forces. Under such conditions night attacks could possibly be considered novelties rather than necessities. Unfortunately, no such guarantees are available. It is certainly probable that in event of a conflict in Europe, American soldiers will find themselves struggling against an enemy who has final and absolute manpower superiority and who also has, at least initially, air superiority. Against such an opponent the principle of surprise will be a paramount consideration in all tactical operations. Night attacks with armor must help to secure this vital element.

Two more possible sources remain to be discussed, After Action Reports and Unit Histories. No one can deny that these publications contain a wealth of potentially valuable material. Yet in their standard forms they are of little worth as contributions to military history. This contention is based on the difficulty and danger involved in extracting lessons from them. As an example, in order for a student to determine the available material on Armor in night operations, he would first have to discover, probably from some outside source, when such actions occurred and what units participated in them. Armed with this data a dilligent student might be able to extract tactical lessons from After Action Reports or Unit Histories.

An additional factor must be considered. There is a danger that the inexperienced student might completely misconstrue what he finds. After Action Reports infer rather than state lessons. On one occasion tactical principles might be violated with impunity yet the battle still be won. At another time complete adherence to principles might not prevent defeat. After Action Reports and Unit Histories, however, make no distinction between violation and obedience. Only the experienced military historian would be able to do this and to properly extract lessons from the reports or histories.

SUMMARY AND CONCLUSIONS

Among documents at The Armored School the best material on this subject is Armor In The Night Attack, a committee report by students of the Officers' Advanced Class. This writing presents a complete discussion of Armor in night operations. It not only states principles but employs historical examples from World War II to justify these principles. Writings of this type are valuable contributions to military history; they are lucid and thorough, and the lessons they derive are based on sound historical fact. It is a pity that this report is such a rare example.

The work done by the Historical Division, Department of the Army, is also worthy of special mention. While this organization has not to date written a paper specifically devoted to Armor in the night attack, Russian Combat Methods in World War II does present material on that subject which will benefit the student. It is felt that the writings of the Historical Division should receive more publicity than has yet been granted them. An examination of the publications of this organization indicates that valuable military history is being produced; this fact should be more widely emphasized by the army.

In addition to these writings there are, of course, other documents on hand at The Armored School. Most of these are classified and deal with technological developments to a large extent. While such information is of some historical value, these documents are hardly

worth any special study, especially since most of the material they contain has since become common knowledge. Certainly as long as these writings remain inaccessible because of their security classifications, they will contribute little to military history.

Periodicals render some service to the History of Armor by their collection of material from foreign sources. An outstanding American exception to the general scarcity of home-produced articles is "Tanks and Infantry in Night Attacks". This contribution appeared in two service magazines and is worthy of note not only because of its rarity but because of the sound factual information it contains. With this exception most of the writing on this subject was produced by foreign authors.

Neither After Action Reports nor Unit Histories, as such, are worthy contributions to the History of Armor. The necessary information is there, but it must be processed to be of value. This processing should be done by experienced historians who will attack these writings with the idea in mind of deriving lessons from them. Once this is done and the results made available to military readers, the reports and histories can then occupy their proper places as contributions to military history.

The writings of high commanders have had little to add to the subject of Armor in the night attack. This is not surprising when the levels of these writings are considered. Few General Officers could afford to spend time on the minutiae of night attacks; that they recognize, as Patton did, the necessity for such operations is sufficient. The material produced by these authors is certainly of value to military history in general, but it will have little influence on specific types of operations.

FM 17-32, the only field manual which touches on the subject, is sound as far as it goes. It is felt, however, that more detailed material should be presented in this manual. It is the principle source of doctrine and techniques as far as the lower levels of command are concerned. The soldier in the field relies chiefly on this manual to supply him with immediate answers to immediate questions. For this reason FM 17-32 should be expanded to include all the pertinent information presently available on Armor in night operations.

A study of Armor in night operations as based on the History of World War II indicates several conclusions. First, Armor was seldom employed by American "Tankers" in the night attack. Second, there is little material available concerning those few occasions when it was employed. Third, the forgers of today's policy and doctrine apparently attach little importance to such operations. Finally, it is obvious that foreign armies believe night operations to be worthy of special study.

It is felt that this neglect may prove to be dangerously shortsighted. In the future American Armor can ill afford to overlook the advantages of surprise. Against any enemy surprise will help reduce casualties; against a strong enemy surprise is essential to success. One of the surest methods of obtaining this principle is the employment of tanks in the night attack. It is indeed a misfortune that American commanders will have so little background material to study.

RECOMMENDATIONS

In order to overcome the present deficiencies with respect to the History of Armor in World War II, it is recommended that the Historical Division, Department of the Army, initiate a special project. That organization should undertake a thorough study of the operations of Armor in that conflict and from this study arrive at conclusions on the value of present techniques and doctrine. The results of this study, complete with historical examples, should be published in pamphlet form and made available to all military students.

To be of any worth historical writings must convey lessons from the past to the students of the future. This is particularly true of that history which concerns military operations. Few soldiers study history merely to gain general information; they do so to learn lessons which will increase their professional knowledge. Because of this it is believed that pamphlets on tactical lessons including historical illustrations of those lessons would be of great value to future generations of American Soldiers.

An examination of the material published by the Historical Division proves that this group is capable of producing the desired writings. The material on hand is well written, accurate and completely devoid of any attempts to sermonize. Since the average professional soldier is untrained for this type of writing, it is believed that the employment of experienced historians is the only solution to the problem. In view of the urgent need for work of this nature, it is recommended that some such project be initiated as soon as possible.

BIBLIOGRAPHY FOR CHAPTER 5

Bradley, Omar N., A Soldier's Story, (New York: Henry Holt & Co., 1951).

Corotneff, Nicholas, "Tanks In Night Combat," The Cavalry Journal, LII, No. 4 (July - August 1943).

Duncan, W. D., "Tanks and Infantry In Night Attacks," The Military Review, XXVII, No. 7 (October 1947) and The Armored Cavalry Journal, LVII, No. 7 (January - February 1948).

Fuller, J. F. C., Armored Warfare, (Harrisburg: Military Service Publishing Co., 1943).

Korzhov, N., "Attack of a Reinforced Infantry Company Against a Strong Point At Night," Intelligence Report, Intelligence Department, U. S. Army (Washington: Undated).

Landis, Albert B., Night Attacks, the Effect in World War II, (Fort Knox: The Armored School, February 1947).

Night Fighting, Armor in the Night Attack, a report prepared by Committee #33, The Armored School (Fort Knox: May 1952).

Night Fighting With Tanks, (APO 230: Headquarters 1st Army, 17 April 1945).

Night Vision and Training in the Army Ground Forces, a report prepared by the Medical Research Laboratory (Fort Knox: August 1945).

Night Operations, The Armored School (Fort Knox: March 1945).

Patton, George S., Jr., War As I Knew It, (Boston: Houghton Mifflin Co., 1947).

Ribakov, Peter, "Soviet Night Attacks, Tanks," The Cavalry Journal, LIV, No. 1 (January - February 1943).

Rodin, A., "Tank Operations In The Enemy Rear," The Cavalry Journal, LII, No. 1 (January - February 1943).

Russian Combat Methods in World War II, Department of the Army (Washington: 1950).

"Soviet Night Attacks," The Military Review, XXX, No. 10 (January 1951).

Tank Platoon And Tank Company, FM 17-32 (Washington: Department of the Army, March 1950).

Wanty, E., "Night Operations: Surprise and Mobility in Defense," The Military Review, XXXI, No. 12 (March 1952).

CHAPTER 6

ARMOR IN COLD WEATHER OPERATIONS

To make a critical analysis of the historical material available on the subject of Armor in cold weather operations it was necessary to first choose a basic reference point. The most logical approach was believed to be an examination of current field manuals on this subject. These publications contain specific details based on the experiences of a large number of individuals, and more important, they are based on the entire field of historical writing. Therefore, by evaluating these manuals and by comparing the historical material available in them with that found in various papers on the subject, it was possible to determine the value of these publications as contributions to the History of Armor in World War II. For that reason those manuals which contain information on the employment of Armor in cold weather operations are discussed below.

Operations In The Arctic, FM 31-71, is a basic manual on the tactical employment of the combat arms under conditions of extreme cold. With respect to Armor the manual describes in detail such subjects as tank trafficability, ice crossings with Armor and vehicular maintenance. In addition, it discusses the planning and preparations necessary for the successful operations of Armored units under arctic conditions.

FM 31-71 is valuable as a basic reference on the subject. From it the reader gains a knowledge of the tremendous problems encountered when employing tanks in winter. In addition to the presentation of these problems the manual points out some of the solutions which may be employed to surmount them.

The Basic Arctic Manual, Draft FM 31-70, is of value only as a reference on the subject of individual survival in the arctic. It contains nothing of interest concerning the use of tanks. Because this manual does present a picture of the arctic climate, it may be considered as being of some worth as background material. It adds nothing, however, to the material concerning Armor which can be found in FM 31-71.

Operations In Snow And Extreme Cold, FM 70-15, is primarily a manual devoted to the training and employment of ski troops. As far as the student of Armor is concerned, this manual is in the same class as FM 31-70. It is of slight value as background material but presents nothing of interest on Armor in cold weather operations.

Tank Platoon and Tank Company, FM 17-32, is recognized by most students of Armor as being the "Bible" of small unit tactics. This manual discusses in great detail practically every phase of the employment of the tank platoon and company. Those who use it as a reference expect to find information on every subject related to the tactical operation of tanks. Unfortunately, the reader who expects to gain information concerning the employment of tanks in cold weather will be disappointed.

The manual paints the picture of cold weather operations with too broad a brush. Such an approach is dangerously insufficient. In the first place, the readers of FM 17-32 are not concerned with generalities; they need specific details concerning the employment of their tank, their platoon or their company. Secondly, the operation of tanks in cold weather is highly specialized and calls for expert knowledge of exactly how the weather is going to effect the employment of full-tracked vehicles. The new platoon leader or non-commissioned officer requires a clear, detailed account of how to employ Armor in cold weather fighting. The manual does not fulfill this need. Field manuals, it is true, are supposed to be guides for clear thinking and not substitutes for it, but in order to be good guides they must contain enough information to enable the reader to get a clear picture. In this respect FM 17-32 is weak.

An examination of the documents concerning employment of Armor in cold weather discloses a clue to the scarcity of material on the subject to be found in existing field manuals. Official writings by Americans are few. This is indeed disconcerting in view of the fact that United States Armored Divisions and smaller Armored units played a vital role in the winter warfare which took place in Europe. True, some information on the subject can be gleaned from After Action Reports and Unit Histories, but the fact remains that all too few American military writers have chosen to discuss the lessons learned concerning employment of tanks in winter operations. An analysis of the more important, unclassified documents on this subject follows.

Armor Under Adverse Conditions, a report by Committee #3, Officers' Advance Class, The Armored School, 1948-49, is an outstanding paper available at The Armored School on the subject of Armor in cold weather operations. This report discusses in detail the employment of the 2nd and 3rd Armored Divisions during the Ardennes Campaign. It views the operations of these divisions from the standpoints of terrain, weather and the enemy situation with proper emphasis on the last two. More important, the report considers the operation of Armor at all levels of command. In addition, an account of the "Battle of the Bulge" is given from the enemy viewpoint. Finally, the lessons to be learned on the employment of tanks under such conditions are enumerated and discussed at length.

Some idea of the importance attached by this committe to a knowledge of the techniques of cold weather operations can be gained from the following quotation.

"In the study of the facts surrounding the employment of two United States Armored Divisions which fought in the Ardennes Campaign, two circumstances stand out clearly. These are: the severity of the weather conditions and the intensity of confusion which existed throughout the campaign."

This report is the most fully documented, unclassified document written by American military writers on the subject of Armor in winter. Other writings concerning the training, tactical employment and possible effects of recent developments with respect to the operation of tanks in cold weather do exist at The Armored School. Each of these documents does contain information of value to the student of Armored Warfare. Since they are classified, however, they are not available to the average reader stationed away from Fort Knox. Thus, they cannot be considered as general contributions to military history. At some future date when these documents are studied, evaluated and their contents made available to all military students, they may become valuable additions to the lessons learned from World War II, but at present they contribute nothing because of their inaccessibility.

In addition to the writings mentioned above there is an article by Lt. Col. Delk M. Oden, Armor, which appeared in the Military Review in January 1948. This contribution will be discussed in more detail later in the chapter.

Because of the general sparsity of material from American sources on the employment of Armor in cold weather operations, and more important, because of dire indications that American "Tankers" might soon be in urgent need of additional information on this subject, it was felt that an examination and discussion of the available foreign writings was necessary. It should be obvious, even to the casual observer, that American soldiers might well expect to find themselves operating under extreme winter or semi-arctic conditions. The role of the tank in such operations cannot be ignored. Its value has been proven in combat. Since American military writers have almost completely neglected the subject of Armor in cold weather operations, it becomes necessary to explore foreign sources.

Two experts in the field of operating tanks in winter are, of course, the Russians and the Germans. They both employed Armor on a far larger scale in their battles against each other than did any of the other participants in World War II. Some of the most critical of their battles in Russia took place in the winter, and it is fortunate that accounts of these engagements have fallen into American hands.

The Germans began the campaign in Russia as rank amateurs in winter warfare. In fact, it was only because of poor planning and poor logistical support that they became engaged in cold weather operations at all. Had everything gone as scheduled, they would have conquered Russia before the onset of winter. Due to planning and logistical fiascos, however, the amateurs were forced either to become experts or die.

The Soviets, on the other hand, were by birth and training experts on cold weather operations. They thoroughly understood both the capabilities and limitations of tank employment in winter. Their tracks were specifically designed to enhance mobility over ice and snow. Also, of course, they were keenly aware of the terrific damage inflicted on German morale by a climate for which the invaders were ill prepared. In short, the Red Army possessed all the traditional advantages of the defender.

The battles fought in Russia were engagements between military giants. On one side stood the Soviets possessing a terrific advantage which their opponents almost succeeded in overcoming. On the other side were the Germans who, though they failed in their mission, made monumental achievements by their struggles. The fact that they almost defeated the Red Army is a lasting tribute to their military ability. Thus, lessons based on the battles between those two opponents are of great worth. They can be founded on hard fact, not theory, conjecture or experiment.

Now that our former allies are potential enemies, it is doubtful that they can be counted on in the future to furnish much material on the subject of cold weather operations. There are, to be sure, several articles by Soviet authors which have been published in American military periodicals. Several of these are discussed later in this chapter. In addition, a few reports from attaches and deserters are on hand. In general, however, it must be said that Russian sources of information on winter warfare are scarce.

Fortunately, a fruitful source of material on the subject is still available and is presently being exploited. This source is the large number of German soldiers of all grades who fought on the Eastern Front during World War II and who now reside in the Allied Zones of Germany. Were it not for the cooperation of some of these men, the student of Armor in cold weather operations would find himself in difficult straits. Due to the foresightedness of a few American soldiers, however, the cooperation of our late enemies has been obtained, and the lessons learned from them are being preserved. The best of these documents available at The Armored School are discussed below.

Warfare In the Far North by Lt. Gen. (Dr.) Waldemar Erfurth might at first glance be considered useless by the student of Armor. The report deals primarily with Artillery and Infantry training for operations in cold weather. It presents no tactical lessons for Armor but is valuable even so. This is the only available article which thoroughly discusses the vital problem of morale during combat under cold weather conditions. The author devotes a great deal of space to describing that brutal impact with which the monotonous, snow-covered wastelands of the North beat down the soldier from temperate zones. This article also points out that the natives of such regions thrive on the same limitless loneliness which drives invaders distracted. While the problem has no direct relations to tactics, it is one with which every commander should become familiar. This is particularly true of the American leader whose natively gregarious troops might be expected to react even more violently against Arctic conditions than did the Germans.

Combat In Deep Snow by Dr. Lothar Rendulic (Gen. Oberst) is also of some value to the American "Tanker" who is interested in the employment of Armor in Russia. This author points out the superiority of the Russian T-34 Tank over the German Panzer with respect to mobility in deep snow. While Gen. Rendulic is not directly concerned with describing the operation of Armor, he does that arm some service by illustrating the Soviet "Tanker's" view of winter as an advantage rather than an obstacle.

Effects of Climate on Combat in European Russia, a Department of the Army Historical Study, is a good source for some of the broader points of Armor doctrine of winter employment. It discusses at great length the various seasons in European Russia and the effect of each on mobility. This writing is meaningful to the American student because it enables him to visualize a climate which is far more severe than his own. The article also illustrates the effect of such a climate on routes of communication. This is a factor which the American, accustomed as he is to plentiful all-weather roads, might be inclined to overlook in his study of Russia. For these reasons the work is of value to the student of Armor in cold weather operations even though it does not discuss the tactical employment of tanks.

Panzer Leader by Gen. Heinz Guderian is perhaps the most famous of all the German books which deal with the operation of Armor during World War II. With respect to Armor it is equal to if not superior to Patton's War As I Knew It in value. Guderian's book should be required reading for every American officer, not merely because of its historical value but because of the splendid insight it gives into the character of a great military leader. The study of Guderian the man is even more fascinating than the study of Guderian the tactician.

Guderian is perhaps the greatest living expert outside Russia on the subject of Armor in cold weather operations. The lessons from his book are based on hard, bitter, personal knowledge gained from fighting the "Reds" at their best and their worst. True, in his book the author does not concern himself with the employment of small units; his outlook, naturally enough, is far broader. Yet he knew the problems of the small units for they became his problems. The portion of his book which deals with Russia describes his conscientious struggles to overcome those problems. For that reason the book is of military as well as inspirational value.

Guderian focuses the attention of every military reader on the most difficult problem of all in winter operations with Armor, that of logistics. He pounds home again and again the fact that under such conditions any commander, regardless of his tactical brilliance, is foredoomed to failure unless he keeps his lines of communications open and unless the supplies flow freely. The reader immediately realizes that an Armor commander is haunted by twin spectres in winter. One is the urgent need for additional equipment and supplies; the other is the difficulty of obtaining these needs.

While reading Panzer Leader the military student learns to respect the Russian Winter. He becomes aware of the tremendous problems of logistics and morale. He learns to appreciate the necessity for freedom of action on the part of small unit leaders, and he learns the grim misery inflicted on combat troops when higher headquarters sit back and try to control such operations from "ivory towers". For these reasons the value of Panzer Leader as a contribution to the History of Armor in World War II cannot be overstressed. It is unfortunate that some American author has not achieved this level.

Other sources, After Action Reports and Unit Histories, have not yet been discussed. It cannot be denied, of course, that among them can be found a plentiful supply of material on the subject of Armor in cold weather operations. Because of the structure of these reports and histories, however, it is exceedingly difficult to distill any tactical lessons from them. In order to do so the student must first discover what units participated in cold weather operations. Next he has to determine the dates on which such actions occurred. After doing all this the student must wade through a maze of operations orders, troop lists and other irrelevant details in order to learn what problems were met and how they were overcome. Only the most ardent military researcher would attempt such a feat. Even if all this is accomplished, there is always a danger that the material found might be misinterpreted. Unit Histories and After Action Reports usually infer rather than state

tactical lessons. Their emphasis is on the "Who" and "When" rather than on the "How" or "Why".

For these reasons Unit Histories and After Action Reports, as such, cannot rightfully be considered as contributions to the History of Armor in World War II. They will be of value in this respect only after experts study, evaluate and present the lessons derived from them in some usable form.

From time to time military periodicals publish articles which exemplify the history that can be manufactured from After Action Reports and Unit Histories. Because of this such publications do measurably contribute to military history. In addition, periodicals are valuable vehicles for conveying military history because they reach a far greater portion of the reading public than do either After Action Reports, Unit Histories or documents. True, some of the articles appearing in these publications are not authenticated. Also, some of them are written by authors who are more interested in proving some personal point of honor than in producing tactical lessons. In spite of these drawbacks, however, periodicals cannot be overlooked as potential sources of military history.

A search of the periodicals for lessons on Armor in cold weather operations immediately discloses one fact. American authors have been remiss. An examination of many issues of The Military Review, The Cavalry Journal and Armor produced only one article on this subject by an American.

"The 4th Armored Division in the Relief of Bastogne" by Lt. Co., Delk M. Oden was published in the January 1948 issue of The Military Review. Unfortunately for the study of Armor in cold weather operations this author was primarily concerned with describing the methods employed by the 4th Armored Division in effecting the relief of Bastogne. He touches only casually on the problems imposed by snow and ice and how the 4th Armored surmounted these problems. It would be unfair to criticize Lt. Col. Oden for such an omission since he had another purpose in mind. The article would have been a better contribution to history, however, had he made some attempt to extract lessons for Armor in cold weather from the described operation.

A unique aspect of periodicals is the relatively plentiful supply of contributions from Russian authors. Some of these are articles which were sent in during the friendlier days of 1941-43. Others are writings, mostly of a later vintage, which have been extracted from current foreign military digests. It is some comfort to note that although American military writers have been reluctant

to contribute the lessons they have learned, American military editors have had the wisdom to use whatever material they could find.

Obviously there is no check on the reliability of these Russian writings. It would be dangerous to assume either that they present tactical lessons which the U.S. Army should blindly accept or that they necessarily express current Red Army doctrine. The most logical approach is to examine them in the light of other available information on the subject, to accept those lessons which do not conflict and to reserve judgement on any material which is questionable. In any event, regarless of their authenticity, these articles do present food for thought to the student of Armor in cold weather operations.

"Red Army Tanks in Winter" by N. Gerotneff was published in The Cavalry Journal in February 1943. This article is primarily devoted to a discussion of the techniques employed by Red Army "Tankers" in overcoming the technical difficulties imposed by ice and snow. Methods of cold weather maintenance are described with emphasis on the care of suspension systems. From that standpoint the article is of value to the student of Armor. It places proper weight on a vital subject which is all too frequently shunted aside for the more glamorous discussion of tactics.

"Tank Attacks in Winter" by Col. V. Saushkin appeared in the February 1948 issue of The Military Review. It is by far the best of its kind in the field. The author describes the actions of a Red Army Tank-Infantry Team as it attacks a village held by Germans. The assault was conducted by a reinforced battalion over terrain which the defenders, much to their sorrow, had considered to be untankable. This article is of particular value because it so vividly illustrates two points. One is that a smart, aggressive, small unit leader can frequently turn obstacles into advantages. The other is that during the Russian winter no terrain can be safely considered to be untankable. Reprints of this writing should be issued to every student at The Armored School.

The article mentioned above, and to a lesser degree, the one written by Lt. Col. Oden, serves to illustrate the extraction of historical lessons by the proper interpretation and use of After Action Reports and Unit Histories. It is indeed unfortunate that more attempts such as this, especially by American authors, have not been made. There can be no doubt that during the course of World War II many American tank units participated in attacks similar to the one described in "Tank Attacks in Winter". Surely there were instances when bold leadership and intelligent action were combined by American small unit commanders to inflict costly defeats. If this had not been true, the war would never have been

won. Yet few records of these victories can be found. In spite of the fact that valuable lessons could have been gained from such actions, American military writers have been reluctant to extract them.

"Soviet Views on Winter Offense" by Maj. Gen. Yanovski was published in April 1949 in The Military Review. This article discusses the problem of Armor employment in winter from a broad viewpoint. It covers in a general manner Red Army methods of employing the combat arms in cold weather combat. While the writing is too broad in scope to be of tactical value, it does illustrate the importance of logistics to the commander of Armor during cold weather operations. Military critics have accused the Soviets of being indifferent to the needs of their troops. This may well be true; the article belies, however, any contention that they view the needs of Armor with any such indifference.

SUMMARY AND CONCLUSIONS

In general the best American writing on the employment of Armor in cold weather operations as based on lessons learned from World War II is to be found in existing field manuals and in research reports by students at The Armored School. The most complete field manual on the subject is Operations In The Arctic, FM 31-71. Other manuals, while they present nothing opposed to accepted doctrine, are too general and too sketchy to be of much value. This is particularly true of FM 17-32, Tank Platoon and Tank Company.

The best research report was found to be "Armor Under Adverse Conditions" by Committee #3, Officers' Advance Class, The Armored School, 1948-49. This report, by use of historical example, illustrated many lessons for Armor. The writing is of greater value because in addition to giving a running account of the Ardennes Campaign, it extracts principles for the employment of tanks in winter from the operations of two American Armored Divisions during that winter battle.

In addition, there is at The Armored School a wealth of classified material relating to the subject. Committee reports, interrogation reports, letters from commanders in the field and information from Red Army deserters are all on hand. It is felt, however, that as long as these reports remain inaccessible, they are useless as contributions.

The Historical Division, Department of the Army, has rendered valuable service in recording some of the lessons learned by the German Army during its ill-fated campaign in Russia. The topics of Red Army tank operation in winter, the effects of Russian climate on mobility and the manifold problems of logistics which confronted the invader are all discussed in the publications of the Historical Division. The value of these writings as historical material cannot be overstressed. It is to be hoped that many more of them will be published.

After Action Reports and Unit Histories are readily available at The Armored School. No doubt an experienced military student could make good use of them in drawing up lessons for Armor. Little of this has been done, however, and until it is, these publications cannot rightfully be considered as historical contributions except that in a limited sense they present a chronological account of World War II.

As far as unofficial books are concerned, the only one worthy of note is Guderian's Panzer Leader. Fortunately, this biography is a valuable contribution to the study of Armored Warfare. Nowhere else can be found the graphic, personalized descriptions of what the commander of Armor in cold weather operations might have to face. This book certainly deserves consideration as an important contribution to the History of World War II.

Periodicals are almost completely dominated by foreign authors as far as articles on Armor in cold weather operations is concerned. Unfortunately, it is impossible to determine the authenticity of such writings, but since they do present tactical lessons of value, they cannot be ignored as sources of military history. The best of these writings was "Tank Attacks in Winter" which appeared in The Military Review. This one article contains a summation of all the tactical lessons to be learned on the employment of Armor in Winter. Other articles by Russian authors contribute some information in the way of broad aspects of tank operation and the logistics problems involved, but "Tank Attacks In Winter" is by far the most valuable of the lot.

The conclusion is inescapable. As far as the subject of cold weather operations is concerned, most of the History of Armor from World War II has been derived from foreign sources. There is no American counterpart of Panzer Leader or "Tank Attacks In Winter", but one is sorely needed. American Armor came into its own during World War II; it defeated experts on their own home grounds, and it played a key role in gaining the victory in Europe. Yet the lessons learned from these exploits can now be found only in field manuals and committee reports. Much of the experience gained by small unit commanders in combat has been completely lost to posterity.

This would not be so unfortunate were it not for the fact that Armor's future role in war will be even more decisive than that in World War II. Only a fool could fail to realize the role of Armor in modern warfare. Yet this arm whose future is unlimited has to rely for its doctrine and historical lessons on the efforts of a few foreign writers and on an even scantier number of Americans. Such a condition is dangerous. Most of the lessons learned are based on the experiences of some six of the many American Armored Divisions which fought in Europe. What of the others? Did their experiences bear out or refute what we now accept as sound military doctrine? No one knows because most of that information is buried away in After Action Reports and Unit Histories which for the most part have been left unprocessed. Perhaps additional research and writing will remedy the situation in the future, but as far as the present is concerned, the record is bare.

RECOMMENDATIONS

In view of these serious deficiencies in authenticated, valuable, historical writing by American authors on Armor in cold weather operations, it is recommended that experienced military historians be placed down with the tank companies and battalions now fighting in Korea or with those units which might participate in some future war. These historians should be charged, not with recording the day by day sequence of events, but with preserving the lessons learned by the men who employ Armor in combat.

Such writings should also be passed on to other experienced military historians who will have assigned the mission of evaluating them, comparing them with each other and consolidating the findings. It must be emphasized that these consolidating historians should be experts in the field of military history. They will be required to study a mass of seemingly conflicting information and to derive from their studies lessons which will be of value to junior officers and noncommissioned officers as well as to senior commanders. The inexperienced amateur cannot perform such a task.

Finally, the findings of this board of historians should be made readily available to the general military public. In fact, they should be made required reading for all officers. This does not mean that historians should become the formulators of military doctrine or that their findings should be forced on soldiers as being the only workable solutions. In short, while these tactical lessons should be thoroughly studied and understood by all commanders, those officers should look on the lessons presented as guides rather than substitutes for their own initiative.

The present forms prescribed for After Action Reports are obviously not intended to convey tactical lessons. Rather they are intended for the preservation of data. It may be possible to expand these reports so that they will require additional information relating to tactical principles. It is felt, however, that such a solution is not as sound as the preceding recommendation. In the first place, no commander in the field, nor any member of his staff, has time to accomplish historical writing while in combat. Modern warfare demands full time concentration on the job at hand with scant allowances even for food and rest. Secondly, if commanders or their staffs are to wait until the appearance of some opportune moment to write down their impressions, much valuable material will have been crowded from their minds by subsequent events. Finally, even if the tactical commander were able to completely recall all his decisions, his actions and the actions of his subordinates, it

is doubtful that he could force himself to admit the errors he might have made or to set down on paper the possible failings of loyal subordinates. Such candor would require exceptional courage. In the normal man human nature probably cannot be overcome even by an altruistic desire to preserve lessons for posterity. A study of the various biographies and autobiographies written after World War II illustrates the natural reluctance of commanders to see or admit their errors.

Military history, if it is to be of value to succeeding generations of soldiers, must be written by men who are unhampered by the chain of command. They must be completely free to set forth their findings without regard to personalities. Such work entails observing the field of battle with complete detachment. It is hardly possible that any soldier who participates in such battles would be able to do so.

At first glance the above recommendation may appear to be a wishful attempt at empire building. Such is not the case. In actuality it is a crime to allow the hard-learned, costly lessons of combat to pass into oblivion. This negligence forces each new generation of military leaders to learn for itself, the hard way, the selfsame lessons that were learned in the past. American soldiers can no longer afford to pay the price of such lessons.

BIBLIOGRAPHY FOR CHAPTER 6

Abel, Bernard; Tactics of Finnish Army In The Winter War, Intelligence Division, Department of the Army (Washington: 2 Aug 1950).

Arctic Warfare In Foreign Countries, Intelligence Report, unsigned and undated.

Arctic Warfare, 'Experiences of the German Soldier', German Report Series, MST-24 (Undated).

Armor (German) Battle of Peiper, Historical Division, Department of the Army (Washington: Undated).

Armor Under Adverse Conditions - Ardennes Campaign, a report prepared by Committee #3 (Fort Knox: The Armored School, May 1949).

Corotneff, N., "Red Army Tanks In Winter", The Cavalry Journal, LII, No. 1 (January-February 1943).

Effects Of Climate On Combat In European Russia, Historical Division, Department of the Army (Washington: February 1951).

Exercise Yukon, Army Field Forces (Fort Monroe: 1948).

German Winter Warfare, G-2 Section, Armored Forces Hq (Fort Knox: 15 December 1943).

Gersdoff, V. Tanks-German Report On The Battle Of The Hurtgen Forest, Historical Division, Department of the Army (Washington: 12 December 1945).

Govan, Thomas P. Training In Mountain And Winter Warfare, Army Ground Forces (Washington: 1946).

Guderian, Heinz, Panzer Leader, (New York: E. P. Dutton, Inc., 1952).

Guerilla Activity In The Winter War and Development From 1941-1944, Intelligence Department, U. S. Army (Washington: 1944).

Hart, B. H. Liddell, Defense Of The West, (New York: William Morrow & Co., 1950).

Hart, B. H. Liddell, The German Generals Talk, (New York: William Morrow & Co., 1948).

Interview With German Generals, Intelligence Section, OCAFF (Koenigstein, Germany: 1948).

A Military Encyclopedia, prepared by the G-3 Section, Headquarters 15th Army Group (Italy: 1946).

Military Operations, Military Intelligence Department, The War Department (Washington: 10 April 1942).

Oden, Delk M., "4th Armored Division In The Relief of Bastogne," The Military Review, XXVII, No. 10 (January 1948).

Offensive and Defensive Operations in Extreme Cold, The Armored School (Fort Knox: Undated).

Operation In The Arctic, FM 70-15 (Washington: Department of the Army, 1944).

Rendulic, Lothar, Combat In Deep Snow, Interrogation Report (19 April 1947).

Saushkin, V., "Tank Attacks In Winter," The Military Review, XXVII, No. 11 (February 1948).

Sears, H. A., Tanks In Snow, Improving Traction, (APO 403: Headquarters 17th Armored Group, 14 January 1945).

Tank Platoon And Tank Company, FM 17-32 (Washington: Department of the Army, May 1950).

Task Forces "Frigid," "Frost," and "Williwaw" Trends in Development, a report prepared by Army Ground Forces (May 1947).

Training The Tank Company For Operations In Extreme Cold, a report prepared by Committee #3 (Fort Knox: The Armored School, May 1952).

"The Winter Battle of Rzhev," The Military Review, XXIX, No. 3 (June 1949).

Yanovski, "Soviet Views On Winter Offense," The Military Review, XXIX, No. 1 (April 1949).

51.9-16

CHAPTER 7

THE EMPLOYMENT OF LIGHT AIRCRAFT

IN THE ARMORED DIVISION

Light aircraft were initiated into our ground forces to be used for spotting artillery fire, however they were successfully employed on many other missions. In the armored division light aircraft became a vehicle for command, liaison, and reconnaissance; and at the close of World War II they enjoyed the praises of everyone who had employed them. Were the history of their employment and the lessons learned adequately recorded?

To find the answer to this question research was conducted in the library and document section of the Armored School. Though not expected to be a rich source for material on this subject, it was felt that the need definitely existed. Light aircraft, such a vital vehicle in the employment of Armor, is of interest to all students of that branch.

The writings consulted that were in battle narrative or personal account style may be discussed in a very few words. After action reports, formal histories of World War II, unit histories, and writings about artillery mentioned only briefly or infered the employment of light aircraft. In these battle narrative and personal account writings equipment of this type is quite naturally undiscussed except where such equipment plays a decisive role. Because of this writings of that nature were valuless as a source. There were, however, writings in document form and in military periodicals which discussed this subject in varying degrees of completeness.

The General Board, United States Forces, European Theater, established at the end of hostilities to study lessons learned in that theater completed two superior reports pertaining to this subject. These reports, Study of Organic Artillery Air Observation, and Liaison Aircraft with Ground Force Units, set a high standard in recording the employment in battle of new military equipment and technique.

In setting this standard a board of highly competent officers were supported by experience, questionaires from the field, and reports of subordinates. The subject was covered in the eyes of all interested levels of command. Pertinent quotations enlivened the study and were used to express major points. An

example follows:

> Extracts from a discussion of combat operations submitted by the Artillery Air Officer of the 4th Armored Division are typical of operations in armored units in fast moving situations. "Ever since this division started its rapid movements our cubs have been used to make reconnaissance for the heads of our columns. This has proved to be one of our most important jobs. We operate on patrol on a common channel, and any unit is free to call on us direct for information....All of the above are problems peculiar to only armored divisions but I believe that reconnaissance is a job at least as important as our artillery work."1

The history of light aircraft was also traced in these reports with the reasons for various changes throughout that history. Conclusions and recommendations were written which conform amazingly with official concept and doctrine published in postwar tables of equipment and field manuals.

Other documents including Army Ground Force observer reports and articles in military periodicals provided sources for study of varied phases of this subject. This writing was normally quite narrow with a single type or phase of employment being discussed, and this at some specific level of command. Observer reports told of the use of light aircraft to lead task forces, to assist in terrain studies prior to an attack, to perform route reconnaissance and liaison, and to locate enemy tanks. A search of long duration through the many documents available would undoubtedly reveal a complete list of possible types of employment. This in not satisfactory for the casual reader or the average student. In a like manner articles in military periodicals were limited in number, scope, and valid lessons discussed.

Summary and Conclusions

It was found that the writing done to express the lessons learned in World War II concerning the employment of light aviation in the armored division has received relatively insufficient attention.

Only one author, a board of officers, has expressed those lessons in a writing available to the general military reader. The reports of the General Board, European Theater are excellent recordings of the lessons in the use of light aircraft with the combat arms.

Though the many uses of light aircraft are often mentioned or inferred in other writings, these writings failed to give the complete picture. Articles in periodicals, unit and campaign histories, and personal accounts are all in this category.

It is felt that a need exists for writings on the history of light aircraft and their employment in the armored division during World War II. This could be done satisfactorily through any of the common medians. The great need is to get the writings to the general military reader.

NOTES FOR CHAPTER 7

[1] Study of Organic Artillery Air Observation, a study prepared by the General Board, United States Forces, European Theater, APO 408, 1945, p 15.

BIBLIOGRAPHY FOR CHAPTER 7

Barco, Ernest T., Jr., Lt Col, "Light Aviation Joins Armored Cavalry," Armored Cavalry Journal, LVIII, No. 3 (May-June 1949).

"Command Reconnaissance," A Military Encyclopedia, prepared by the G-3 Section, Headquarters 15th Army Group (Italy: 1946).

Coolidge, George W., Col, Cavalry and Armored Report, AGF Report No. 385 (Headquarters European Theater: 1944).

Devore, Col, Tank Action in Italy, AGF Observers Report (Headquarters European Theater: 1944).

Dewitt, Paul A., 1st Lt, "The Air OP of Armored Artillery," The Military Review, XXIV, No. 6 (September 1944).

Donnelly, C.H., Lt Col, "The Artillery Aerial OP," The Military Review, XXII, No. 1 (April 1943).

Eisenhower, Dwight D., Crusade in Europe (New York: Doubleday & Company, 1948).

Liaison Aircraft with Ground Force Units, a study prepared by the General Board, United States Forces, European Theater (Headquarters European Theater: 1945).

The Lorraine Campaign, Historical Division, Department of the Army (Washington: 1950).

McCormick, Otis, Col, Tactics, Organization and Equipment of the 10th Armored Division, AGF report No. 119 (Headquarters European Theater: June 1945).

Pathes of Armor, a history of the 5th Armored Division (Atlanta: Albert Love Enterprises, 1950).

Patton, George S., Jr., War As I Knew It, (Boston: Houghton Mifflin Company, 1947).

Study of Organic Artillery Air Observation, a study prepared by the General Board, United States Forces, European Theater (Headquarters European Theater: 1945).

CHAPTER 8

THE ORGANIZATION OF THE ARMORED DIVISION

Due to the fact that the armored division was created, developed, faught, and further developed almost entirely within the years of World War II, the writings which explain the changes are of prime importance. Today the division has combat commands, separate battalions, an equal number of tank and infantry battalions, and a logistical organization which differs from any previous or present American Division. The question is: "Were the lessons of World War II, from which this organization evolved, adequately recorded?"

In determining the answer to this question the library and the document section of The Armored School became the primary sources. The card catalogue files of these sources were screened, and appropriate staff personnel were consulted to locate writings on or related to this subject. The material discovered by this method was read, evaluated, and then further evaluated as the research progressed. This chapter will discuss the findings made.

The Historical Division, Department of the Army in a history entitled The Organization of Ground Combat Troops has recorded the changes, substantiated by combat lessons, in an excellent manner. The history is complete and very well documented. This documentation gives an authenticity which few writings possess and adds interest by giving the reader an insight. This insight helps the reader to understand the men who made the final decisions along with the multitude of problems they faced. Though primarily concerned with high level problems and organization, the history is definitely of concern and interest to commanders of all echelons. The evolution of our postwar armored division is recorded along with the reports, correspondence, and conferences which gave this division its present organization; something new in our army.

A book, Forging the Thunderbolt, by Mrs. Mildred Hanson Gillie, dealing with the history of United States Armor is worthy of comment. Though not written from an organizational view, the history of the creation and development of the armored division is definitely outlined. It is felt that this is the most valuable paper of a general nature which includes the lessons of World War II and their impact on the organization of the armored division. The authenticity of this book is detracted from by the fact that the author is a woman who has written chiefly from personal observation and interviews. Despite this, the book gives a very complete and accurate history of the armored division.

Unit histories, campaign histories, after-action reports, and biographies of war-time leaders reflect the changes in the armored division. These, however, are not written to give the reader the understanding of a specific problem or even of a particular field such as Armor. Their scope embraces specific instances or broader fields, and a reader interested in lessons of limited nature must resort to involved research to construct a complete picture. For this reason books of general historical and biographical nature are adjudged of little value to the casual reader interested in this subject. The student or researcher will find them of value as background material.

Military periodicals, a primary means of expression to military writers of all levels, were thoroughly screened for articles related to this subject. The Military Review, published by the Command and General Staff College, was found to be the only periodical containing articles worthy of mention. The service journals, and more specifically the journal of Armor, were void of articles pertaining to this subject. A timely article about the original organization of the armored division was found in The Military Review. In 1943 and 1946 subsequent articles were written which deal with the reorganizations which were based on the lessons learned in World War II. Included in these articles were a complete summary of the current organization and the changes made. An explanation of the combat lessons which dictated the organization was included. The authors fortunately were experienced, relatively senior officers well founded in their subject. These excellent articles are listed in the bibliography of this chapter.

In addition to the writings mentioned above there are other documents available which include historical data and discussions of the organization of the armored division. Organization, always a topic for comment, is discussed in almost all Army Ground Force observer reports and spontaneous reports from the field. These reports usually are limited to that organization found unsound or most satisfactory under the circumstances of the unit reported upon. They are, however, excellent recordings of the lessons learned by that unit, and when coupled with like reports of other units, give a valid account and explanation. Though not intended to become historical records in themselves they are of considerable value when studying this subject.

Another type of document of broader scope, greater authenticity, easier accessibility, wider distribution are reports and studies of boards. Reports of boards composed of senior officers set up by the Department of the Army, Army Field Forces, and Theater Commanders have produced excellent documents on the organization of the armored division. These reports reflect the experience and lessons learned by members of the board during World War II.

The Historical Section, Army Ground Forces, in a study entitled The Armored Forces Command and Center produced a history of Armor which surpasses all other material found on this subject. It is written by professional historians, authenticated by thorough footnoting, and organized for quick reference and easy reading. The history is complete through 1943. Some events and developments of later years are included; however, the period 1943 to 1945, is not covered in detail. Though not covering the complete history of Armor in World War II nor including the postwar organization of the division resulting from combat lessons, the material presented and style of writing is superior. As changes in organization took place the reasons for the changes were recorded. This enables the reader to follow closely both the history and lessons learned. The material in this study is or will be incorporated into the histories published by The Department of the Army; however, it remains the finest writing on Armor that has been found in this research.

The General Board, United States Forces, European Theater, in a study entitled Organization, Tactical Employment, and Equipment, of the Armored Division furnished a superior study of this subject based on the lessons of World War II. The study concerns all command levels. It gains authenticity from the experiences of the members of the board, questionnaires from junior officers in the field, and the reports and opinions of many subordinate officers. The organization of our armored divisions, both heavy and light, was studied. The lessons learned in each division were enumerated. The advantages and disadvantages of the two organizations were weighed in the light of these lessons. A section of the study was devoted to indicating the task organization normally used by each of the armored divisions in different tactical situations. This gives the student, in graphic form, historical examples of the flexibility of the organization. It also shows the balance between units of various types that experience has proved the most satisfactory for each type of mission. This study, supplemented with a basic military knowledge, provides the reader with a complete and thorough understanding of the development of the organization of the armored division as influenced by the lessons of World War II. This fact is substantiated by the close parallel between the organization recommended by the board and the organization later approved by Department of the Army for the postwar armored division.

Though not historical in nature, two additional sources reflect the lessons of history. Postwar tables of organization, and more especially field manuals dealing with the armored division, its organization, missions, employment and logistical support are in effect full recordings of the lessons learned in World War II. Our current manuals, written in the postwar years under the supervision of experienced commanders, are, by virtue of their detail, complete integration, and clear understandable language the finest

recording of lessons learned to date. While not historical documents in the truest sense of the word, they do reflect the lessons of the entire field of Armor in World War II.

Summary and Conclusions

It is felt that the history of the organization of the armored division and the effect of the lessons from World War II have been adequately recorded. The history and lessons can be found in writings of general distribution.

The Historical Division of the Department of the Army, the Historical Section of Army Ground Forces, and the General Board, European Theater are authors of the best writings consulted. The writings of these agencies are authentic, readable, and complete within their scopes. The Department of Army has integrated the history of Armor into that of the other arms. Army Ground Forces has recorded the history and lessons of Armor primarily apart from the other arms. And, the General Board recorded the history and lessons of armor in the European Theater.

Other histories and reports present less reliable and more limited information on the subject. Unit and personal histories, though writing about armored units and their commanders, have neglected an analysis of organization, the foundation of the unit and the design of the commanders weapon.

The Military Review was found to be the only periodical which included articles on this subject. These articles are excellent in their coverage of the organization of the division as it existed at the time of writing.

It is felt there is need for a history of the individual arms in the style of the study entitled The Armored Forces Command and Center prepared by Army Ground Forces. The study in reference is complete only through 1943, but it could serve as an excellent base for a more current history. This could become a continuing program under Army Field Forces so that in each arm there would be readily available, sound reference to contemporary history and its lessons. The rapidity of events today provides the need for history to be recorded and studied as early as possible.

BIBLIOGRAPHY FOR CHAPTER 8

"Armored Division," The Army Almanac (Washington: Government Printing Office, 1950).

The Armored Force Command and Center, Study No. 27 (Washington: Historical Section, AGF, 1946).

Barrows, Frederick M., Col, "Streamlining the Offensive," The Military Review, XXI, No. 80 (April 1941).

Berry, H. W., Major, "Signal Communications in the Armored Division," The Military Review, XXVII No. 1 (April 1947).

Buchler, Lloyd G., Lt Col, Observers Report European Theater 12 August 9 October 1944 (Washington: Headquarters AGF, 28 October 1944).

Combat Record of the Sixth Armored Division, prepared by the staff of the 6th Armored Division (Aschaffenburg, Germany: 1945).

Conclusions of the Organization Committee (Fort Knox: The Armored Conference, 1946).

Coolidge, George W., Col, Interview with Personnel of the 4th Armored Division (Headquarters European Theater: November 1944).

Gillie, Mildred Hanson, Forging the Thunderbolt (Harrisburg: The Military Service Publishing Company, 1947).

Kelly, Will H., Major, "The Tank Battalion," The Military Review, XXV, No. 3 (June 1945).

The Lorraine Campaign, Historical Division, Department of the Army (Washington: 1950).

Marshal, S. L. A., Col, "The Armored Future," Cavalry Journal LVII, No. 6 (December 1948).

Montgomery, Robert O., Report on the 2nd Armored Division, AGF Report No. 51-A (Headquarters European Theater: April 1944).

Oden, D. M., Lt Col, "The New Armored Division," The Military Review, XXVII, No. 4 (July 46).

Oliver, Lunsford E., Maj Gen, Organization, Equipment, and Tactics of Armored Forces (Headquarters CCB, 1st Armored Division: December 1944).

Organization, Tactical Employment, and Equipment of the Armored Division, A Study prepared by the General Board, United States Forces, European Theater (Headquarters European Theater: 1945).

Organization of Ground Force Combat Troops, Historical Division, Department of the Army (Washington: 1947).

Pathes of Armor, a history of the 5th Armored Division (Atlanta: Albert Love Enterprises, 1950).

Pittman, J. M., Lt Col, "Combat Command of the Armored Division," The Military Review, XXV, No. 11 (February 1946).

Smart, Wayne D., Lt Col, "Reorganization of the Armored Division," The Military Review, XXIV, No. 1 (April 1944).

Tansey, Patrich H., Jr., Lt Col, "Armored Taskforce," The Military Review, XXVI, No. 6 (September 1946).

CHAPTER 9

COMBAT MAINTENANCE OF ARMORED UNITS

This is a critical analysis of the writings done during and after World War II concerning combat maintenance of armored units. In analyzing the historical data available on the subject of combat maintenance, one salient point must be stressed. ---The amount of material available and the method in which it has been recorded. To fully illustrate this point, two of the many phases of maintenance have been selected to give a cross section of the material available. The quotations and extracts listed represent the type of writing that has been recorded in history on this particular subject. All types of material have been considered including after-action reports, unit histories, documents, periodicals, books, conference and board reports.

From the relatively few words that have been written on the subject, it would appear that maintenance occupied a position of little importance in World War II. The only material available is found in fragmentary form in writings concerning World War II in general. It has to be extracted in paragraph and sentence form. This widely scattered information makes it very difficult to gather historical data on combat maintenance. The information, such as it is, presents the problems that confronted many units and in many cases explains the causes and the methods the units used to overcome these problems.

The quotations listed below are typical of the pertinent yet very short squibs of material found in the various types of historical writing. They illustrate the variety of sources where such information is found.

> ...Therefore it can be said that misuse of equipment and lack of preventive maintenance through lack of knowledge were the greatest causes of material failure; design weaknesses were not considered a serious cause. Colonel W.R. Slaughter, "Report of Operations in ETOUSA," a report to the Ordnance Department, US Army (20 Sept 1944), p 32.

> When tactical units were issued tanks they assumed the responsibility for maintaining them. This only added to the problems of the line unit commanders, already overburdened with duties. Insufficient time was devoted to properly training the personnel to drive and maintain these new tanks. Basically the new tanks were well made and would give good service. Many of the faults discovered, mostly minor in

nature, could be attributed to the lack of preventive maintenance and to improper driving. These faults included:

1. Operating tanks with tracks too loose, causing unnecessary wear on the track, sprockets, support rollers, and the engine (first echelon and driver fault).

2. Excessive operation of the tank in reverse gear causing clutchplate failure (first echelon and driver fault).

3. Walking on rear deck of tank with muddy shoes, allowing dirt and trash to work down through the forward grill and lodge in the core of the radiator; this cut down on the free passage of air and caused the engine to overheat unnecessarily (first echelon fault).

4. Operating the tank in low gear for a long period of time, causing the engine to overheat (driver fault).

5. Coasting downhill with clutch disengaged (and the transmission in gear) or engaging the clutch part way down the hill after high speed has been reached; this caused the transfer case to fly apart and the clutch driving disc to disintegrate because of tremendous overspeed (driver fault).

"Notes On Maintenance," Armored Digest Magazine (Fort Knox, Ky: The Armored School, June 1944), p 39.

In fast moving situations little time could be allowed for maintenance and crews had to be trained to use every available minute. Colonel Joseph M. Tully, CO, 4th Cav Group, "Cavalry Comments," Immediate Report No. 77 (Combat Observations, Aug 1944), par 26, p 1.

It was a big problem to perform first and second echelon maintenance when needed. Ninety percent of mechanical failures were due to lack of preventive maintenance. Colonel Lloyd G. Buchler, GSC, "Observer's Report ETO," a combat observer's report, p 15.

Based on the above extracts, it appears that the problem in the early stages of World War II was to insure that the tactical units performed prescribed preventive maintenance and that all crews, especially drivers, were given proper training.

To substantiate the fact that preventive maintenance paid dividends the following extracts are presented:

> It has been concluded by numerous observer reports, inspection reports, and after-action reports, that units which developed a consciousness of the necessity for first echelon preventive maintenance, alloted time to accomplish it and released their vehicles for the prescribed maintenance checks, had the lowest deadline. After-action Report, 4th Armored Division, 1 Sept 1944, p 19.

> Every tank or vehicle repaired in the field meant one less new one to be shipped. Lt Col Randolph Leigh, 48 Million Tons to Eisenhower (Washington: Infantry Journal Press, Fighting Forces Series, 1945), p 92.

Another serious problem to be considered was that of obtaining and maintaining sufficient stock levels of spare parts as indicated by the following extract:

> Due to the shortage of spare parts, canibalization was extensive. Some units reported if it had not been resorted to, deadline of vehicles due to major item shortages would have reached a tremendous figure. The policy was that ordnance material should not be canibalized by using units under any circumstances, but it was done and constituted one of the major problems faced by ordnance units in the field. "Report of Operations in ETOUSA," a report to the Ordnance Department, US Army, 20 Sept 1944, p 17.

SUMMARY AND CONCLUSIONS

The extracts presented above give practically the entire picture of the recording of the methods and problems of combat maintenance in armored units during World War II. They record the thoughts and experiences of the men who were dealing with combat units. It is unfortunate that so little has been done to gather, edit and interpret the many scattered articles. Most of the writing on the subject has been gathered above division level. There appears to have been an effort to collect ideas, recommendations and remarks from division level and below and to consolidate them into reports. This is due, no doubt, to the higher levels having the available personnel and time to make more complete and readable reports.

The lessons learned have not been properly and adequately recorded. The widely scattered interviews and reports which do exist are difficult to locate and cover a variety of subjects. In

addition, the thoughts and experiences of many men who have broad experience in the field have not been recorded.

A person desiring to learn something of combat maintenance problems during World War II will not be able to find a comprehensive and complete paper on the subject. The majority of the reports are written on broad subjects, of which maintenance is only a part. The portions concerning maintenance are in many instances, not substantiated by adequate background or facts to be considered as a base for sound conclusions.

In the final summary it appears that combat maintenance of armored units is a special subject, vitally important in armored warfare, which has been almost completely overlooked in the recording of history. This is unfortunate because the entire course of an operation can be changed as a result of a lack of combat maintenance. It is important then, that a study be undertaken immediately which will give the tank crews, junior officers and students of armor a source from which they can learn the techniques and problems of combat maintenance as taught by the lessons of World War II.

RECOMMENDATIONS

1. That The Armored School cause a study to be made on the subject of combat maintenance. This study to be used as a text for the teaching of combat maintenance to students of the school.

2. That The Armored School make a request of the Office of the Chief of Military History to prepare a special study on combat maintenance of armored units in World War II.

BIBLIOGRAPHY FOR CHAPTER 9

After-Action Report, 4th Armored Division, (ETO: 1 Sep 1944).

Campbell, William R., Maj, "Field Expedients and Battlefield Recovery," The Armored Cavalry Journal, LVII, No. 3 (May-Jun 1948).

"Comments of Col Joseph M. Tully, CO, 4th Cav Group," Cavalry Comments, Immediate Report No. 77 (Combat Observations), (Hq ETO: Aug 1944).

Coolidge, George W., Col, Interviews with Personnel of the 4th Armored Division (ETO: 1944).

Leigh, Randolph, Lt Col, 48 Million Tons to Eisenhower (Washington: Infantry Journal Press, 1945).

Maintenance and Supply, a report prepared by Army Field Forces Board No. 2 (Fort Knox: March 1952).

Maintenance, Tanks, M-4 Series, a report prepared by JICAME (Cario, Egypt: 13 Jul 1944).

Muller, Frank M., Lt Col, "The Ordnance Maintenance Battalion," The Armored Cavalry Journal, LIX, No. 2 (Mar-Apr 1950).

"Notes on Maintenance," Armored Digest Magazine (Fort Knox: The Armored School, Jun 1944).

Notes on Maintenance of Sherman Tanks, a report prepared by OCO (Washington: 15 Mar 1944).

Ordnance Service Units in the European Campaign, a study prepared by the General Board, ETO (Hq European Theater: 1945).

Organization, Equipment and Tactical Employment of the Armored Division, a study prepared by the General Board, ETO (Hq European Theater: Nov 1945).

Slaughter, W.R., Col, Report of Operations in ETOUSA, a report to the Ordnance Dept, US Army (Washington: Sep 1944).

CHAPTER 10

THE DEVELOPMENT OF LOGISTICAL ORGANIZATION OF ARMOR

In order to make a critical analysis of the logistical development of armor it is necessary to consider all types of writing dealing with organization of the new armored division. This is necessary because lessons learned during combat operations in World War II were expressed in many different ways and by many sources. Therefore, unit histories, documents, periodicals, books, conference and board reports were searched for information upon which an analysis could be made.

Immediately following the end of World War II units were requested to submit recommendations and comments on improvements that could be made in organization. This included the logistics phase, which is undoubtedly one of the more important functions in any type of unit. Valuable comments were submitted and many of the recommendations were eventually to become accepted procedures for the armored units today.

It is interesting to note how identical points occured in many reports even though the units submitting these reports were widely separated geographically and the personnel unknown to each other.

The General Board, US Forces, European Theater of Operations in 1945, was probably the first of many high level groups to take these many reports on recommendations and comments under study. This board gathered the material to compile and consolidate before placing it before a committee of experts from the various arms and services. The committee dealing with logistics made a study of the many comments and recommendations before submitting its report. This report is now recognized as an authentic and important document. Not all their recommendations were accepted, but their fine work is still used as a guide to study the development of logistics as a result of combat experiences. Many studies and reports of later date used the General Board, US Forces, ETO, as a basis for their findings because it is apparently recognized that this board met during an ideal period. Their comments were recorded while things were fresh in the minds of those submitting reports.

The General Board was established by General Orders 128, Headquarters European Theater of Operations, US Army, dated 17 June 1945, as amended by General Orders 182, dated 7 August 1945, and General Orders 312, dated 20 November 1945 to prepare a factual

analysis of the strategy, tactics and administration employed by the United States Forces in the European Theater.

There are 131 reports, each on a different subject. Approximately ten of these reports are devoted to logistics in general. Each report is a mimeographed account of the committee meeting dealing with an assigned subject and is bound in a semi-permanent form. The reports are available at the Documents Section, The Armored School, Fort Knox, Kentucky.

Periodicals during and after World War II include a wealth of information on logistical problems encountered during combat operations. The majority of the authors, who were supply officers, motor officers, communications officers, etc., relate their methods of overcoming these problems. It is realized, of course, that many of the expedients used were "dreamed up" on the spur of the moment and would probably be practical only in combat, but they do demonstrate combat expediency. As a result lessons can be learned from them.

The periodicals taken into consideration for this report were the Military Review, Infantry Journal, Combat Forces Journal, The Cavalry Journal, The Armored Cavalry Journal and Armor.

The articles in Military Review are well written and extremely interesting. They appear to be written for the most part by field grade officers and as a rule refer to echelons of division level and higher. A fine example of the type articles that appear in the Military Review is one written by Lieutenant Colonel Charles S. Cobb, QMC, in the October 1943 issue. The title of this article is "Gasoline Supply in the Combat Zone". It is a discussion of motor fuels and lubricants in the combat zone, the available means of distribution and how these means are utilized.

There are articles also in the Military Review written by company grade officers. A good example is one written by an unknown company commander of a quartermaster truck company. It appears in the September 1943 issue of Military Review and is entitled, "With a Quartermaster Truck Company in the Middle East." This company commander gives a most interesting description of actual conditions in the field and suggestions on the training of a quartermaster truck company.

The present day "Armor" magazine is devoted to expressing, primarily, ideas concerning armor. Prior to and during World War II the name of this publication was the Cavalry Journal and was devoted almost entirely to matters dealing with reconnaissance. There were occasional writings concerning armor, but primarily they were about cavalry groups and cavalry reconnaissance squadrons.

The trend began to change when the name of the publication was changed to "The Armored Cavalry Journal." More emphasis seemed to be placed on articles concerning armored divisions, tank battalions, armored infantry battalions, etc.

The Cavalry Journal in the March-April 1945 issue included two articles concerning logistics. One written by Lieutenant Colonel Herbert F. Krucker, Cavalry, "Ammunition Supply During Rapid Movement in Combat" discusses the system of ammunition resupply within the 4th Armored Division during the "blitz across France." The other article, "Medical Evacuation with a Reconnaissance Squadron" by Captain Lawrence Loewinthan, MC, concerns the nature of work performed by a medical detachment of a reconnaissance unit in actual combat and how the problem of evacuation and medical care under fluid conditions are not covered by standard operating procedures or field manuals.

Conference reports are excellent sources of information on logistical organization. The various conferences, such as the Armored Conferences of 1946 and 1949, were attended by officers who were combat veterans of armored units. The experience of these officers when applied to the subject under study, resulted in valuable, as well as authentic information. Through discussions many points were considered and a thorough study made of each. Committees were appointed to study definite problems. The committee then presented their findings to the main body for further discussion and eventual vote for acceptance or disapproval.

The Armored Conference of 1946 composed of United States Army officers was held at Fort Knox, Kentucky. A complete record of this conference is available at the Document Section, The Armored School, Fort Knox, Kentucky. The Armor Conference of 1949 was composed of United States officers as well as high ranking officers from several allied countries. The purpose of this conference of US and Allied officers was to further the study of armor in the US Army as well as to make an attempt to standardize the principles and techniques of armored warfare. A complete record of this conference is also available in the Document Section, The Armored School, Fort Knox, Kentucky.

By reading the many conference reports available, a person is able to learn lessons from the problems encountered and methods of overcoming them. It is also possible to trace the development of the logistics in armored units to a certain extent by noting the recommendations of these conferences and their reasons for making them.

Books written about logistics in general provide an excellent source for gathering material on this subject. It is

unfortunate, however, that information concerning logistics in armored units is limited. One book, "The Organization of Ground Combat Troops", published by the Historical Division, Department of the Army, in 1947 in discussing the changes in the logistical development of the army touches occasionally on armored units. As a whole, this is a well-written and valuable account of the United States Army prior to and during World War II.

This volume is the first to be published in the series THE UNITED STATES ARMY IN WORLD WAR II, and the first in the sub-series THE ARMY GROUND FORCES. All volumes are to be closely related, and will present a comprehensive account of the activities during World War II. This book is available at The Armored School Library, Fort Knox, Kentucky.

SUMMARY AND CONCLUSIONS

Lessons learned concerning logistics in general have been properly and adequately recorded, however, those concerning armored units are limited. It is necessary to look in too many different places to make a thorough study of the logistical development of armor. Emphasis seems to have been placed so that it covers all echelons of command and does not pick any level in particular. Logistical doctrine advocated today through lessons learned from World War II seems to be amply substantiated in military writings, even though they are difficult to locate.

It is believed that the primary reason for the lack of material concerning logistics in armored units, is due to the fact that armor is still comparatively new. During World War II many problems arose that had not been considered during the planning phase. As these problems presented themselves, methods of overcoming them were developed. Many of these methods and lessons learned have been incorporated into our present day logistical organization in armored units. Others have provided the basis for further experiment and development. It is unfortunate, however, that very little comprehensive material has been written about the many lessons learned. There is need for a series of studies based on World War II which will thoroughly record the development of the present-day logistical organization of the various armored units.

RECOMMENDATIONS

1. That The Armored School cause a study to be made on the subject of the development of logistical organization of armor. This study to be used as a text for the teaching of logistical development in armor to students of the school.

2. That The Armored School make a request of the Office of the Chief of Military History to prepare a special study on the logistical development in armor as a result of lessons learned during World War II.

BIBLIOGRAPHY FOR CHAPTER 10

Busch, E., Col, "Supply of an Armored Division in Combat," Military Review, XXVI, No. 6 (Sep 1946).

Butler, James J., Capt, "Individual Tank-Infantry Communications," The Armored Cavalry Journal, LVI, No. 4 (Jul-Aug 1947).

Cobb, Charles S., Lt Col, "Gasoline Supply in the Combat Zone," Military Review, XXIII, No. 7 (Oct 1943).

Coolidge, George W., Col, Interviews with Personnel of the 4th Armored Division, (ETO: 1944).

Greenfield, Palmer and Wiley, The Organization of Ground Combat Troops (Washington: Historical Division, DA, 1947).

Krucker, Herbert F., Lt Col, "Ammunition Supply During Rapid Movement in Combat," The Cavalry Journal, LIV, No. 2 (Mar-Apr 1945).

Forsythe, Jeoffrey, Capt, "Logistics and Trains in the Armored Division," Armor, LX, No. 3 (May-Jun 1951).

Forsythe, Jeoffrey, Capt, "DSCP," Armor, LX, No. 2 (Mar-Apr 1951).

Forsythe, Jeoffrey, Capt, "The Quartermaster Battalion of the Armored Division," Armor, LIX, No. 6 (Nov-Dec 1950).

Leigh, Randolph, Lt Col, 48 Million Tons to Eisenhower (Washington: Infantry Journal Press, 1945).

Loewinthan, Lawrence, Capt, "Medical Evacuation with a Reconnaissance Squadron," The Cavalry Journal, LIV, No. 2 (Mar-Apr 1945).

Maddox, Warner V., Maj, "Trains of the Armored Division" Military Review, XXIII, No. 6 (Aug 1943).

"Maintenance and Supply," a report prepared by Army Field Forces Board No. 2 (Fort Knox: Mar 1952).

Muller, Frank M., Lt Col, "The Ordnance Maintenance Battalion," The Armored Cavalry Journal, LIX, No. 2 (Mar-Apr 1950).

O'Brien, Robert A., Lt Col, "Logistical Coordination In Burma," The Armored Cavalry Journal, LVI, No. 5 (Sep-Oct 1947).

Ordnance Service Units in the European Campaign, a study prepared by the General Board, ETO (Hq European Theater: 1945).

Pittman, J.M., Lt Col, "Reorganization of the Armored Division," Military Review, XXIV, No. 1 (Apr 1944).

Organization, Equipment and Tactical Employment of the Armored Division, a study prepared by the General Board, ETO (Hq European Theater: Nov 1945).

Rolph, Arthur R., Capt, "Battlefield Vehicle Recovery," The Armored Cavalry Journal, LVI, No. 4 (Jul-Aug 1947).

Slaughter, W.R., Col, Report of Operations in ETOUSA, report to the Ordnance Dept, US Army (Washington: Sept 1944).

"With a Quartermaster Truck Company in the Middle East," author unknown, Military Review, XXIII, No. 6 (Sep 1943).

CHAPTER 11

THE DEVELOPMENT OF ARMOR DURING WORLD WAR II

Since the first use of tanks in World War I, it has been recognized that in armored warfare, design is of fundamental importance. The development of armored vehicles has progressed more or less erratically during the last twenty years with most of the progress being made by the United States, Germany and Russia. This paper is concerned only with the development of armored vehicles in the United States.

Due to the fact that this country is the unchallenged leader in mass production of trucks, tractors and automobiles, it would seem almost natural that the development of armored vehicles would also remain unchallenged. Unfortunately, this has not been true. It is not within the scope of this paper to discuss the possible reasons for this. It is desired, however, to make a survey and analysis of the manner in which our rather uncertain program of development of armored vehicles has been recorded.

One would presume that this field, which has been so much "in the news" and which is of extreme importance in this age of mechanized warfare, would be a strong attraction to the individual interested in the recording of vital and important developments. For some reason this has not been true. In analyzing the available material on the development of Armor during World War II it was found that the writings on the subject are widely scattered with very few being devoted wholly to the subject. In many types of writing there are frequent references to development and short squibs giving specific details. It remains to the reader, however, to gather these and draw the trace of development to the best of his ability.

The few sources which give a more or less complete picture of the various phases of development include books, articles written for military periodicals, reports by boards or committees and field manuals.

Forging the Thunderbolt by Mildred Hanson Gillie, contains material of a general nature concerning the development of Armor. In writing this book the authoress apparently had the benefit of much expert advice and direction. In addition to containing valuable information, the book is interesting and readable. It is the story of how the few officers who believed in Armor as opposed to horse cavalry fought a difficult and, at times, a very discouraging battle to gain full recognition for Armor. In the course of

tracing the progress of these men, Mrs. Gillie paints a rather complete picture of how the present-day Armored Force was born. A birth which was imminent but long in coming. Within this theme is found a limited amount of details concerning the development of the various types of armored vehicles prior to and during the early years.

This book, while contributing in a limited degree to the history of the development of Armor, is definitely a valuable contribution to the history of Armor. Mrs. Gillie has captured, in many cases, the feelings of overwhelming necessity which drove these few farsighted men on. They were eventually able to conquer the great masses of doubt and complacency on the part of the civilian populace as well as brother officers.

Mrs. Gillie's book, as a contribution to the history of the development of Armor, does not compare favorably with two other books. The first of these, The Fighting Tanks, was written by Jones, Rarey and Icks. In this book the authors give specific details on each armored vehicle as it was developed, built and eventually discarded in favor of something better. It was carefully brought out that the chief difficulty with the early vehicles was a very large number of mechanical defects, thereby causing them to be of questionable tactical importance. Organization of this material is very well handled. Each vehicle is thoroughly considered and its successor chosen for specific reasons. In addition, the problems encountered with each new change are discussed in a most thorough manner. Each separate phase of building, testing, remodeling, and retesting is considered. The book portrays very well the extended efforts of a group of men to design and produce vehicles which would break the stalemate of trench warfare.

The second book, Eye Witness and the Origin of the Tank, by Major General Sir Ernest D. Swinton, is written much along the same lines, but it concerns the development of British Armor and indicates that approximately the same problems were involved. General Swinton shows that the main difficulties have centered around the ratio of weight to horsepower. This problem, however, has been solved to an encouraging degree by the development of the torque converter, cross-drive transmission, and other advancements. The book further outlines the history leading up to the necessity for some form of vehicle with a skin thick enough to withstand the effects of devastating machine gun fire and shell fragments, and to protect the infantry which may be following. It points out clearly the necessity for a vehicle which would travel cross-country over rough terrain. While the book is concerned with the development of British Armor, it is mentioned here because there is a decided lack of good books on this subject; also because development in England and America has run more or less parallel.

In addition to the books discussed above, it was found that an excellent paper on the development of Armor in World War II was produced in the form of a staff study by the Army Ground Forces Board in Europe. This study, prepared during the war, is based on questionnaires sent to all levels of command in Europe and the Pacific Theater of Operations. The Army Ground Forces Board interviewed many ranks under actual combat conditions. The study considers all phases of operations (i.e., supply: oil, gas and lubricants; ammunition: types, amounts, caliber and storage, maintenance, etc.). This material is well organized and is presented in a manner which is readable and easy to use.

The study was prepared for the purpose of ascertaining the effectiveness of the various vehicles in combat as seen through the eyes of the individuals who were responsible for their operation in the field. The value of the article lies in the facts presented which concern the effective operation of the vehicles under actual combat conditions. It is important from the viewpoint of development in that the remarks made by the people interviewed give many clues as to the strong and weak features of various armored vehicles.

Trends in Tank Development, an article found in the "Cavalry Journal" for January and February 1949, gives the reader an overall view of the development of the tank during and right after World War II. It illustrates how the knowledge gained in tank warfare has been applied to producing the present day tank. Each tank is considered individually and discussed from every angle. The main emphasis is on the three "P's", Pounds, Penetration, and Power.

The Armored Force Command and Center, Study No. 27, by the Historical Section, Army Ground Forces, 1946, is a report which covers every phase of the organization of the Armored Force. It includes a section on the development of the armored vehicles which were in use at that time. It also gives the trend of the time in the thinking of the individuals responsible for this development. The early history of the light and medium tank records a trend toward sacrificing fire power and protection in order to secure greater speed and mobility. This trend was later dropped for the characteristic of greater protection. Finally, the three "P's" of Pounds, Penetration, and Power came to be regarded as the primary consideration. While the study contains only a short section on development, it is very important in that it represents the official viewpoint during the years discussed.

Another important article is concerned with the development of the half-brother of the tank, the Tank Destroyer. This excellent article appears in the "Cavalry Journal," July and August, 1947, entitled Tank Destroyer Development, and was written by Major Ralph W. Lang. The article discusses the development of the Tank

Destroyer from its conception to the end of World War II when it was replaced by the heavy tank as a tank destroyer. The main reason brought out for the discontinuance of the Tank Destroyer was the susceptibility of its crew to air bursts. It was also brought out that, due to its relatively thin armor, it was very easily knocked out by any heavy caliber enemy weapon.

Development of Self-Propelled Mounts is the most valuable paper on the self-propelled gun. It considers the specifications on manufacture and general characteristics such as height, width, length, weight, gear ratio, armament, maximum speed, engine type and required crew for operation. It does not discuss the operation and the relative value of the weapon. It does, however, give the results of the tests made on each vehicle at the proving ground such as firing with brakes and gears engaged; with brakes but with gears in neutral position; without brakes and gears in neutral position; and other pertinent tests of structural development. The material presented in this document is purely technical and does not offer much to the history of development other than a source of material for comparison with existing material on earlier vehicles.

In the broad area of the Field Manuals, the material is again purely technical. It considers each vehicle separately and does not in any way trace or attempt to trace development.

Summary and Conclusions

In summarizing the observations made while analyzing the available material on the history of the development of Armor in World War II, there is a thought which dominates all others. This is the surprising lack of organized material on the subject. As stated above, the writing which has been done is found in the form of a limited number of books, articles in periodicals, and reports of boards or committees. All of this material serves to give information and data on the subject, but the fact remains that we do not have a paper which gives the complete story of the development of armored vehicles.

It is felt that there is a pressing need for a study which will include the history of the development of armored vehicles from the viewpoint of the technician, the tactician and the crew member. Such a study would be of great value to all interested in armored warfare. It would also give the student an excellent picture of what has been done in the field as well as the difficulties encountered. In attempting to determine the reasons for the lack of material on the subject, the conclusion was drawn that the people who are primarily concerned with the development of armored vehicles devote their complete energy and abilities to this

field. They do not wish to stop long enough to write more than a detailed factual report of their progress. This type of report is indispensable, but it does not provide anyone but the technician with information which he can use. These reports, as well as the observations of the tacticians who employed the vehicles and the crews who operated them, should be gathered into a study which will contain the information and data which is now found in several widely scattered places.

It appears that the initiative for this type of study must come from those who are interested in Armor as a combat arm and not those who are concerned with a particular phase of its development. Those who guide the present-day Armored Force must be made to realize the need in this field and then take steps to insure that this need is fulfilled. By providing the members of the Armored Force with a history of the development of Armor, the leaders of the force may very well supply the basis for new ideas of great potentiality. It is not at all inconceivable that such a source can stimulate the leaders of tomorrow in such a manner as to bring about the development of the vehicles which will insure winning the peace of tomorrow.

Recommendations

1. That The Armored School initiate a survey to determine the type of study required to give a complete history of the development of Armor in the United States Army to include World War II.

2. That the findings in the survey recommended in paragraph 1. above be used as a basis for the preparation of the history of the development of Armor. This study to be made by the agency determined in the survey.

3. That The Armored School make an official request of the Office of the Chief of Military History to prepare a special study on the development of armored vehicles during the period 1938 to 1946.

BIBLIOGRAPHY FOR CHAPTER 11

Armored Vehicle Vision and Advancement, a report prepared by the National Research Council, National Research Council Bulletin No. A-14-29 (June 1944)

Barker, Stephen M., Capt., "What's Wrong with Armor," Cavalry Journal, LV, No. 6 (November-December 1946).

Carver, R. M. P., Col., "Tank and Anti-tank", Cavalry Journal, LV, No. 5 (September-October 1946).

"Conference on Armor," a report prepared by a conference headed by Lt. Gen. Devers, Cavalry Journal, LVIII, No. 4 (July-August 1949).

Coolidge, George W., Col., Interview with Personnel of the 4th Armored Division, (Headquarters European Theater: November 19 44).

Development of Policy Trends and Items in Fighting Vehicles, a report prepared by Army Field Forces Board No. 2 (Fort Knox: 28 September 1948).

Development of Self-Propelled Mounts, a report prepared by Army Ground Forces, (November 1948).

Development of the Armored Personnel Carrier, a report prepared by Committee No. 5, The Armored School (Fort Knox: 1952).

Gavin, James M., Maj. Gen., "Air Borne Future of Armor", Cavalry Journal, LVI, No. 6 (November-December 1947).

Gillie, Mildred Hanson, Forging the Thunderbolt, (Harrisbury: Military Service Publishing Co., 1947).

Harris, Arthur C., Col., "History of Armor," Cavalry Journal, LVII, No. 4 (July-August 1947).

Heiberg, H. H. D., Col., "Trends in Tank Development," Cavalry Journal, LVIII, No. 1 (January-February 1949).

Jones, Ralph E., Maj., The Fighting Tanks, (Washington: The National Service Publishing Co., June 1933).

Lang, Ralph W., Maj., "Tank Destroyer Development," Cavalry Journal, LVI, No. 4 (July-August 1947).

Ogorkiewicz, Richard M., Maj., "Armored Cars: Their Past and Future," Armor, LX, No. 2 (March-April 1951).

Swinton, Sir Ernest D., Maj. Gen., Eye Witness: And The Origin of The Tank, (Garden City: Doubleday, Dorant Co., Inc., 1933).

The Armored Force Command and Center, Study No. 27, (Washington: Historical Section, Army Ground Forces, 1946).

The Role of the Army Ground Forces in the Development of Equipment, Study No. 34, (Washington: Historical Section, Army Ground Forces, 1946).

The Tank Destroyer History, Study No. 29, (Washington: Historical Section, Army Ground Forces, 1945).

CHAPTER 12

SUMMARY AND CONCLUSIONS

This final chapter is intended to give the reader of this report a summation of the observations made by the members of the committee while making an analysis of the history of Armor in World War II. No attempt will be made to summarize in detail the various types of writing that were studied. Instead, the subject will be approached from the viewpoint of how much value the current history of Armor in World War II is to the military student, the average member of the Armored Force, and the casual reader, military and civilian.

First, it is necessary to define what is considered to be history. In this report it is felt that anything whatsoever which authentically contributes to the picture of what took place during World War II is part of the history of the war. Within this broad definition of history it is necessary to divide the various types of historical data and papers into general categories. These are four.

The first consists of the basic data itself. This is the material upon which all history is based. It includes the voluminous records and documents submitted by units and individuals in the field. Within this first category are found the records, reports and documents prepared during and shortly after the end of the war. The official records include a complete series of journals, operations reports and after-action reports. In general, these records are on file in the various agencies in Washington, D. C., such as the National Archives, The Adjutant General's office and the Office of the Chief of Military History. Also, there are less extensive collections in the various schools like the United States Military Academy, The National War College, and Army Industrial College. The various military and service schools also hold limited collections of this type of document. As a means of making the reports available to the agencies and schools which can utilize them, many of the reports have been microfilmed and distributed as required.

The second category includes a large number of published and unpublished works in the form of memoirs, biographies, unit and organizational histories, diaries, personal narratives and experiences, and monographs relating to the various aspects of World War II. These papers supplement the collections of original documents. They are quite valuable, but are apt to present a problem when used in the preparation of a well-balanced scholarly

history. This is due to the fact that they were prepared near the end of the war and are apt to contain personal bias and fail to make critical use of all possible sources of information.

Category three is made up of the works which are called "histories". They are normally prepared by a governmental agency or professional historian. The latter may work with the government or independently. These histories are based on the basic documents listed above, and require long periods of careful tedious research and evaluation. When completed they serve as authentic basic historical documents to be used as a foundation upon which to write further history. No attempt is made by the historian to interpret the history recorded or to point out lessons learned; that is left to the reader and future historian. In the case of World War II, the government, through the various agencies of the Armred Forces, has undertaken the task of preparing an official history of the war.

It is expected that eventually professional historians will begin to produce histories which may take the form of a study of the war as a whole or of a particular phase or aspect of it. Perhaps it is too soon after the end of the war to expect such works to be produced. In the past it has been proved that a number of years are required before the basic documents have been sifted, evaluated and interpreted to a sufficient degree to allow the historian to produce a history which would be universally accepted as factual, balanced and worthwhile. With these considerations in mind, it might be pointed out that the period which will produce a series of first-class historical works on World War II has perhaps not yet begun.

The fourth category includes all other types of writing which contain data or information of World War II. It also includes charts, graphs, atlases, pictures and other types of visual information. The most important types of writing in this category are special studies prepared by the various government agencies and military establishments, and articles written for periodicals. This type of writing is normally an interpretation of the basic histories on a particular subject or action. It expands and evaluates the material contained in the basic documents and histories. Eventually this writing may come to be regarded as basic data upon which further studies and histories will be written.

At the present time, a few short years after the close of the war, the special studies and articles are very important as they provide a large part of the available history of World War II. They serve to fill the gaps which exist in the basic histories by covering a large range of specific aspects or phases of the war. This is particularly true in the history of Armor in World War II.

The reasons for this are fairly obvious. To begin with, the employment of armored vehicles and units is a relatively new concept in warfare and the idea of an armored force as a separate branch of the service is even newer. It appears that due to the fact that sound and scholarly history is not written over night or even in the course of a few years, it is too soon to expect an acceptable history of Armor in World War II to be written. This does not preclude, however, the beginnings of such an effort. In fact, the foundations are being laid in the form of official histories and the special studies and articles which are constantly being prepared. In addition, the process of research and evaluation never ceases. A large number of people are kept busy at the task of sorting, sifting, evaluating and interpreting the maze of basic source material from which history is written.

The general discussion which follows is a summation of the various types of writing which contribute to the history of Armor in World War II.

The most commonly recognized type of history of a military operation is the so-called "official history" produced by a government agency. The History of World War II is being produced by the Office of the Chief of Military History. This ninety-nine volume account is a tremendous undertaking which will require several years to complete. It is being written by a group of civilian historians working under the supervision of experienced Army officers. The historians are capable men, experienced not only as historians and students, but, in most cases, as wartime members of the Army as well. The history they are writing is based on the vast field of documents of all types which serve as source material. Much of this material is found in the basic after-action and operations reports submitted by units during the war. From this maze of material the historian writes his history of a particular campaign, operation, phase of staff work or administrative operation. By directive from the chief historian he is expected to write a basic history which will give a detailed, authentic picture of the actions involved. This account is based generally at the division level with background material of both higher and lower units worked into the picture. If the action involved demands it, the level is dropped to platoon or even individual action. No attempt is made to interpret or draw conclusions from the various actions recorded; this is to be a basic history.

When the historian has completed his final draft of the work it is submitted to a panel composed of military and civilian members of the Office of the Chief of Military History. These men suggest whatever changes they deem necessary to make the paper a finished piece of work. After a series of panel meetings and constructive criticisms the history is approved for publication. Included in the histories are excellent maps and an index which add immeasurably to

the overall value of the documents. In some of the early volumes published such as the "Lorraine Campaign" the index was not very extensive. In later volumes this deficiency has been corrected with the result that the value of the history to the student is measurably increased.

Let us return to the question of what value these histories are to the person concerned primarily with the history of armor in World War II. It is felt that when completed they will be indispensable as basic source material. The volumes completed to date contain a limited amount on armor due to its comparatively limited use in the campaigns recorded. Future volumes will complete the picture of all actions in which armored units were involved. When completed the Armored Force will have in these volumes not a history of Armor, but a basis upon which to write a history of Armor. In the meantime, those volumes which have been completed serve to give the overall picture of certain campaigns and operations. The casual reader will no doubt find them detailed, involved and perhaps boring. The inexperienced student will probably have the same difficulty, whereas, the experienced student, researcher, or historian will no doubt regard them as incomparable sources from which to write further history or draw conclusions as to the lessons learned.

In the field of what will be called "historical type" books it appears that nothing has been produced as yet. An excellent example of the type of work referred to is "Lee's Lieutenants", by Douglas S. Freeman. Nothing more can be said about the lack of this type of writing except that the historian has in these books outstanding examples and inspiration for a similar work on World War II. It is realized that this may be far too soon after the close of the war to expect a polished top-flight history to be produced by anyone. In spite of this it is felt that every effort should be made by military authorities to encourage capable historians to undertake the preparation of books concerning World War II. Those who guide the Armored Force should exert sufficient influence to insure that these historical papers, in whatever form they may take, include a full measure of the story of Armor.

In addition to insuring that books on the war as a whole contain a proportionate share on Armor, those who guide the destinies of the Armored Force should take positive measures to bring about the writing of the History of Armor in World War II. It is apparent from the observations made above that to date nothing of any import has been done in this direction. It is a task for a professional historian. No less a person should attempt it. He will probably be a civilian and will have to be induced to do it. Once he has consented to undertake the project, he must be given

all assistance possible. This means that he must be allowed to work with the Office of the Chief of Military History. The extensive background and facilities and the voluminous source material of this office would be of inestimable value to the writer of the History of Armor.

It should be mentioned here that it is felt that the most logical approach to writing a complete history of Armor in World War II is to start with the very beginnings of the Armored Force and build up to the major portion which would cover the war.

There is one paper which represents the most authentic, factual and complete study of the history of the development of the Armored Force. This is Study Number 27, "The Armored Force Command And Center", prepared under the direction of the Historical Section-Army Ground Forces in 1946. This history was written by officers assigned to The Armored Center and was reviewed by such prominent officers as General Jacob L. Devers, Lt. General Alvan C. Gillem, Jr., and Major General Charles E. Scott. The final draft was then edited in the Historical Section. Most of the material which provided the basis for the history was found in the files of The Armored Center at Fort Knox.

The study contains chapters on the original structure of the present-day armored force, organization of armored divisions and separate tank battalions, tactics, commanders, training, principles of the employment of armor, testing of equipment, The Armored Force School and Replacement Training Center and The Armored Force Board. In addition there are seven charts which illustrate the organization of the Armored Force during the period July 1940-1943. The appendices include courses offered by the Armored School and historical sketches of armored divisions and corps. This forty-seven page study gives a rather complete picture of Armor during the period 1940-1943. In addition to its completeness it is factual and reasonably well organized. In summary, it is felt that this study prepared under the direction of the Historical Division-Army Ground Forces, is the only available document which represents, in any sense of the word, a history of Armor. It would provide an excellent basis for a more complete history.

Soon after beginning the project of analyzing the history of Armor in World War II it became apparent that of the many copyrighted books which have been written about the war, none can be considered as a first-class book on Armor. None of the men who have been the leaders in the organization and guiding of Armor have come forth with an effort such as "Panzer Leader", by Hanz Guderian of Germany. The book "War As I Knew It" by General George S. Patton is interesting reading, but it contains only a limited amount of information on armor. It is felt that if General Patton had lived

he would more than likely have written a book which would have taken its place beside "Panzer Leader" as one of the most important books of the war.

Earlier in this report reference is made to "Forging The Thunderbolt" by Mrs. Mildred Gillie. This is a very interesting book based primarily on the activities of Major General Adna R. Chaffee. Mrs. Gillie was a close personal friend and admirer of the Chaffee family. She apparently had access to much of the official and unofficial material which allows her to give a rather complete picture of the difficulties encountered during the period when the Armored Force was born. She deals heavily in personalities and, as can be expected, includes many details which treat with the family life of the Chaffees and other prominent Army personalities. In spite of this, the book does give a definite trace of the development and progress of the Armored Force before and during the early years of World War II. It is fortunate that this interesting book has been written. First, because it gives recognition to the sincere and continued efforts of General Chaffee and other prominent leaders in the change-over from horse cavalry to armor. Secondly, it does portray, from a woman's viewpoint, an important portion of the history of Armor.

The other prominent books written about the war or the experiences of an individual during the war all give the "big picture" with the emphasis dictated by the position held by the author or phase of the war about which he is writing. Unfortunately, none of these books place the emphasis on Armor. In "Crusade In Europe" by General Eisenhower, "A Soldier's Story", by General Bradley, "Calculated Risk" by General Clark, and other well-known books by famous soldiers, there are occasional references to armored units, actions involving armored units or the influence of armor on a particular action or operation. Unfortunately these references are few and widely scattered.

Before launcing a discussion of the other types of historical writing which contribute to the history of Armor in World War II, it should be noted that the material contained in the basic records and documents is very extensive. So much so that the process of editing, evaluating and interpreting it has, in reality, just begun. This processing of the information and data contained in these records is, however, progressing at an unprecedented rate. It should be noted that the majority of this work is being done under the direction of the Office of the Chief of Military History. As it exists before processing, the material serves the purpose of providing a detailed and sometimes confused account of what actually happened during the course of the war. As such it becomes the basis for a large proportion of what will eventually be written about the war. Due to its extremely detailed nature the material is of limited

use to the inexperienced student and certainly is of little or no interest to the casual military reader or civilian. Considering the reports from the viewpoint of their contribution to the History of Armor in World War II, the statement made above applies - "They are an excellent and indispensable source of basic material, but of little use to any but the historian, researcher or experienced student."

In surveying the material available on Armor in World War II it was found that of the various types of material which fall into the second general category of memoirs, biographies, unit histories, diaries, personal narratives, research reports, and monographs only the unit histories, research reports and monographs contribute valuable material. The monographs are interesting and are of definite value as far as they go. Each is a record of a small bit of history by an individual who, in most cases, was present at the action being described. He is thus able to supplement the official record of that action with his personal knowledge of what took place. The weakness of this type of paper lies in the fact that the author appears to have leaned too heavily on the official record. He has merely repeated in a detailed, often boring, style that which is to be found in official documents.

A second weakness is the often flowery dissertations on the skill and bravery of the individuals involved. This information is certainly worthy of note, but it must be handled in a tactful manner to avoid boring the reader. It is felt, then, that the monograph is a worthwhile contribution to history provided that the author writes his own story and selects his material carefully. The overall value of this type of paper would be increased manyfold if a series of monographs on a particular subject were gathered into one volume with a table of contents, index and comparative evaluation of the contents to guide the reader.

The various service schools have assigned committees of students research topics which cover, in general, specific studies within the realm of interest of the branch concerned. The topics are chosen with the purpose of filling the gaps which have been found to exist in available sources and to keep in stride with new developments. This basis of selection is excellent. It provides for the writing of history which, in the normal course of events, probably would not be written for several years.

It is felt that the research reports are valuable contributions to the history of Armor in World War II. Some are not of high quality, but they do serve to fill the gaps in other material. Most of them gather and, to a degree, interpret important phases of history. Still others represent the only paper available on a specific aspect of armored warfare. As such the reports are of definite

value. They are serving a purpose at the present time and, in the future, may very well be used as a guide to more deliberate studies.

During and shortly after the close of the war most of the regimental and division size units prepared so-called unit histories. Actually few of them are worthy of the title "history". This is in no way intended to be a criticism of the individuals who prepared them. The statement is made because, in the beginning, these accounts were not intended to be histories in the true sense of the word. They were written largely for sentimental and morale purposes, intended to give the members of the various units a readily available story of what their unit had done during the war. To accomplish this they naturally had to be written and published during the war or soon after it ended. From the historian's viewpoint such a situation seldom gives rise to the writing of a valuable history. Nevertheless, these books do have a definite value. First, they did accomplish the purpose of providing the unit members with a story of their unit at the time when they wanted it the most. Secondly, they provide excellent source material upon which to base more careful and scholarly unit histories at a later date.

In all fairness to some units, it must be pointed out that the unit histories vary greatly in general quality and in value as contributions to history. They range all the way from excellent to poor. Each, regardless of its quality, records data on personalities and individuals, as well as small unit actions, that are to be found in no other place. In addition, most of them contain pictures which are very difficult to duplicate.

Now that the war has been over for several years ample time has elapsed for the collection of basic source material. There has also been time to interpret and evaluate much of this material. It is felt, then, that in spite of the great variance in quality the unit histories are valuable bases for more complete and authentic accounts of the history of a unit.

Some of the more active unit associations have already undertaken a revision or rewriting of their unit histories. They have commissioned an experienced and capable historian to produce a first-class history of their unit. The 1st Armored Division is an excellent example of such a unit. This program will undoubtedly result in many extremely valuable contributions to the history of World War II.

It is felt that every effort should be made to encourage all the unit associations to have their unit history revised or rewritten. In the case of those which have no unit history, they should be encouraged to have one written. In view of the limited

amount which has been written about armor in general and the broad gaps which exist in the history of Armor in World War II, it should be kept in mind that unit histories are perhaps more important to Armor than any other branch of the service.

The fourth general category of writing includes periodicals and special studies on particular phases or aspects of the war. It is felt that this is an extremely important type of writing. It is important because it is the medium through which the largest group of interested people are reached. Normally, articles on military subjects are found in the so-called service journals, but World War II caused a rather large number of worthwhile articles to appear in all types of periodicals. Most of the articles found in non-military periodicals are of a general nature, covering the story of a particular unit or phase of the war. They are factual, reasonably authentic and readable. This is the type article which reaches the American people as a whole. It is the only contact many civilians have with the Armed Forces. In addition, this is the only military history that an alarming proportion of the general public is exposed to. It is felt that if many more such articles were written for and published in the leading periodicals an important service would be performed. First, as a medium to give the American people an appreciation of the Armored Forces through military history and second, as a worthwhile contribution to the History of World War II.

The military periodicals are of two types: The regular service journal, and reviews published by the various government agencies and schools. The "Military Review" published by The Command and General Staff School is an example of the latter type. These reviews contain articles on all phases and aspects of the military establishment with the emphasis predominately on Army affairs. Some of the articles are concerned with current doctrine, policy, or developments, and others with material which can be regarded as history. Many of the latter are good. They have either been reprinted from one of the service journals or were written by a member of the faculty or student at the school. Some of the subjects are general in nature, but for the most part the articles cover something specific such as a type of special operation, the use of a particular weapon or how to conduct certain staff work. This characteristic adds greatly to the value of these articles. It causes them to fill many of the gaps which exist in the current military writing concerning World War II. The authors are writing from personal experience or knowledge and are capable of not only recording history but of interpreting it.

In many of the articles an attempt is made to teach a lesson by a thorough description of the subject and then a summary, conclusions, recommendations, or an outline of lessons to be learned. This interpretation is of great value to the average member of the Armed Forces or the inexperienced student.

In addition to the articles written by American authors the "Military Review" includes a section of "Foreign Military Digests" in which articles written by members of foreign armies are presented. These articles cover a wide range of subjects and are written by members of most of the foreign armies of the world. They also are of particular value both as an orientation on the methods used by other armies and as a matter of general interest.

The service journals, similar to the "Military Review", carry articles which cover all phases of ground warfare. Normally, these articles are limited in scope to something which is of particular interest to the branch or branches the journal represents. They cover a wide range of subjects with the emphasis on attempting to teach a lesson. The articles are normally written by officers who have a particular knowledge of the subject about which they are writing. Through their knowledge they are able to interpret the bit of history they are writing about, thereby adding measurably to its value. Unfortunately, the number of articles which might be considered as contributions to the History of World War II is limited. It appears that there is no organized program to encourage members of the Armed Forces to write articles for military or other periodicals. As result, the various journals have had to run articles encouraging people to write and submit papers on whatever subject they are capable of writing about.

To add emphasis, it is repeated that the periodical is an extremely important medium for the recording of history, military history included. It is not within the scope of this paper to judge whether the periodical is given proper recognition by the historian, but it is noted that the military periodical is sadly neglected by military personnel. Although the articles which have appeared in the past and which appear in the current issues of the various journals are generally rather good, the selection, as a whole, could be much better provided that the editors have sufficient material to select from.

The following article from "The Infantry Journal" of October 1946 is included here because it gives an excellent picture of the state of writing in the Army at that time and at the present.

> THE JOURNAL is often asked to suggest suitable men for writing jobs in the Army and the War Department. This was so, even during the war, when large numbers of able writers were in the service. Now, since so many have been discharged, it happens more often. There does not appear to be enough capable writers in uniform to do even some of the most essential writing work.
>
> It seems to THE JOURNAL that it is about time for the Army to become realistic about writing and its importance to training and war.

The average army man is not very different in his attitude toward writing from the average civilian in industry or business. Both agree that an easy flow of clearly arranged words is useful and at times important. Both believe that men who can write are essential in any sizable activity, if only for the purpose of preparing plans and reports. But in general, soldiers, like most civilians, have the idea that a man who can write is somehow different from other men, perhaps not quite as hairy-chested or levelheaded. A writer, many feel, can do little else well. You need him, and pay him for his special ability. But you would hardly put him in command of a battalion.

This idea undoubtedly comes from the manner in which writing has been taught in the United States for a century. Even the most virile of the classic writings have too often been presented to young people with chief emphasis on the beauty of the language rather than upon what the words say. Fine English, they learn, is beautiful, artistic, inspiring, which of course it may be. But what it says is of equal and usually of greater importance. And at any rate our schools have presented the studies needed for writing facility in such ineffective ways that most adult Americans shrink from writing as a dreary chore and feel that there is something different about those who can readily put words together.

The fact is, as THE JOURNAL has insisted many times, that writing is a normal and necessary tool of business for the businessman. And a lack of facility in it may frequently hamper either. At least the man who may rise to high responsibility without the ability to write, dictate and edit his ideas clearly must have assistants around him who do have that ability.

It is of course a fallacy that a man who writes is somehow not likely to reach a place of high responsibility, or that men who do reach such places can harldy be writers of ability. Several of the very top men of World War II are men whose prose is lucid and effective. And THE JOURNAL makes this statement with full allowance for the fact that high Army men, like those elsewhere, must often have drafts of speeches and reports prepared by others.

It is indeed a fact that several of our great military leaders can write and write well. General Marshall's manner of written expression is vigorous, accurate and readable. His many public statements are an undeniable proof. General Eisenhower's more informal way of writing is clear, direct, and deeply interesting. One talk he gave in London during the war is a first-rate piece of writing, and it is surely to be hoped that he will take the time, when he can, to put his own story and his

ideas on leadership and our military future in written form. It may be that General MacArthur's prose has a distinct flourish. But this tendency toward the dramatic takes little or nothing from the lucidity, emphasis, and clarity of what he writes.

There are others. But these three examples should be enough to make the point that writing has its normal place in the life of a successful military man, that it is a desirable ability for a military man to have, and that there is nothing whatever about it that necessarily makes a man too special for a rounded and successful career. And these examples should be enough to emphasize the further point that more attention must be paid to the cultivation and encouragement of writing ability within the Army.

The Army should never run short of men who can write. It should insist that much more time be given in the training of student officers, at West Point and elsewhere, to make them practical and efficient writers. It should give thought to special training, particularly toward developing early a facility for dictation. It should encourage useful military writing of every kind.

And above all, the Army should find and train men who can do a far better job on its instructional materials, especially the field manuals and all books of training. Despite the ability and earnestness of many of the officers who have developed the present field and training manuals, they are on the whole far from meeting the best standards of modern written and pictorial instruction.

In the past, the manuals have almost always been prepared under pressure, usually by inadequate staffs. Now, they do not need a mere factual revision in the light of late developments. They need a complete overhauling.

There is a special need at this time for first-rate instructional texts for the Reserve Officers Training Corps and the civilian components generally. These parts of the Army must lean perhaps more on written texts than the Regular Army because of the difference in available training time. The Army's books for their use should therefore be as good as they can be made---with every help toward interest and learning that is to be found in the best of the modern textbooks used in schools and colleges and for self-learning.

If, by any chance, the field manuals are used in their present form as textbooks for the ROTC, there is hardly a more discouraging or stultifying measure that could be taken. For

the manuals are mainly handbooks for officers who already have some degree of training---dull and uninspiring handbooks at that. They are not suitable in any way for use with the ROTC and especially not for use in any program of universal military training that might eventually be adopted.

THE JOURNAL does not intend to say that these things are unrealized by the military authorities. But the Army has never had reasonably adequate books of instruction. THE JOURNAL itself has been pointing at this particular weakness for many years, and it believes that now is a time when action is greatly needed and is possible of accomplishment.

And a good part of that accomplishment must be a change in the general military attitude toward writing itself. Writing is vital and necessary to the Army--and to the Army man of the future.

The above article and the observations made throughout this report in regard to the weakness of the present-day history of World War II point out the fact that there is a definite need for a program to be instituted at a high level which will not only encourage but require officers at all levels to write articles on military subjects. This program should begin with the initial officer training and continue throughout the Army School System. The two-fold value of such a program is obvious; the student would not only increase his basic knowledge and ability to produce an acceptable paper, but would assist in the recording of valuable military history. The dire need for such program becomes apparent when one considers the small number of worthwhile articles on any particular subject which have appeared in the service journals during and since World War II. Armor in general, and the various phases and aspects of armored warfare, are an excellent example. The preceding chapters have indicated the limited number of valuable articles which have appeared covering specific aspects of armored warfare. These things are of vital importance to those concerned with armor and there should be a source of material on them.

During this period when the basic histories and the interpretations of them are still in the process of being written there is a pressing need for some type of military history to fill the gap. This can be done admirably by the military periodical, but only if it is properly supported. It is felt that the answer lies in the program outlined above. It would inevitably produce a store of valuable papers which would be of worth to the present-day student and eventually come to be regarded as lasting contributions to the History of World War II.

Let us consider also the amount of material which has been produced by the American junior officer as compared to the foreign

junior officer. During the course of this analysis it became evident that the "Military Review" and other sources contain many valuable articles written by junior officers of foreign armies. In some fields there was ample material about foreign armies but practically nothing by Americans about the American army. This was particularly true in the case of special operations such as Armor in night operations, forests and cold weather. The material written by the foreigners was usually the effort of a junior officer writing at a level which is of prime importance to the American junior officer and student, and is easily understood by the average civilian.

The methods used by foreign armies to induce their junior officers to write these articles is unknown, and perhaps not important, but it is important that the American Armed Forces do something about inducing their junior officers to do more writing. Until this is done the present-day student and the American people will be needlessly denied a source of knowledge of matters which are of vital importance to all.

All of the observations made above in regard to periodicals pertain fully to the history of Armor in World War II. In this field, as in all others, the periodical is an extremely important medium for the recording of history. Yet it is not being properly exploited, in fact, it is being given a minor role. Armor is an excellent example of how the periodical is not being used to its full advantage. Due to its relative newness in the field of warfare, comparatively little has been written about the subject in general. In addition, very little has been written about specific phases and aspects of armor and armored warfare in World War II. The reasons for this are readily recognized, but what has been done to use the periodical as a medium to fill the gap -- very little. It might be said, however, that the articles concerning Armor in World War II which have appeared in the various periodicals have generally been excellent. They are a valuable contribution to history, but are just too few in number and too limited in their coverage of specific phases and aspects of armored warfare.

Before opening a discussion on the subject of special studies it is desired to remind the reader of this report that it was prepared by a committee of relatively junior officer students. This committee fully appreciates the necessity for the preparation of the official histories, but it is also deeply impressed by the lack of easily accessible historical information and data on specific phases and aspects of armored warfare. Much of the material which is available is either too general in nature or is in such a disorganized state that the student simply does not have time to gather and assimilate it. He is looking for material which is readily available, well organized and specific. Of all the material analyzed in this survey the so-called special studies meet the needs of the student the most fully.

Special studies, as they are prepared by the Office of the Chief of Military History and other agencies, are historical studies written about a particular phase of World War II such as Armor in general or any specific aspect of armored warfare. The employment of Armor in cold weather operations, or combat maintenance in armored units, are examples of the latter type. These studies are prepared from the official histories, or in the event these histories have not been completed, from the basic records and documents. As can be expected, the studies differ as to form. In general they are detailed and factual, but are written more in a narrative style than are the official histories. They serve as an excellent complement to the official histories by elaborating on particular phases of history. Also, during this period when the official histories are being written and few worthwhile works by independent historians have been produced, they fill many of the gaps in the history of the war. It is in this latter role that the studies are of value to the student. It gives him an unsurpassed source of material on specific subjects.

At the present time the most important and valuable special studies on World War II are being prepared by the Office of the Chief of Military History. The various theatre headquarters are also preparing studies, but the work they are doing is generally confined to current events which took place since the end of the war. A similar type thing was done during the war by the theatre and army headquarters and the various major staff sections of the Army such as Army Ground Forces. The latter produced an excellent series of studies on the various phases and branches of the ground forces. These studies now represent the only organized material on many subjects and as such are invaluable. In addition, they form the basis for many of the more extensive studies presently being prepared. Study Number 27, "The Armored Force Command And Center", which was mentioned earlier, is an example of the type study prepared by the Historical Section of the Army Ground Forces.

In the Office of the Chief Of Military History the special studies are being prepared by the Special Studies Division. This division has two branches, The Applied Studies Branch and The Foreign Studies Branch. The Applied Studies Branch has the mission of preparing studies on any particular phase of history which the various Army agencies or competent individuals determine necessary and vital. To date, a large number of these studies on a wide variety of subjects have been completed or are being written. The responsibility for the initial request that a study be made lies with the various Army agencies, headquarters and schools. Once the request has been approved, the study is prepared by selected officers working with the various members of the Office of the Chief of Military History.

This explanation of the organization of the Special Studies Division and the manner in which the special studies are produced is included because it is felt that these studies are an extremely

important type of historical writing which is not being properly exploited. The Armored School, as well as other responsible agencies, should make every effort to add to the history of Armor in this manner. By continued liaison and mutual support and assistance, the Applied Studies Branch and The Armored School could do much to fill the wide gaps which now exist in the historical material available on Armor.

It should be mentioned here that the research reports prepared at The Armored School are a type of unpublished special reports. As mentioned earlier they do make a contribution to history but lack the quality of a report prepared in a more deliberate manner by selected personnel. The importance of the special study to the students of the school cannot be overstressed. Due to the nature of the courses offered and the level of experience of the average student, it is these studies, along with the articles found in periodicals, which provide him with the most useful source of information.

In addition to the special studies of specific phases of warfare, there is a definite need for histories of small unit actions. This need is partially filled by the articles and monographs, but these sources represent only a beginning in the field. At present, the Office of the Chief of Military History is in the process of completing two projects which will cover small unit actions in the service arms as well as the combat arms. The project which includes Infantry, Armor and Artillery is being done by Mr. Gugeler. When completed it will certainly fulfill a pressing need for historical material based on the level of the small unit or junior officer.

While this paper is a study of the history of United States Armor in World War II the studies being made of foreign armies are of such import that they should be mentioned here. The Foreign Studies Branch of the Office of the Chief of Military History is exploiting to a remarkable degree the sources of the military history of World War II in Germany. An imposing number of articles on practically all phases of the German Army and the war have been written, mostly by former German generals. Generally, these articles and studies are excellent. They provide a valuable source of historical material which, had it not been for this project, probably would never have been recorded. Equally significant is the fact that many of the studies represent exactly what should be written about the war from the American point of view.

There have been several studies made which concern Armor. Examples are: "Tank Losses", "Tank Recovery and Evacuation", "Heavy German Tank Weapon" and "Small Unit Actions During German Campaign in Russia". In addition to these studies which concern a particular phase of Armor there are several which contain valuable information

on various aspects of armored warfare. These studies are examples of what can be produced as well as what is badly needed in the field of American military history of World War II. It is felt that the German studies are definitely important and valuable, but also, that the American side of the picture should be recorded equally well. Judging from the studies listed in the "German Studies Catalogue" it appears that the German studies are far more complete than the studies made about American units or actions.

Major General R. W. Grow has begun a series of special studies which are outstanding examples of a type of writing about World War II which, up to this time, have been virtually neglected. General Grow has used the "Lorraine Campaign" as a basis for three studies which are titled: "Broad Front vs Narrow Front", "Armor and Mobility in Maintaining the Momentum of a River Crossing" and "Mobility-Unused". These studies are based on the application of the principles of war and tactical principles as taught by the Army School System. The author analyzed the campaign thoroughly and then pointed out how the various principles or techniques were followed or neglected. By doing so General Grow has made a fine contribution to history, a contribution which is invaluable to the student who does not have the time, experience and knowledge required to make such a study. By indicating lessons learned and criticizing the actions of various commanders these studies interpret an important segment of history. In addition, they illustrate, by example, how an operation can result in success or failure by the proper application or neglect of accepted principles.

Two of the studies by General Grow deal directly with Armor. The first, "Mobility-Unused" is a strong argument in favor of Armor. It shows how the mobility characteristic to Armor was not properly exploited and how, if it had been, a period of difficult and expensive fighting could have been avoided. The study also points to instances where armored units were needlessly given the mission of containing the enemy when they could have been employed more profitably in other roles.

In the second article, "Armor and Mobility in Maintaining the Momentum of a River Crossing", General Grow traces the river crossing operations of two army corps. He illustrates how each commander conducted the operations and points out the reasons for the relative success of each operation. In addition, he places the emphasis on the role of Armor in this type of operation and illustrates how each commander employs his Armor.

It can readily be appreciated what an important contribution to the history of Armor in World War II is made by these articles. They represent a mere beginning in a field which should be exploited to its fullest extent. Those who guide the destinies of the Armored Force should make every effort to encourage and ensure that a complete

series of such studies are produced at all levels of command. The student of Armor is in great need of this type of material, and it can be produced.

As the official histories and other basic historical works are completed, there is no reason why they cannot be thoroughly analyzed for lessons learned as done by General Grow. The initiative, however, must come from those concerned with the Armored Force. It appears that within the overall scheme of the writing of the History of World War II, it is he who shows the most initiative and interest who gets the most written about the subject in which he is primarily interested. It is mere good fortune that General Grow has an interest in Armor and subsequently placed emphasis there. If other officers of all ranks who are interested in and familiar with Armor are induced to analyze history from the Armor viewpoint, the result will be of inestimable value.

Although not normally considered as a true type of historical document it is felt that the field manual, lesson plan and manuscript should be mentioned in this paper. These sources represent, in a very condensed and factual form, the lessons learned during World War II. In the case of Armor they provide practically all of the available material on certain subjects and particular phases of armored warfare. This is unfortunate, and as the various historical works are produced, the situation will be rectified. In the meantime the field manual will continue to occupy rather an important role as a historical document. The student searching for information on a particular subject is often forced to use this source in the absence of other material.

In spite of the fact that the field manual, manuscript, lesson plan and other devices used for teaching are often rather compact and uninteresting, it must be remembered that they represent the condensation of the efforts of a large group of experienced individuals. In many cases this is the only medium through which many capable and knowing men have expressed their ideas and reflected their experiences. It is fortunate that these men have had this medium in which to express themselves because this is the only place in which their experiences and knowledge will ever be recorded.

When analyzing the history of Armor in World War II, the researcher often finds that when searching for material on a particular phase or aspect of Armor during the war the usual sources of historical material contain very little information. As a result he has two choices. He can go to the maze of basic records and documents and dig the material out or he can resort to the field manuals on the subject. Usually the basic records and documents are not available to him and if they were, it would require a prohibitive amount of time to get the desired material. These observations bear out further the need for an intensified effort in the various fields of historical

writings discussed above and makes further note of the fact that at the present time the field manual, while not a true historical document, serves to fill many of the gaps which exist in recorded history.

Up to this point nothing has been mentioned about the type of history which includes the so-called visual devices such as pictures, charts, maps, diagrams and others. This type of recorded data certainly occupies an important position among the various types of history. The historian may regard it as merely a supplement to written history, but that concept is not accepted in this paper. The well-worn saying that "A picture is worth a thousand words" is probably a gross exaggeration, but the visual devices cannot be regarded lightly as sources of historical information and data. In fact, it is felt that the history of the war would be grossly incomplete without them.

The Office of the Chief of Military History has prepared two volumes, the "European Pictorial" and the "Pacific Pictorial" which represent the official pictorial histories of the war. In addition to these volumes every effort is being made to produce pictures, charts, and other type of works which will be of interest to the members of the various Army units. In addition, there is an untold number of maps, diagrams, charts and pictures distributed throughout the whole field of military history. Practically every type of history includes them in varying amounts. As a result of this they add immeasurably to the completeness of history as a whole.

It appears that, to date, nothing has been produced which might be considered a pictorial review of Armor in World War II. There are, however, thousands of pictures of the exploits of the various armored units in the pictorial reviews and other places. In fact, it might be said that, comparatively, Armor has received the most complete coverage of any branch of the service. As a result, this is the only field of historical material in which Armor has been given the most attention. Contrary to the observations made about all other types of material discussed, it is felt that the present day coverage of the history of Armor in World War II by the various visual devices is rather complete. There is a need for reorganization and certainly room for more work here, but the need is not as pressing as in other fields.

In the opening remarks of the chapter it was stated that this summary would be approached from the viewpoint of the military student, an average member of Armor, and the casual reader, military and civilian. Let us take first the casual reader. This type individual is in search of relatively easy, interesting reading which he can enjoy and, at the same time, increase his general knowledge. Looking at the field of history of Armor in World War II as a whole, it might be said that there is comparatively little material available to him.

The field of books of all types offers practically nothing in the field of Armor. There are frequent references to it in a few books which give the "big picture", but these are widely scattered and fragmentary. Periodicals, both military and civilian, offer a surprisingly limited amount of worthwhile material on Armor. As stated before, this appears to be the result of a decided lack of interest in the writing of articles by the average officer.

The special studies of all types are of interest to the casual reader. Many of them are excellent interpretations of the official histories and other basic sources, and, as such, make interesting and worthwhile reading, The histories themselves are simply too detailed to be of much interest to an individual who desires easy reading. Unless the reader has a special interest in a particular operation or action, it is quite likely that he will soon become confused or bored. The various unit histories are of much more interest to the casual reader. He will find that they offer rather light and easy reading well complemented by numerous pictures, maps and diagrams. The pictorial reviews are also of definite interest; in fact, the average individual who has no particular aim in his reading has probably acquired more knowledge of Armor in the war from this source than any other.

In summation, the casual reader, at the present time, does not have available to him a broad field of writing on Armor in World War II. It appears that this may be due to the comparative newness of Armor coupled with the fact that the men who are familiar with Armor and its employment simply have not produced much material which is of interest to the casual reader.

There will always be a lack of agreement on the question of for whom history should be written. It is beyond the scope of this paper to fully discuss this question, but the following observations have been made. The members of the committee feel that the history of Armor should be written for those who can benefit from it the most, the members of the present-day and future Armor branch. To a degree this is being done, but there are certain areas of endeavor within the historical field which are not being properly emphasized.

It was pointed out earlier in the paper that there is a decided lack of information on particular phases and aspects of Armor. This is the information which is vitally important to the student, and in many cases it has not been organized and presented in a form which is of use to him. In the previous paragraph the weakness of the medium of periodicals was discussed. This is a medium which is readily available to the average Armor member and which should be fully exploited by those in positions of responsibility. It appears that those who are interested in history and are influential in the direction of the recording of history, are prone to place too little emphasis on the type of history which can be of use to the average soldier and non-commissioned officer.

It is true that within the Office of the Chief of Military History there is a section which approaches the recording of history from the viewpoint of furthering the morale of the troops. This is done by attempting to familiarize the members of various units with the history of the unit. The program is excellent and is undoubtedly enjoying success, but sufficient emphasis has not been placed on it. The average soldier, due to his age, education and the type of life he leads in the Army cannot be reached by a detailed, scholarly type history. In fact, he will not be reached by any type of history unless his leaders, from the highest level to the platoon leader, provide him with the type of thing he will read and assist him in making the best use of it. It is felt that history can be a very potent weapon against the enemy as a means of building pride in a unit and giving it "esprit de corps". A concerted effort should be made to determine the type of material which the average soldier is interested in, and then bring history to him in the medium he prefers.

Probably the greatest user of history is the student. It is he who desires to learn and who is searching for sources from which to learn. Naturally he is required to turn to history for much of his information. The military student of World War II is faced with the fact that during the period 1919-1948 contemporary military affairs received little attention from military and civilian scholars and historians. Since 1948 there has been unprecedented progress made in the process of evaluating the tremendous maze of basic records and documents. The writing of the official histories and special studies on a wide range of subjects has also progressed rapidly. The fact still remains, however, that this work has only just begun. The student will find large gaps in the material available to him and probably will be frustrated with the knowledge that the basic material exists, but has not yet been recorded for him in a form which he can use. It appears that the present-day student must content himself with the knowledge that at this time, some seven years after the close of the war, the available material on the history of the war is far more complete than during any other comparable period. In addition, he should recognize that the recording of history is, by nature, slow-moving. Most historians feel that any attempt to hurry it will result in a lack of detachment as well as a failure to make critical use of all possible sources.

In a final summary of all the various types of material which have been called in this paper, "The History of Armor in World War II", it might be said that the history of Armor is suffering growing pains. The relative newness of the concept of armored warfare, the difficult struggle which its exponents had to undergo to gain its acceptance as a full-fledged member of the combat arms, and the limited amount of time which has elapsed since the close of the war, have all contributed to the fact that writing which represents the History of Armor is

rather limited. In the normal course of events it can be assumed that eventually much more will be written about Armor in World War II. This, however, is not enough. Because the concept of Armor is new it can be expected that few except the leaders are going to make a concerted effort to record its exploits and further its progress. These leaders are going to have to take the initiative in insuring that a more complete history is written.

The writing of this history of Armor should be planned in a manner that will insure its use by all those who can benefit from it. It should include all types of writing from the basic scholarly history to the comic book, if necessary. The efforts of the leaders of Armor need not parallel those of other individuals or agencies; they should complement them. There is a need for stronger liaison and more complete cooperation between Armor and those who are actually writing history or are capable of doing so. Until this is done, the average soldier, the student, the casual reader and other interested persons will have to be content with what is available to them.

CHAPTER 13

RECOMMENDATIONS

Based on the observations made in Chapter 12 the following recommendations are presented:

1. That a program be instituted at Department of the Army level which will require officer students at all levels of the Army School System to prepare at least one article of not less than three thousand words. These articles to be submitted to the various service periodicals for possible publication.

2. That the Armored Center establish the office and position of "Historian of The Armored Center." The historian to be charged with the following responsibilities:

a. Establishing close and continuing liaison with the Office of the Chief of Military History.

b. Arranging for the temporary assignment of members of his staff to the Office of the Chief of Military History for the purpose of working on special projects and studies of particular interest to Armor.

c. Determining the subject of and types of studies needed by The Armored Center and making official requests to the Office of the Chief of Military History that these studies be prepared.

d. Directing the writing of the articles called for in recommendation "1" above.

e. Directing and editing the writing of all historical material produced at The Armored Center.

f. Making special studies of particular phases and aspects of armored warfare.

g. Cooperating in a program whereby historical examples of the employment of armored units are used in the teaching of the various units at The Armored School. (See recommendation "3")

3. That The Armored Center, in conjunction with the United States Armor Association, foster a continuing series of contests and prizes which will stimulate interest in the preparation of articles covering various phases of Armor and armored warfare.

4. That The Armored School institute a program whereby historical examples are used, wherever practicable, in the presentation of instructional units.

5. That a program be recommended by The Armored Center and instituted at Department of the Army level to stimulate the interest of:

a. Senior officers in preparing papers similar to the studies made by General Grow, which will analyze in terms of basic principles and concepts the various operations in which armored units were involved in World War II.

b. Capable civilian historians and scholars in the preparation of interpretive histories of Armor and operations which involved armored units.

6. That an immediate request be made of the Office of The Chief of Military History that:

a. A "History of United States Armor in World War II" be prepared.

b. Special studies be prepared on the following subjects:

(1) The development of armored vehicles.

(2) Combat maintenance of armored units.

(3) The employment of light aircraft in armored units.

(4) The employment of armored units in heavily wooded areas.

(5) The employment of armored units in cold weather operations.

(6) The employment of armored units in night operations.

(7) The employment of armored units in amphibious operations.

7. That The Armored Center establish liaison with the various armored unit associations with the purpose of encouraging and assisting them in the rewriting or revision of their unit histories.

8. That a program be instituted by The Armored Center which will insure the purpose of utilizing of history to the fullest extent in the furthering of the missions of Armor. This program to include the teaching of commanders at all levels of the importance of properly and thoroughly recording all events. This program of education to include the importance of assisting those individuals who are assigned the specific mission of recording and gathering historical information data.