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TRAINFIRE I: A New Course in Basic Rifle Marksmanship

by

Howard H. McFann, John A. Hammes, and John E. Taylor

**Human Research Unit Nr 3, CONARC
Fort Benning, Georgia**

Under the Technical Supervision of

**The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
operating under contract with
THE DEPARTMENT OF THE ARMY**

TRAINFIRE I:
A NEW COURSE IN BASIC RIFLE MARKSMANSHIP

by

Howard H. McFann, John A. Hammes, and John E. Taylor

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Task TRAINFIRE

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The contents of HumRRO publications, including the conclusions and recommendations, should not be considered as having official Department of the Army approval, either expressed or implied.

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BRIEF

Problem: Recent studies have shown that the rifle, the basic weapon of the United States Army, has in recent years been used relatively ineffectively in combat.

Purpose: By means of suitable research, TRAINFIRE I proposed (1) to develop a practical basic course of rifle marksmanship instruction which will prepare the soldier to use his rifle effectively in combat and (2) to develop proficiency tests, based upon combat criteria, to measure the adequacy of this training.

Procedure: Comprehensive analyses of the situations confronting the rifleman in combat, provided the bases for developing an experimental course of training and two proficiency tests (marksmanship and target detection), within the scope of the 90 hours of rifle marksmanship training prescribed in Army Training Program 21-114, 26 Jan 54. The experimental course required 16 fewer hours of training time and 34 fewer rounds of ammunition than the conventional. Two groups of trainees underwent the first four weeks of basic training at Fort Benning, one group under the experimental and the other under the conventional method of training. A third group underwent conventional training in a training division at Fort Jackson. Upon completion of training, the relative proficiency of the experimentally and conventionally trained troops was evaluated.

Results: Those trained by the experimental method were more proficient than the conventionally trained individuals in (1) the ability to detect and mark targets, and to estimate their ranges and (2) the ability to hit targets, once detected.

Conclusion: As measured by the ability to detect targets, and the ability to hit targets once detected, the experimental training course better prepares the soldier for effective use of his rifle in combat than does the conventional course.

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**TRAINFIRE I:
A NEW COURSE IN BASIC RIFLE MARKSMANSHIP**

Chapter I

BACKGROUND OF THE PROBLEM

The startling effectiveness of American small arms in the Revolutionary War taught the British Army to respect and fear a skill which would have proved useful to the Americans had they retained it until World War II and the recent Korean conflict. In our early history, riflemen, firing from covered positions and employing weapons which were of advanced design for their time, halted and decimated the ranks of enemy troops at ranges impossible by the standards of the smooth-bore musket. A minister of the Church of England writing to the Earl of Dartmouth in 1775 reported:

"Rifles, infinitely better than those imported, are daily made in many places in Pennsylvania, and all the gunsmiths everywhere [are] constantly employed. In this country, my lord, the boys, as soon as they can discharge a gun, frequently exercise themselves therewith, some a-fowling and others a-hunting. The great quantities of game, the many kinds and the many privileges of killing, making the Americans the best marksmen in the world, and thousands support their families principally by the same, particularly riflemen in the frontiers, whose objects are deer and turkeys. In marching through woods, one thousand of these riflemen would cut to pieces ten thousand of your best troops."¹

Riflemen, as contrasted with men armed with smooth-bore muskets, constituted only a small percentage of the Colonial Army, but much of the reputation of that army was based upon their skill.

Despite a long series of American battlefield successes dating from 1775, which were attributable largely to the superiority of rifled weapons and frontier marksmanship, the rifle did not become the standard Army weapon until late in the Civil War. The revolution in tactical planning which the rifle demanded was not realized until after that war. Although the Army had authorized systematic target practice in 1858, marksmanship was considered an inborn trait, and sharpshooters were selected rather than trained. When General Hiram Berdan, of the Union Army, was authorized to form two regiments of sharpshooters, he restricted membership to those who could, at 200-yard range, put 10 consecutive hits in a 10-inch circle.²

¹Quoted in J.G.W. Hillin, *The Kentucky Rifle*, National Rifle Association, Washington, 1924.

²*The Infantry School, Tactics and Techniques of Infantry: Vol. II, The Military Service Publishing Co., Harrisburg, Pa., 1953.*

The standard weapon of the Union Army, late in the Civil War, was the muzzle-loaded Springfield rifle, a crude weapon by modern standards but far superior to the smooth-bore musket. Its maximum effective range was 250 yards. A good man, working at top speed, could fire two aimed rounds per minute. In the hands of an expert, this rifle was deadly. Any commander who failed to give the Springfield proper respect found his unit torn to shreds before it got close to the enemy.

The supply of American sharpshooters dwindled with the passing of the frontier, and the myth of "natural marksmanship" gradually faded. Systematic training replaced selection of marksmen with the establishment, by the Army, of the School of Musketry. The rigorous training with live and elusive targets which the frontier had provided was replaced by intensive target practice which emphasized training in positions and other fundamentals of accurate range shooting. At this school, and later at the Infantry School, the Army gave systematic training to marksmanship instructors, thus laying the groundwork for the mass training of infantrymen in rifle skills. The general level of marksmanship engendered by the Army training was high, and riflemen strongly supported the machine guns which forced the armies of World War I to remain close to their entrenched defenses. The offense regained its advantage with introduction of the tank, which permitted the attacker to ignore small-arms fire to a great extent, and with expensive use of artillery and air bombardment to "soften up" small-arms concentrations. These tactics set the pattern for World War II.

The effectiveness of modern small-arms partially forced the adoption of increased dispersion and intensive use of cover and concealment as principles of tactics. Faced by obscure targets, the hastily trained replacement of World War II left much to be desired as a marksman, and frequently failed to fire at all. Training units often were handicapped by inadequate range facilities and lack of qualified instructors. After the first year of the war, there was little defensive fighting, the type of combat which favors effective rifle fire. The scope and pace of the "blitzkrieg" fighting were such that volume of fire was often crucial and many engagements were decided by sheer weight of munitions.

In the Korean conflict, the battle conditions encountered were more reminiscent of oldtime Indian fighting. Unfortunately, however, we had no pool of frontiersmen to draw from. "Terrain and weather are often miserable; the inconsiderate enemy attacks at midnight; ranges are sometimes very close—the most difficult shots for the uninitiated. In the face of this, we are dismayed to find that many of our boys . . . do not fire at all; and many others who may pull the trigger are doubtless as ineffective." It has been conservatively estimated that the soldiers detected less than one-third of the "recognizable" targets they met in combat; against a detected target, their marksmanship was frequently not expert. As a result, combat troops developed a tendency to

¹Howard C. Sarvis, "Motive Targets" (Unpublished manuscript on file at Human Research Unit Nr 3, CONARC, Fort Benning, Ga.), 1953.

²Raymond A. Katzell et al., *Combat Recognition Requirements*, in Engineering Report SpecDevGen 383-6-1, Special Devices Center, Port Washington, L. I., N. Y., 15 April 1952.

substitute volume for aimed fire, fire power for marksmanship, quantity for quality.

Beginning with the onset of the Korean conflict, there has been an awakened interest and a renewed emphasis upon individual marksmanship in the Army. General J. Lawton Collins, while Chief of Staff, summed up this feeling when he said: "The primary job of the rifleman is not to gain fire superiority over the enemy, but to kill with accurate aimed fire."¹ A glance through military journals for the past several years indicates how general the concern with these problems has become.

The standard course in individual marksmanship training includes five areas or steps of instruction which are developed separately: sighting and aiming, positions, trigger squeeze, sustained fire, and sight setting. This training program has been developed largely on the basis of expert and authoritative opinion. "Little, if any, experimental evidence is available demonstrating the validity of most of the training principles and procedures currently in use. This is not to say that such principles and procedures do not possess some face validity. Rather, little experimental verification has been achieved. Moreover, it is possible that rigorous evaluation might show some practices to be of questionable value."

The validity of any military marksmanship training course may be considered under two major headings: (1) How well does the training enable the trainee to take advantage of the accuracy and range of the modern rifle and (2) how well is he trained to fire under the difficult conditions of battle, where targets may be not only hard to hit but hard to detect as well? Such experimental work as has been done has been concentrated on the first of these questions and has largely been concerned with specific features of the current Army marksmanship training program.

The importance of improving marksmanship training was pointed up in an experiment by Hirsch,² who found that halving the amount of time spent in preliminary rifle instruction did not appreciably affect qualification scores. Hirsch found that, on a special qualification test, the average score of men who had been given almost no training was about 45 per cent of the total possible; after preliminary rifle instruction, the average score was about 60 per cent of the total possible. In additional experiments, Hirsch discovered that various procedures such as interspersing firing practice with live ammunition during preliminary instruction and substituting lower-caliber firing practice for some of the .30-caliber practice failed to raise the average score appreciably above

¹Col. John T. Corley, "New Courses for Old Traditions," *Combat Forces Journal*, June 1953, pp. 14-16.

²E. V. Gaul and R. S. Hirsch, "Psychological Problems in Marksmanship of Infantry Type Weapons," *Journal of Psychology*, vol. 37 (1953), pp. 257-270.

³Richard S. Hirsch, *Experimental Evidence for Improvements Needed in Rifle Marksmanship Training* (Human Engineering Report SpecDevCen 494-01-3), Special Devices Center, Port Washington, L. I., N. Y., 15 June 1953; Hirsch, *Experiments in Rifle Marksmanship Training* (Human Engineering Report SpecDevCen 494-01-2), Special Devices Center, Port Washington, L. I., N. Y., 15 June 1953.

60 per cent of the total possible. He found, however, that increasing the number of rounds of .30-caliber ammunition fired resulted in large increases in scores, particularly those of the poorest marksmen. Hence, with increased expenditure of time and ammunition, target marksmanship can be improved.

In an experiment conducted by The Infantry School, Hirsch's last finding was confirmed. The addition of 68 rounds of practice live firing before firing for record increased the number of men who qualified. Similarly, where time and ammunition permit, current practice in replacement-training units is to refire men who have failed to qualify, as long as eventual qualification appears feasible.

A special live-firing trigger-squeeze exercise developed at Fort Dix, designed to eliminate "flinch," was evaluated by Human Research Unit Nr 1 at Fort Knox.¹ It was found that the training given did not lead to improved marksmanship.

In another study, Human Research Unit Nr 1 experimented with a technique called the "whole method," in which the five areas of marksmanship training are not taught separately but are given appropriate emphasis "as the trainee learns and practices the integrated pattern of M1 firing." When this technique was combined with the use of live ammunition throughout training, the marksmanship of men so trained was significantly better than that of men trained by the standard method. When, however, the technique was used with "dry firing" throughout training, little improvement in marksmanship was observable. The improvement in record scores cannot be attributed to additional expenditure of ammunition since, by the time of testing, all trainees had fired the same number of rounds. McGuigan believes that live firing throughout preliminary rifle instruction with the whole method should allow the trainee to adjust gradually to the startling effect of firing. He also points out that the firing of live rounds appears to increase trainee interest and improves the knowledge of performance. In all of these studies, the criterion of marksmanship was the score on the known-distance range.

In the mass training of infantrymen, teaching men the special skills required in target shooting in order to prepare them for combat may be wasteful, particularly of time. An important principle of learning—transfer of training—is involved here. In essence, this means that a skill which is learned in one situation may, under many conditions, be used in another. Successful transfer has been found to depend, in general, on similarity between the situation in which the skill is learned and that in which it is to be used later. Applying the principle to rifle marksmanship would require that the similar elements in training and combat be identified.

Since actual combat situations can not be duplicated in training, an attempt must be made to identify those features of combat which are

¹HumRRO Technical Report 6, *Evaluation of a Special Live-Firing Trigger-Squeeze Exercise*, by Victor H. Denenberg and Frank J. McGuigan, Human Research Unit No. 1, OCAFF, May 1954.

²Information Report of Human Research Unit No. 1, OCAFF, *A Comparison of the Whole and Part Methods of Marksmanship Training*, by Frank J. McGuigan, July 1953.

critical to the development of combat rifle marksmanship, and to simulate them at least to a degree which will enable trainees to acquire skill actually usable in battle. The basic question is whether the techniques of firing on a known-distance range are sufficiently similar to the techniques required by the combat situation to justify their use in the training of infantrymen. Many who have studied the problem doubt the validity of existing courses.

"The frontiersman was used to killing; there was game, of course, for food, clothing, and money, but there was also the white bear, the catamount and the lurking Indian. From boyhood he was habituated to live target situations, and practice in meeting them was easily translated to the battlefield. Not so with compulsory target shooting. There may be some emotion, but it is rarely as powerful as fear; there is very little suspense, no surprise, and always another chance with plenty of ammunition. Nothing much will happen if he fails. The shooter is comfortable and well-fed, light and weather are good; the target is plainer than anything he will ever see in the field, and it is going to stay right where it is. The pitiful attempts to simulate actual conditions, such as the transition range shooting, are not the best examples of American ingenuity. Such training is likely to produce only boredom. . . . The shooter should know instantly whether or not his shot was effective, by seeing the target drop or break—he should be able to 'kill' it and it should stay killed; this will govern his next action, which will be, if a miss, another shot."

Realism is difficult to achieve because of two other major requirements of marksmanship training: safety and measurement. The necessary inclusion of strict safety procedures in courses designed to train large numbers of men usually means that considerable realism must be sacrificed. In addition, in training and testing marksmen it must be possible to measure how well a trainee has learned to utilize his weapon, and for this purpose the known-distance range has become the standard instrument. Even though this situation only remotely resembles combat, its use as a criterion of marksmanship proficiency has caused the training program to be oriented toward firing at bull's-eye targets—an emphasis which many experts have deplored, pointing out that the combat rifleman will never encounter a similar target. Thus, in the current marksmanship program, the requirements of safety and measurement have largely predominated, to the exclusion of realism. The development of the means has tended to obscure the end.

TRAINFIRE I was an initial attempt to develop and evaluate a rifle marksmanship training program designed for maximum, rapid transfer to combat conditions, and to do this without neglecting the requirements of either safety or measurement. The effort has been to extract the elements of the combat problem and to reproduce them as closely as possible in training.

In this development, patchwork improvement has been deliberately avoided. Instead, the marksmanship training program has been redesigned in package form suitable for use in the existing basic training

schedu'g. Because the changes are in package form, no attempt has been made to evaluate the individual contributions of different features to the achievement of the whole program. The experimental course has been tested as a unit in comparison with the existing course. Throughout, the aim has been to produce more effective combat riflemen with economy of ammunition and training time, utilizing the type and quality of instructors likely to be available in time of mobilization.

Chapter 2

THE PROBLEM AND GENERAL APPROACH TO ITS SOLUTION

RESEARCH REQUIREMENT

On 25 June 1953, President Eisenhower received a letter dealing with ideas on "rifle shooting" from Mr. Howard C. Sarvis of New Meadows, Idaho. This letter was referred to Chief, Human Relations and Research Branch, G-1, Department of the Army, who in turn referred the letter to the Human Resources Research Office for action.¹

Mr. Sarvis met at HumRRO on 14 October 1953 with representatives of the Department of the Army, the Office of the Chief of Army Field Forces,² and HumRRO to present his ideas for improvement of rifle marksmanship training.³ As a result of this conference, it was recommended that HRU No. 3, OCAFF, develop a research plan to determine, among other things, whether the suggestions concerning rifle marksmanship proposed by Mr. Sarvis would be more effective and realistic than the currently prescribed course.

At a meeting on 5 January 1954, OCAFF recommended that HRU No. 3 undertake a project to fulfill the following three objectives:

- (1) To develop a practical basic course of rifle marksmanship instruction which will prepare the soldier to use his rifle effectively in combat
- (2) To evaluate current instruction to determine how rifle marksmanship can be integrated throughout the basic training program in order to emphasize rifle marksmanship by repetition in applicatory training
- (3) To investigate certain weapon components (such as sights and triggers) which may have critical effects upon the above objectives without delaying unduly the over-all time schedule of the task.⁴

¹Letter, G-1 416 (12 Aug 53), D/A ACoS, G-1, dated 21 August 1953, to Director, HumRRO, subject: "Mottis Targets," with inclosures.

²Now Headquarters, Continental Army Command.

³Special acknowledgment is made to Mr. Sarvis, whose ideas and interest served both as a basis and a stimulant for this study.

⁴The research plan incorporating these objectives was approved by the Chief, Army Field Forces on 10 February 1954. Letter, ATDEV-4 353.1, OCAFF, dated 23 Feb 54, subject: "Experimental Development of Proficiency Tests and Training Methods for Improving the Effectiveness of Combat Rifleman."

GENERAL APPROACH

A developmental approach was employed to attack the problem of improving combat rifle marksmanship. The steps included:

- (1) Analyzing the battlefield situation encountered by the rifleman and determining the essential marksmanship skills required
- (2) Developing proficiency tests which provide for measurement of individual rifle marksmanship ability incorporating the essential skills
- (3) Devising a training method to develop and integrate the skills required of the combat rifleman
- (4) Training new recruits with the proposed and the conventional techniques
- (5) Testing the groups trained by the proposed and the conventional techniques on the proficiency courses.

PREMISES CONCERNING COMBAT MARKSMANSHIP CONDITIONS

The sole purpose of infantry training is to prepare for combat. Though training rarely covers all the requirements of battle, it is vital that every pertinent and feasible combat skill be included. If this is to be done, the combat skills required must be analyzed and reduced to fundamentals, which then constitute the basis upon which sound training can be grounded.

Comprehensive coverage of recent combat literature¹ and interviews with battle-experienced veterans resulted in the formulation of premises concerning the battlefield situation faced by the combat rifleman. These premises were then submitted to departments of The Infantry School for comment. Intensive conferences were held with the various TIS departments and concurrence was obtained on the validity of these premises:

- (1) Enemy personnel targets are rarely visible except in a close assault.
- (2) Most battle targets consist of a number of men or objects, arrayed in a lateral manner and utilizing cover such as ground folds, hedges, borders of woods, ditches, and similar topographical lines.
- (3) The indications given by such targets are usually fleeting and consist of such clues as smoke, flash, dust, noise, or movement.
- (4) Such fleeting indications can best be engaged by marking their location on the ground with reference to an identifiable near-by object suitable for use as an aiming point.
- (5) Range of battle targets rarely exceeds 300 yards.
- (6) The nature of the target and the terrain on which it is encountered, coupled with the fact that the defense will frequently be dug in, often precludes the use of the prone position, but favors a supported position such as the foxhole standing or kneeling position.

¹See Selected Bibliography for a partial listing of the material covered.

(7) Selection of an accurate aiming point in elevation is a difficult task because of the low outline and obscurity of battlefield targets.

(8) This problem of proper elevation is complicated by the existing zeroing instructions; that is, using a six o'clock hold at the bottom of the bull's-eye to achieve a center hit.

(a) This procedure introduces an error which is half the diameter of the bull's-eye.

(b) The error thus introduced is further increased by existing training which requires the soldier to aim at the center of the "mass" of a field target rather than at its lowest visible edge. Since only part of the actual "mass" or bulk of the target is usually seen, the center of seen "mass" will normally be above the actual center.

(9) The conditions of rifle fire in battle rarely necessitate or permit the use of windage adjustment.

GENERAL TRAINING PRINCIPLES

Once the fundamental premises were established, the problem became that of selecting the best way to develop the required skills and integrate them into a training program. Transfer effect may be either positive or negative, that is, may either improve or detract from later performance. Extensive laboratory and general experience indicates that the following well-established training principles facilitate the learning of complex skills. These principles are listed here by way of review:

Transfer. Transfer occurs when training in one task affects performance in another. In the development of complex skills it is very important that the training be so arranged and taught that the acquisition of one skill does not detract from the acquisition of another, but rather that it facilitates the learning process as a whole.

Motivation. Learning will take place more rapidly when the learner has a desire to learn and grasps the personal significance of the task being learned. The attitude or "set" that the trainee brings into, or acquires in, the learning situation determines his performance to a great extent.

Knowledge of Principle Involved. Learning in general is faster, and transfer from one situation to another is facilitated, when the learner understands the principles underlying the task he is required to perform.

Knowledge of Results. The learner should be given as specific and immediate information as possible concerning the outcome of his efforts.

Meaningful Units. When the material to be learned is quite complex, it is advantageous to break it down into meaningful units. The learner may then concentrate on a phase which constitutes a comprehensive unit which can be mastered within a reasonable length of time. The arrangement of material should be such that the learner comprehends the meaning of one unit in relation to another, as well as to the task as a whole.

Accuracy or Speed. The emphasis on accuracy versus speed should be determined by the ultimate importance that one or the other plays in final performance of the learned act.

Repetition. In order to learn a new act efficiently, it is essential that the learner practice that specific act.

Fatigue. Whether brought into the learning situation or caused by excessive practice in the situation, fatigue retards the learning process.

Distributed Practice spaced practice periods, interspersed with rest periods or other acts, have been found to be superior to continuous practice over long periods of time.

Variety of Training Materials. It is advantageous to vary the material to be learned so that boredom and fatigue are reduced and motivation increased.

RESEARCH DESIGN

General Design

The general plan for this investigation covered the training of three groups of new trainees in their first four weeks of basic training. One group, designated the experimental group (Group E), was trained with the experimental marksmanship method on specially designed marksmanship and target detection ranges at Fort Benning, Ga. The second group, Control I, was trained with the conventional marksmanship method at Fort Benning, by training personnel comparable to those teaching Group E. The third group, Control II, was trained with the conventional marksmanship method at Fort Jackson, S.C., by regular training personnel.

After the first four weeks of basic training, Group C-II was moved to Fort Benning. There it joined the other two groups in undergoing proficiency tests on experimental target detection and firing ranges which reproduced the problems of the combat rifleman as closely as safety and measurement considerations permitted. These ranges differed from and were more difficult than the experimental training ranges used by Group E.

Groups E and C-I, trained at Fort Benning, were both informed that they were part of an experiment in which the latest developments in marksmanship training would be employed. Thus any motivation that might arise from the knowledge of being selected for an Army project could be expected to be the same for both groups.

Inclusion of two control groups in this investigation was considered necessary for the following reasons:

(1) To allow for the heightened motivation of trainees who had been moved to an unusual location to receive basic training. E and C-I could be considered comparable with respect to motivation, whereas E and C-II or C-I and C-II could not.

(2) To allow for the effects of relatively superior teaching by experienced instructors. C-II trainees received training from experienced instructors; C-I and E received training under instructors with

little or no prior teaching experience. Therefore, with respect to instructor ability, E and C-I could be considered comparable, E and C-II or C-I and C-II could not.

(3) To permit increased generality of results. E and C-II provided for comparisons which would not be specific to a particular training camp or to a single group of instructors.

Performance Measures

The marksmanship data from the proficiency tests on the experimental ranges are reported in terms of number of hits, number of misses, and a derived proficiency score. The target detection data are reported in terms of number of targets detected and number of clues required to detect a given target. Obtained differences among the three groups were analyzed statistically to determine their reliability.

Subjects

Two hundred and seventy recently enlisted trainees constituted the subjects for this study. The only restriction placed on the selection of these troops, aside from the usual Army screening procedures, was that none of them be conscientious objectors or unable to understand the English language.

Assignment to Groups

Immediately following initial administrative processing at Fort Jackson, 220 men were moved to Fort Benning, where they were formed into a provisional company. Upon arrival at Fort Benning, the recruits were divided into two comparable groups, 112 of them constituting Group E and 108 of them Group C-I. Group E was further divided into Platoons 1 and 2, and Group C-I was divided into Platoons 3 and 4. Assignment to groups was made on a random basis, but was controlled in a manner designed to produce equality with respect to intelligence (as measured by Aptitude Area I scores) and representation of Caucasian and Negro troops.

An additional 50 men were randomly selected from a company of 200 who received their first four weeks of basic training at Fort Jackson. The only requirements placed on this 50-man group, Group C-II, were that the average intelligence score and race ratio be comparable to Groups E and C-I and that all members have completed the first four weeks of basic training.

The method of selection not only equated race and intelligence among the groups, but also, through randomization, produced groups which were comparable with respect to education, occupational experience, age, height, weight, general physical condition, and marital status. For a detailed comparison of the experimental and control groups with regard to these categories, see Appendix A, Table A-1.

Chapter 3 TRAINING

SCOPE OF TRAINING

The first four weeks of basic training were administered to all trainees.¹ On marksmanship, this included only individual training in basic fundamentals and did not cover technique of rifle fire. Outlines of the subjects taught, and the order in which they were presented, appear in Appendix B. Every attempt was made to keep all training, other than marksmanship training, identical for the experimental group and the control group at Fort Benning.

TRAINING CADRE

Before the trainees arrived at Fort Benning, five officers and 22 enlisted men were obtained from the 29th Infantry to serve as training cadre. Only one of the officers, a captain, had previous training experience. The four others, second lieutenants, were recent graduates of ROTC; none of them had previously commanded troops, nor had any of them taught rifle marksmanship. Of the 22 enlisted men, only one sergeant first class and four sergeants had previous troop training experience. An inexperienced cadre was selected intentionally for the investigation, in the belief that this training should approximate, as closely as possible, what might be experienced during time of mobilization.

Officers and enlisted cadremen assigned to the provisional company formed at Fort Benning were responsible for all instruction during the course of training. No special instructors were employed for any part of the four-week program.

Before the experimental work with the trainees was started, the officers gave the enlisted cadre members a month's instruction in the first four weeks of basic training. In addition to providing training for the enlisted cadre, this procedure served as a rehearsal for the officers prior to their classes with the trainees. This preliminary instruction and practice given the training cadre was in no way intended to make them expert instructors, but was designed only to familiarize them with the program of instruction to be administered to the new trainees. Following

¹Training and testing occurred from 17 Sep 54 to 18 Oct 54.

the month's preliminary instruction, the training cadre was divided into four groups; each group consisted of one lieutenant (platoon leader), one sergeant (platoon sergeant), and four squad leaders. The four groups were equalized in ability as closely as possible. The captain served as company commander and principal instructor, the sergeant first-class as first sergeant, and a corporal as projectionist-truck driver.

Upon the arrival of the 220 trainees comprising Groups E and C-I, each of the four cadre groups was assigned to a training platoon on a random basis. Thus, each platoon of trainees was under the direction of one instructor (the lieutenant) and five assistant instructors (the platoon sergeant and four squad leaders). In order to maximize instructor-trainee contact, the enlisted cadre lived in the barracks with the trainees.

For all non-marksanship training, the five officer-instructors were assigned specific topics in which they instructed the entire company. However, for all marksmanship training the company was divided according to the original assignment of men to Group E and Group C-I. Instructor groups of two officers and 10 enlisted men handled all the instruction for the two platoons of their own group. Thus, confusion or contamination from one to the other of the two training programs was reduced. Contamination was further reduced by housing the two groups separately.

CONVENTIONAL MARKSMANSHIP TRAINING

General

The Control Group trained at Fort Benning (C-I) received the weapons instruction (Individual Weapon Qualification—U.S. Rifle, Caliber .30, M1) as set forth in Army Training Program 21-114, dated 26 January 1954. The specific marksmanship training program pursued was that outlined in Training SOP B-22 (U.S. Rifle, Caliber .30, M1) Headquarters, 101st Airborne Division, Fort Jackson, S.C., dated 24 July 1954.

Outline of Conventional Marksmanship Course (90 Hours; 377 Rounds)¹

1. MECHANICAL TRAINING (4 Hours)

Period 1. *Mechanical Training* (4 hours)

Description, disassembly, assembly, operation, functioning, stoppages, immediate action, and care and cleaning.

2. PREPARATORY MARKSMANSHIP (26 Hours)

Period 2. *Sighting and Aiming* (4 hours)

First, second, and third sighting and aiming exercises.

Period 3. *Positions and Sling Adjustment* (4 hours)

Prone, sitting, kneeling, and standing positions, and adjustment of the loop and hasty slings.

¹Detailed lesson outlines are presented in Appendix C.

- Period 4. *Trigger Squeeze* (3 hours)
Three trigger squeeze exercises in the prone, sitting, kneeling, and standing positions.
- Period 5. *Sustained Fire Exercise* (3 hours)
Taking prone position rapidly and reloading.
- Period 6. *Sustained Fire Exercise* (3 hours)
Taking sitting position rapidly and reloading.
- Period 7. *Sustained Fire Exercise* (3 hours)
Taking all positions rapidly and reloading.
- Period 8. *Range Procedures and Safety Precautions* (1 hour)
Operation of firing line and pits and safety measures.
- Period 9. *Review and Examination* (4 hours)
(a) Review of all marksmanship instruction.
(b) Performance examination.
- Period 10. *Review Before Firing* (1 hour)
Special films on marksmanship.
3. **RANGE PRACTICE** (40 Hours; 179 Rounds)
- Period 11. *Instruction Practice, 1000' Firing* (4 hours; 9 rounds)
First actual firing of rifle on any range (live-round triangulation exercise).
- Period 12. *Sight Changes, Battle Sight, and Use of Score Card* (4 hours)
Sight setting, windage, score card, zeroing, battle sight, and review of range procedure and safety precautions.
- Period 13. *Instruction Practice - Known-Distance Zeroing* (8 hours; 27 rounds)
Fire Table I, Course B, once.
- Period 14. *Instruction Practice - Known-Distance Range* (8 hours; 59 rounds)
(a) Fire Table II, Course B, once.
(b) Fire Table III, Course B, once.
- Period 15. *Instruction Practice - Known-Distance Range* (8 hours; 42 rounds)
(a) Fire Table IV, Course B, once.
(b) Fire Table V, Course B, once.
- Period 16. *Record Practice - Known-Distance Range* (8 hours; 42 rounds)
(a) Fire Table IV, Course B, once.
(b) Fire Table V, Course B, once.
4. **TRANSITION FIRING** (20 Hours; 198 Rounds)
- Period 17. *Preliminary Instruction for Transition* (4 hours; 30 rounds)
Fire Table VI, Standard Course, once.
- Period 18. *Transition Firing - Instruction and Record Practice* (16 hours; 168 rounds)
(a) Fire Table VII, Standard Course, three times.
(b) Fire Table VIII, Standard Course, twice.

EXPERIMENTAL MARKSMANSHIP COURSE

Fundamental Principles

The aim of the experimental course was to provide the recruit with a program of basic training in rifle marksmanship oriented toward

effective use of his weapon in combat. The course was based upon three fundamental principles:

- (1) The combat rifleman's targets consist of enemy personnel.
- (2) These targets rarely appear at distances beyond 300 yards.
- (3) His effectiveness as a rifleman depends upon his ability to neutralize individual targets.

Essential Skills

The rifleman's task is threefold. He must (1) detect targets, (2) aim his rifle at detected targets, and (3) fire upon these targets without disarranging his aim. For effective combat preparation, the skills listed in Figure 1, in addition to mechanical training in operating the rifle, were considered essential for individual marksmanship instruction.

SKILLS ESSENTIAL FOR INDIVIDUAL INSTRUCTION

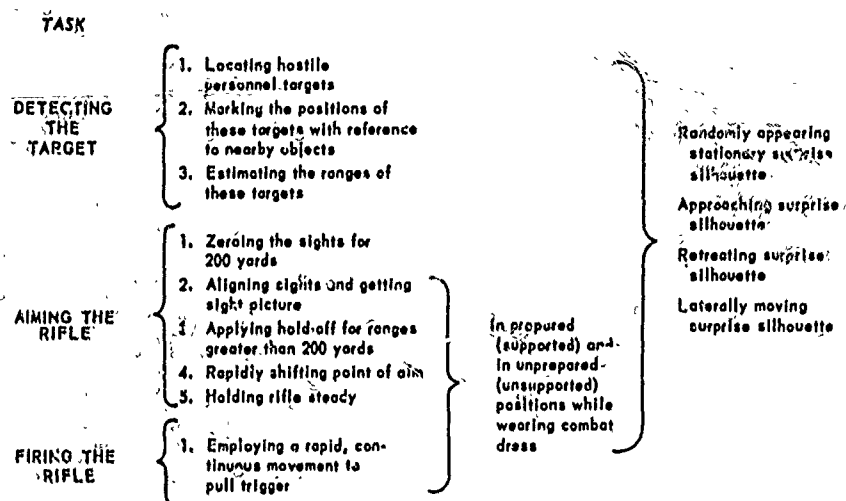


Figure 1

Development of Targets and Ranges

The urgent need for use of realistic targets, both in the experimental training and in the measurement of marksmanship skill under situations simulating combat, was evident at an early stage in the planning. As no existing target device met these requirements, development of realistic targets was undertaken.

Analysis indicated that the target most commonly encountered by the combat rifleman is a briefly exposed, camouflaged, stationary human silhouette. Somewhat less often the target is a briefly exposed, indistinct, fleeting silhouette. Two target devices were therefore developed:

- (1) An electrically powered, stationary mechanism which presents a pop-up, camouflaged silhouette target that falls if struck by a

bullet (Figure 2). It is designed to simulate a human figure that suddenly appears, remains exposed a few seconds, and then disappears. It gives the trainee a "killable" target; it also has the advantage of providing the firer with immediate knowledge of his accuracy.

(2) A hard-powered, track-mounted carriage which briefly presents a pop-up, camouflaged, moving silhouette to the rifleman (Figure 3). It is designed to simulate a human figure that suddenly appears, briefly exposes itself while changing positions, and then disappears.

Details of the construction of the two devices are given in Appendix D. Enough of the devices were produced to construct a marksmanship

STATIONARY TARGET DEVICE

NOTE: SEE APPENDIX D FOR DESCRIPTION OF CONSTRUCTION DETAILS.

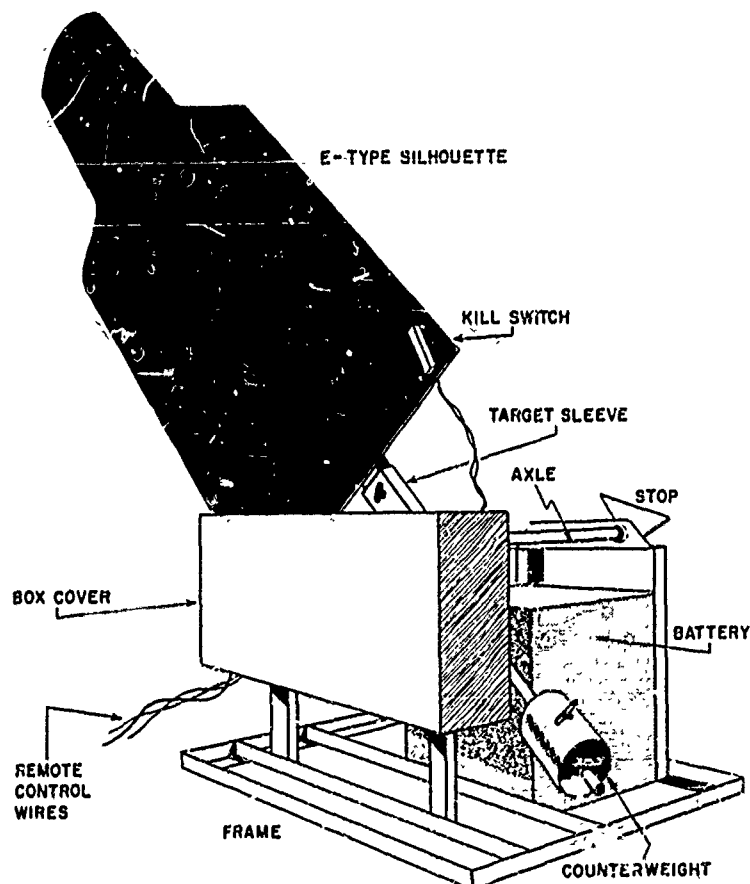
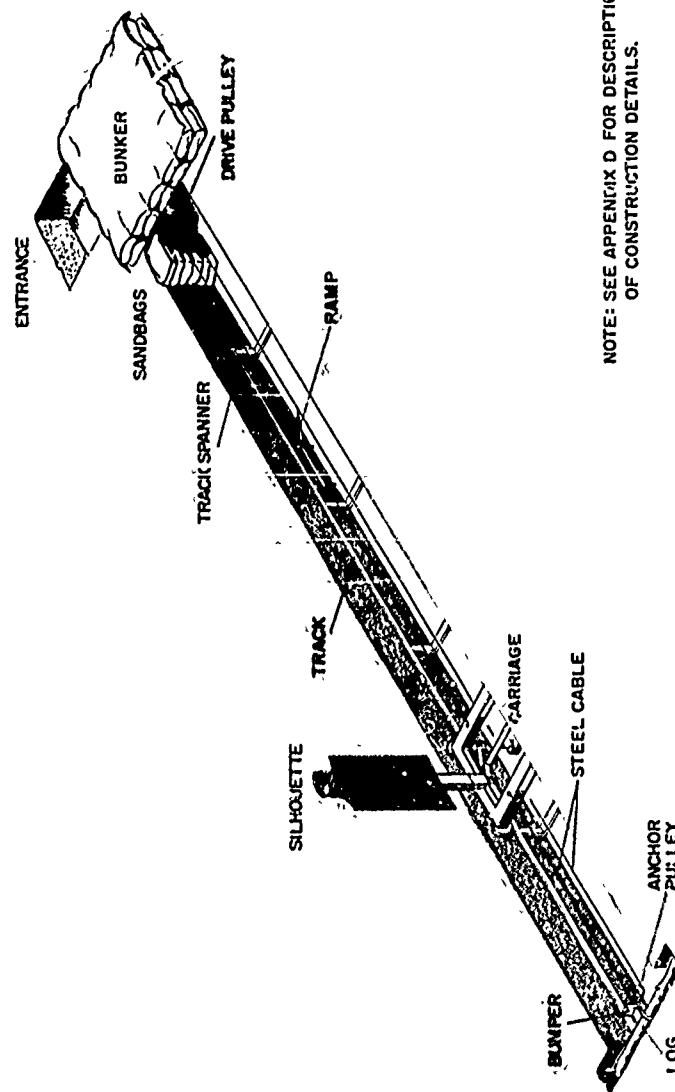


Figure 2

MOVING TARGET DEVICE



NOTE: SEE APPENDIX D FOR DESCRIPTION
OF CONSTRUCTION DETAILS.

Figure 3

training range and a proficiency testing range. These ranges and the training and testing ranges developed for target detection are described in Chapter 4.

Outline of Experimental Marksmanship Course (74 Hours; 343 Rounds)¹

- Period 1. *Orientation* (2 hours)
- (a) Remarks and films concerning role of rifleman.
 - (b) Description and operation of M1.
- Period 2. *Care and Cleaning of Rifle* (2 hours)
- (a) Disassembly, assembly, and cleaning.
 - (b) Rifle inspection.
- Period 3. *Introduction to Firing the Rifle* (4 hours; 3 rounds)
- (a) Range and safety procedures on 1000' range.
 - (b) "The rifle won't hurt you" demonstration.
 - (c) Demonstration firing on 1000' half-bull's-eye targets.
 - (d) Practice firing on 1000' targets to point out differences between trained and untrained firers.
 - (e) Demonstration firing on realistic targets to point up significance of errors (see Appendix D).
- Period 4. *Mechanical Training* (4 hours)
- Description, assembly, disassembly, operation, functioning, stoppages, and immediate action.
- Period 5. *Preliminary Rifle Instruction in Components of Shooting, Part I* (6 hours; 18 rounds)
- (a) Instruction in steadiness and holding, sighting and aiming, and speed of fire in prone position.
 - (b) Live-round 1000' instruction in steadiness and holding, sighting and aiming, and speed of fire on half-bull's-eye targets in prone position.
- Period 6. *Preliminary Rifle Instruction in Components of Shooting, Part II* (8 hours; 24 rounds)
- (a) Dry 1000' instruction in integration of positions with steadiness and holding, sighting and aiming, and speed of fire.
 - (1) Prone, supported and unsupported
 - (2) Standing, supported and unsupported
 - (3) Sitting, supported and unsupported
 - (4) Kneeling, supported and unsupported
 - (b) Live-round 1000' instruction on above.
- Period 7. *Target Detection* (4 hours)
- (a) Location of camouflaged targets.
 - (b) Range estimation.
- Period 8. *Behind the Lines Instruction* (2 hours)
- Concurrently with Periods 6 and 7, additional dry triangulation instruction to correct errors found in sighting and aiming.
- Period 9. *Zeroing Procedure* (2 hours)
- Instruction in sight setting, score card, and range procedure.

¹Detailed lesson outlines are presented in Appendix E.

- Period 10. *Zeroing on Known-Distance Range* (4 hours; 18 rounds)
Zeroing of rifles on half-bull's-eye targets for 200-yard battle sight.
- Period 11. *Introduction to Realistic Stationary Targets* (8 hours; 36 rounds), (see Figures 2 and D-1)
(a) Slow fire from various positions on pop-up targets at 75, 100, 150, 175, and 300 yards.
(b) Practice in single-round loading.
- Period 12. *Simulated Approach of Stationary Targets* (4 hours; 40 rounds)
(a) Slow fire from supported foxhole, kneeling, and sitting positions upon pop-up targets appearing successively from 300 to 75 yards.
(b) Practice in clip loading.
- Period 13. *Timed Fire Exercise, Using Surprise Targets* (4 hours; 48 rounds)
Timed fire from supported and unsupported positions upon mixed sequences of briefly exposed pop-up targets.
- Period 14. *Timed Fire Exercise, Using Surprise Targets, with Firer Assuming Appropriate Position* (4 hours; 32 rounds)
Timed fire, upon mixed sequences of briefly exposed pop-up targets, from supported and unsupported positions rapidly assumed upon presentation of the targets.
- Period 15. *Firing Practice on Silhouetted Moving Targets* (4 hours; 8 rounds) (see Figures 3 and D-2)
Dry and live firing from supported, foxhole position upon laterally moving pop-up targets at 200 yards with targets silhouetted against a white background to increase visibility and to make spotting of misses possible.
- Period 16. *Firing Practice on Non-Silhouetted Moving Targets* (4 hours; 16 rounds)
Dry and live firing from supported, foxhole position upon laterally moving pop-up targets at 200 yards with targets not silhouetted against a white background.
- Period 17. *Firing While Advancing Upon Surprise Stationary Targets* (4 hours; 32 rounds)
Timed fire upon mixed sequences of briefly exposed pop-up targets from supported and unsupported positions assumed while advancing. Position assumed upon appearance of targets.
- Period 18. *Firing Upon Distant Stationary Targets* (4 hours; 48 rounds)
Timed fire upon briefly exposed pop-up targets at 300 and 175 yards from supported, foxhole position.

PREMISES AS REFLECTED IN THE CONVENTIONAL AND EXPERIMENTAL TRAINING PROGRAMS

The premises set forth in Chapter 2 define a situation which approaches realistic combat. Devising a training program based on these premises presents a difficult problem. On the one hand, extreme realism can result in safety hazards and scoring complications. On the other hand, emphasis on safety and scoring techniques can decrease realism to the point where training no longer transfers to the combat situation.

Conventional Course

An emphasis on safety seems to be characteristic of conventional marksmanship training. Undue emphasis on this point can give an artificial aspect to the training procedures. The loss of realism which results from an excessive concern with safety detracts from training in requisite combat skills and risks developing in the trainee a fearful attitude regarding his weapon. The end result is a reduction in the trainee's self-confidence and thus the possibility of less efficient combat performance.

In the conventional course there is a minimum of training in one of the primary skills required of a combat rifleman—namely, the ability to detect, mark, and estimate the ranges of targets. The standard transition course, designed to bridge the gap between known-distance and field firing, does not stress target detection. No attempt is made to camouflage the clearly visible silhouette targets, or to conceal their locations.

Having the recruit wear combat uniform and equipment while he is being trained would also appear desirable. In the conventional course of marksmanship training, the trainee does most of his firing without combat equipment.

Realism seems to be lacking in the teaching of the various firing positions. The firer is instructed to "mark" places on the ground where heels, hand, or rifle butt should be placed, so that in final position the rifle will be automatically pointed at the correct target—a procedure which bears little resemblance to combat conditions, where the location at which targets will appear is unknown. There is little training in the technique of assuming various positions naturally and quickly for emergency situations, such as ambush. In addition, little training is given in speedily securing ammunition from different pockets of the cartridge belt or in reloading while on the move. More serious, emphasis is placed on sustained delivery of a number of rounds at a clearly defined target, rather than on the combat requirement of rapid delivery of a few rounds each at one or more obscure targets.

Although the majority of combat firing positions are "supported" (that is, the firer employs rock, stump, or rubble for rifle steadiness), such positions, particularly the foxhole position, are not emphasized in training. The majority of the conventional practice firing is done from unsupported positions.

In conventional preliminary marksmanship training, there is a basic tenet which tends to reduce accuracy of fire. In sighting and aiming instruction, trainees are taught to use a six o'clock hold at the bottom of the bull's-eye to achieve a center hit. As noted previously, this procedure introduces three errors, which when transferred to combat firing result in a tendency to fire over the top of the target, even though sight alignment and sight picture may be perfect.

Another characteristic of the conventional program is the use of unrealistic targets. The silhouette targets on the transition range are

clearly defined. On the quick-fire course there is lack of realistic effects in the design of the pop-up and moving targets. Also, the inclusion of specially marked "friendly" targets on this course introduces a hesitancy factor of questionable value. No training is given with fast-moving targets, which would provide practice in estimating the lead necessary to hit such targets.

Experimental Course

In the experimental program, an attempt was made to adhere to a course which combined realism, safety, and reliable scoring in such a way as not to jeopardize either the validity of the training or its reliable assessment.

Because of the necessity for many firing points, and consequent narrow lanes of fire, the lateral nature of the rifleman's battle targets could not be ideally stressed on the training and proficiency ranges.¹ However, the initial skill of obtaining correct line of sight upon a low outline target at an unknown range was emphasized. The utilization of cover by the enemy was simulated on both the detection training range and proficiency range by use of camouflage, and by emplacing targets in such a manner as to leave natural cover and terrain undisturbed.

Target realism was provided by employing the olive-drab pop-up silhouette targets. The surprise element of the rifleman's target was introduced by exposing targets at irregular time intervals, briefly, and at unknown distances. The trainee was required to detect his target quickly in order to fire a fast, well-aimed round. Moving as well as stationary targets were employed, the stationary target being designed to drop when hit and the moving target designed to drop at the end of its run. The proficiency range was realistic in that natural wooded terrain was utilized for hidden locations and fleeting appearances of the targets.

In view of the fact that most of the rifleman's targets occur at ranges within 300 yards, the experimental marksmanship course stressed firing practice at these distances. On the marksmanship proficiency range the maximum target distance was 350 yards.

To teach the skill of target detection the troops were taught how to select likely target locations, recognize fleeting target indications (such as dust, flash, or movement), mark their positions, and estimate their ranges.

Emphasis was upon supported firing. Approximately 64 per cent of total rounds expended were fired from supported standing, kneeling, or sitting positions, in contrast to the 32 per cent fired from these positions in the conventional program. Trainees were also taught to assume appropriate firing positions when confronted with successively appearing surprise targets.

To eliminate the errors introduced by the six o'clock hold, the trainees were taught to zero to hit the point of aim. For this purpose,

¹See Chapter 4.

HALF-BULL'S-EYE TARGET

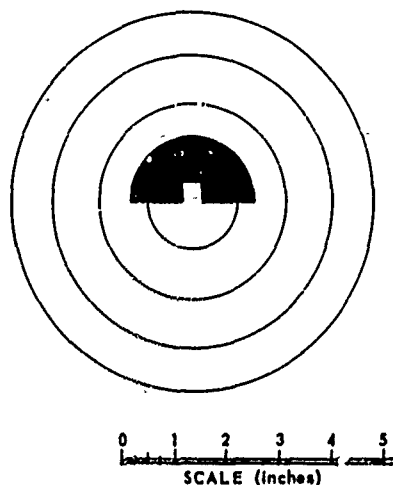


Figure 4

half-bull's-eye targets were used, so that the point of aim would be the center of the bull's eye (Figure 4). When firing upon silhouette targets, trainees were instructed to aim at the lower edge of the seen mass, which in actuality is usually well above the center of mass. A 200-yard battle sight was adopted, in an attempt to reduce trajectory error in firing upon targets within 300 yards.

In firing on targets at a distance of more than 200 yards, the trainees were taught to use hold-off. In firing on moving targets, they were given instruction in leading the target.

In field firing exercises in the experimental course, the trainees were habituated to the combat uniform with steel helmet and pack.

COMPARISON OF IMPLEMENTATION OF LEARNING PRINCIPLES IN CONVENTIONAL AND EXPERIMENTAL PROGRAMS

Transfer of training may be defined in two ways: first, in respect to the relationship between skills acquired during training and their application in combat; second, in regard to the ease of learning within the training program.

In the first sense, transfer of training is concerned with the validity of training material. Marksmanship training should teach the skills that will be effective in the trainee's future role as a combat rifleman. To the extent that the experimental program approximated the real situation, transfer would be greater than for the conventional program.

Transfer of training in the second sense refers to the integration of training material in such a way as to facilitate progressive learning of the various skills. In the conventional program 30 hours of preparatory marksmanship instruction are given before the trainee fires a shot. Implicit in this instruction is the assumption that transfer will take place when the weapon is fired. In contrast, the experimental program provided introductory firing in the fifth hour of instruction and throughout the remainder of rifle instruction. Hence, under the experimental program, learning was facilitated by integration of habits early in training.

Concurrent training behind the firing lines provided repetition of basic marksmanship and target detection principles throughout the entire experimental course. Such arrangement of material helped the trainee to understand the relation of one training phase to another, and to the task as a whole.

Success in maintaining motivation is limited in the conventional program. Firers may remain idle for as much as two hours of a day's firing on the known-distance range while scoring discrepancies between firing line and pits are being settled. In contrast, the experimental program devoted early practice fire to the 1000" range, on which scores are easily and quickly obtained. Emphasis on immediate knowledge of results was applied also in target detection training, wherein the trainee was informed at once of success or failure, and in later field firing, in which the pop-up, knock-down target gave immediate knowledge of accuracy. Possible fear of the weapon was alleviated by demonstrations, early in training, in which cadre fired the M1 rifle off the thigh, belly, and chin.

The conventional program stresses training details that are not yet experimentally supported. For example, trainees are taught that in the prone position the angle made by the pupil's spine and the rifle should be 30 degrees or less, and that in the kneeling position the right thigh should form an angle of 90 degrees with the line of aim. The experimental program, on the other hand, stressed the skills of assuming a firing position quickly and selecting the most appropriate position for engaging the target at hand.

COMMENTS ON TROOP BEHAVIOR

Discipline, control, military courtesy, and the customs of the service within the Task TRAINFIRE unit were strictly and carefully enforced. The trainees were housed in an Officer Candidate Area where high standards were established and maintained from the outset of the project.

There were no cases of nonjudicial punishment (company punishment) under Article 15, Uniform Code of Military Justice (5 May 1950), and no trials by court-martial. There were no cases of absence without official leave and no venereal disease. No military police delinquency reports were received on trainees of the unit. Reports from theater, service club, library, and post exchange operating personnel indicated good discipline, good soldierly appearance, and respect for property.

PROFICIENCY TESTING

MARKSMANSHIP

Description of Range

The rifleman's targets, in combat, may be characterized generally as being camouflaged, surprise targets, which appear momentarily and can often be detected only by fleeting indications. They appear largely within a range of 300 yards, with the majority between 50 and 200 yards. These targets are engaged more frequently from supported than from unsupported firing positions.

The marksmanship range designed to test the proficiency of all three groups, was constructed to approximate as closely as possible the target situation encountered by the rifleman in daylight combat firing, within necessary considerations of measurement and safety (see Figure 5). Pop-up targets were placed at 50-yard intervals, from 50 to 350 yards, insuring measurement of performance over a number of ranges. The targets from 50 to 200 yards were exposed for five seconds, and those from 250 to 350 yards for 10 seconds. Camouflaged, laterally moving targets were placed at ranges of 100 and 300 yards, to provide for measurement of performance on such targets at near and distant ranges.

All targets were emplaced in such a way as to leave natural terrain undisturbed, and the olive-drab silhouettes were further camouflaged by coloring them to blend into the background foliage or brush. The element of surprise was introduced by exposing the targets in a mixed order, and by varying the time intervals between successive exposures.

To provide for supported firing, a standing-foxhole firing line was constructed. Unsupported firing performance was measured by having the firer assume a position of his own choice in front of the foxhole line.

The primary differences between the test range and the training range (Figure 6) which had been used by the experimental group lay in the nature of the terrain and target emplacements. The training terrain was flat, open, and clear of brush and trees. Training targets were openly silhouetted, and easily located in the narrow firing lanes. By contrast, sections of the terrain of the test range were wooded, sloping downward to a lateral swamp line at approximately 150 yards, then gradually rising to ground covered by brush, trees, and high grass.

MARKSMANSHIP PROFICIENCY RANGE

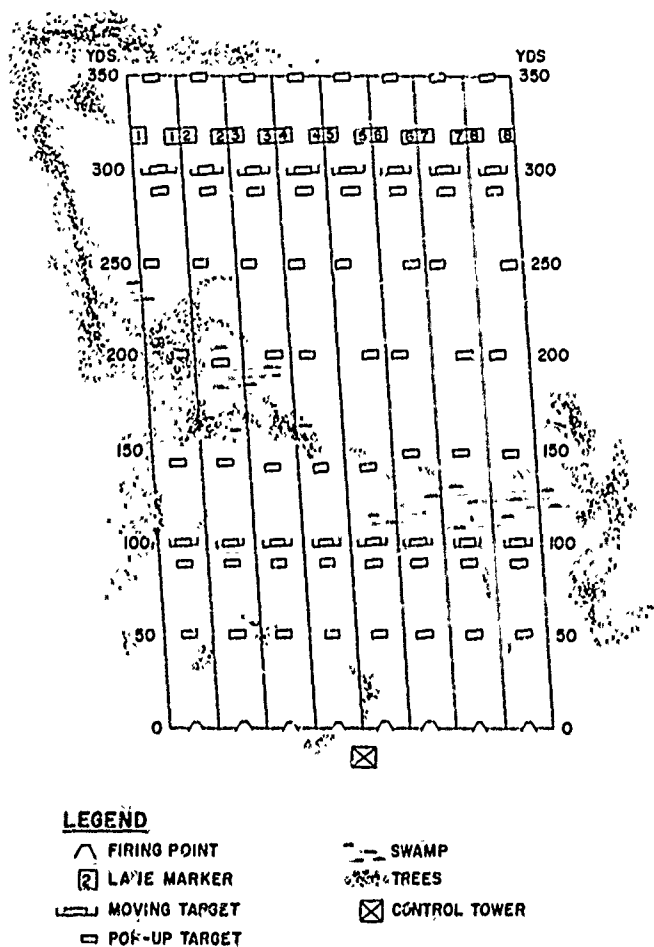


Figure 5

Construction of wide firing lanes and camouflaging of targets on the test range provided a complex detection problem. Furthermore, a greater range of target distances was provided in the test situation.

Testing Procedure

Details of troop movement, orientation, and scoring procedure are given in Appendix F.

A total of 56 targets were presented to the firer, allowing a possible hit score of 56. Forty of these targets were fired upon from the

MARKSMANSHIP TRAINING RANGE

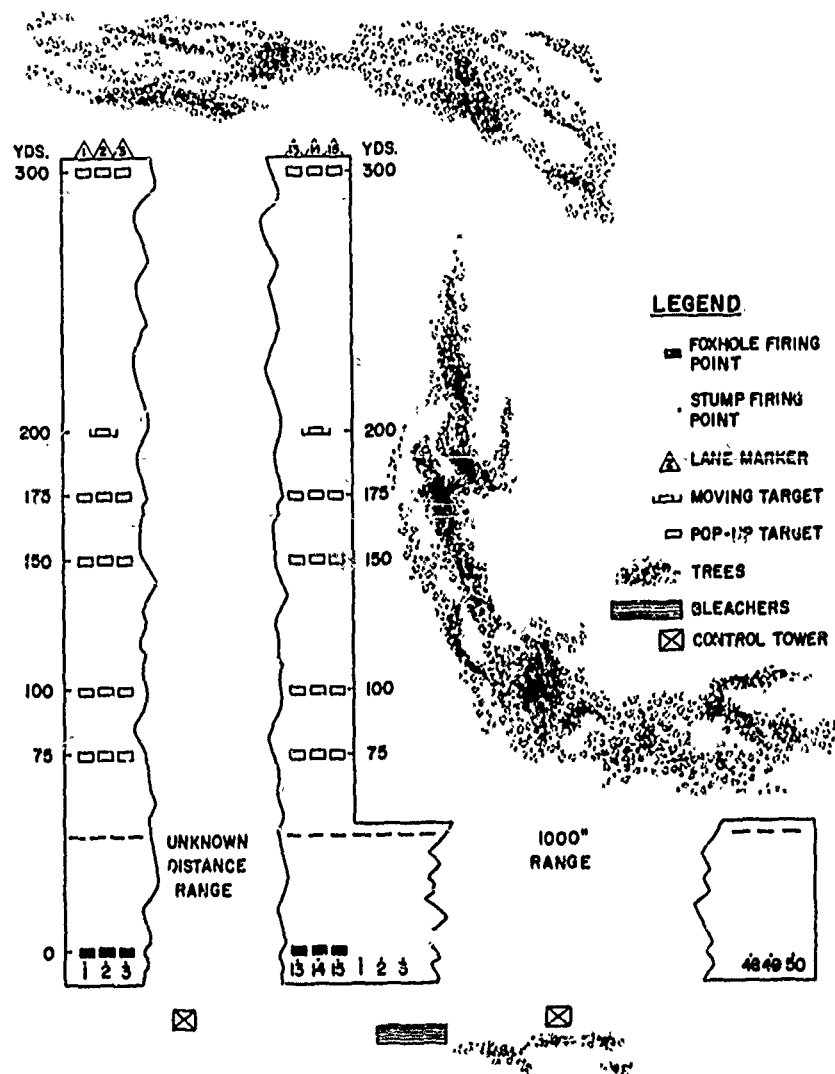


Figure 6

supported standing-foxhole position. The firer then moved down range to a 50-yard marker and fired upon 16 targets, using an unsupported firing position of his own choice.

Each firer was accompanied by a scorer, who also served as a safety man. The entire testing procedure for a firing order lasted approximately 30 minutes.

Procedures to Ensure Uniform Testing

Certain procedures were established to provide for accurate and reliable scoring. No more than one round was fired on each target. After each series of eight targets, weapons were cleared and a fresh clip loaded so that a firer would not be penalized for reloading when targets appeared.

Just before firing the proficiency test, weapons were individually checked to insure that they were operational and that proper battle-sights were set on the weapons. Also, to the extent possible, groups were equally represented in firing orders and on firing points.

Only one lot of ammunition was employed for all testing. All trainees had new weapons. Members of C-II were issued new weapons upon arrival at Fort Benning, and zeroed them on a known-distance range prior to firing the proficiency test.

Both control groups fired upon the pop-up targets and familiarized themselves with the situation. Each man fired eight rounds from the foxhole position at the 100-yard targets on the training range.

In addition, neither trainees nor cadre were allowed on the proficiency ranges or given any information regarding the ranges prior to testing. Scorers did not know to which group the firers belonged and were not allowed to converse with or aid the firers except when necessary.

TARGET DETECTION

Description of Range

The detection proficiency range (Figure 7) was located to meet these requirements: (1) a 120-degree sector of visibility over rolling terrain which provided cover out to a range of 350 yards; (2) proximity to the firing range.

To facilitate reference and scoring, natural landmarks such as bushes, trees, or hedges were identified by two-foot letters. The human targets were not located at or near these letters, but they served as references from which trainees could report the location of detected targets.

In the selection of target locations, the main consideration was that each target be visible from all portions of the observation line. The target locations afforded barely sufficient concealment for a prone target to remain unseen. Targets were dispersed over the entire observation sector to avoid any concentration at any range or in any direction.

TARGET DETECTION PROFICIENCY RANGE

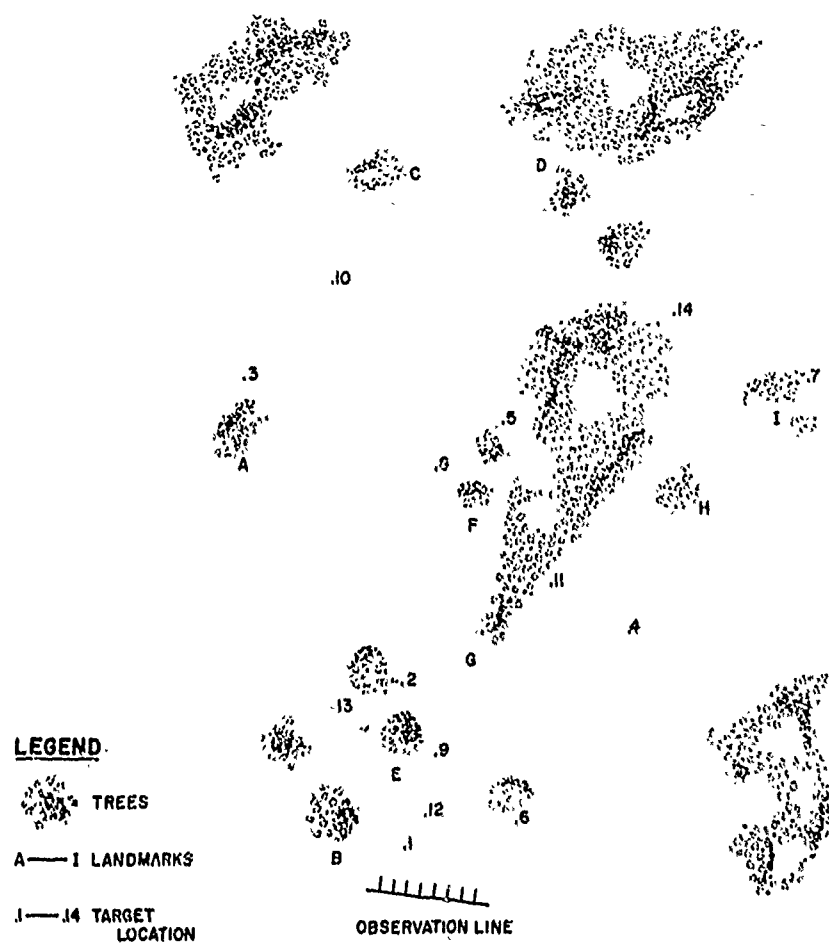


Figure 7

Target indications were selected with a view to realism. These indications occurred in order, from difficult to easy, during the four phases of a trial. Phase 1 indication always consisted of motionless, camouflaged targets. During Phase 2, the target indications consisted of slow movement, such as raising head and shoulders or moving from side to side. Phase 3 was characterized by more readily detectable target indications, such as rapid movement or exposure of shiny helmet liners. Phase 4 terminated the series with the target firing a blank, which gave the additional cues of sound, flash, and smoke to make detection easier.

The primary difference between the test range and the detection training range (Figure 8) lay in the utilization of different tracts of land. Although both areas were sparsely covered with bushes and tall grass, the coverage was greater on the test range. In addition, the targets on the test range appeared in a different sequence and at different ranges than those on the training range.

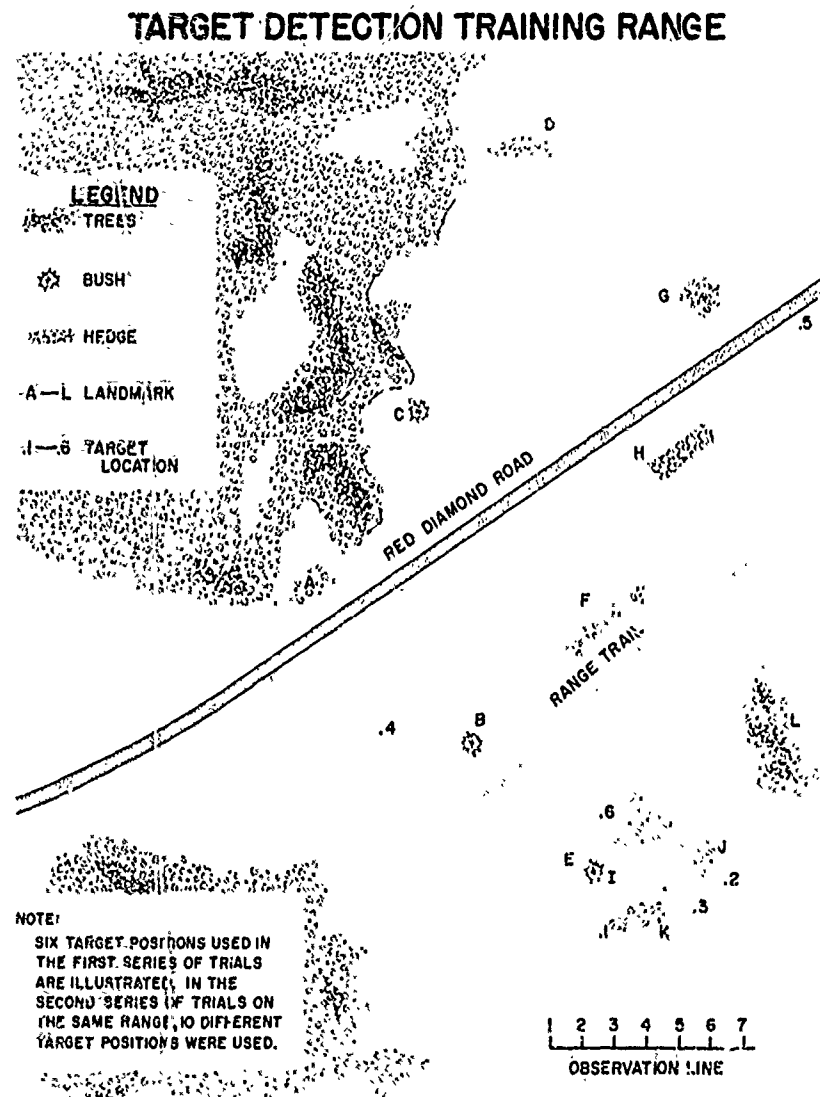


Figure 8

Testing Procedure

Details of the testing procedure are given in Appendix F. Subjects were given 14 trials of four phases each. During each phase, they were allowed 30 seconds to search the observation field. After they had recorded their answers to a particular phase, the target indication for the next phase was presented. After Phase 4, subjects faced away from the observation field while the soldier representing the target proceeded to a new location. After the target reached the new location, a new trial began.

RESULTS OF PROFICIENCY TESTING

To the extent that the proficiency course approximates the target situation encountered by the combat rifleman, the results presented in this chapter reflect the relative levels of preparation of the three groups for combat firing. Results for the Marksmanship and Target Detection Proficiency Tests are summarized in this section. Tabular results and detailed statistical analyses appear in Appendix A.

MARKSMANSHIP PROFICIENCY

Analysis of Data

The firing data were analyzed in terms of: (1) number of hits, obtained by counting the number of times the firer hit the targets; (2) number of misses, obtained by subtracting the number of hits from the number of rounds fired; (3) derived proficiency score, obtained by subtracting the number of misses from the number of hits.

As a measure of proficiency, number of hits has the limitation that it does not reflect the total number of rounds fired; for example, two firers may obtain the same score but differ considerably in the total number of rounds expended to achieve that score.

Number of misses is subject to the same limitation; for example, score of 25 misses may be obtained by getting 20 hits out of 45 rounds fired, or 0 hits out of 25 rounds fired.

In evaluating these two measures, it follows that if one group has more hits and an equal or smaller number of misses, or an equal number of hits and a smaller number of misses than a second group, the first group is superior to the second. If the two groups have the same number of hits and misses they are equal in performance. However, if one group has both more hits and more misses than the other group, a new question arises: Which is more important—the number of hits alone or the number of hits per number of rounds fired?

The derived proficiency score reflects the relationship among number of rounds fired, number of hits, and number of misses. The score has the following characteristics:

(1) A positive score indicates that the number of hits is greater than the number of misses (20 hits minus 10 misses = 10).

(2) A negative score indicates that the number of misses is greater than the number of hits (10 hits minus 20 misses = -10).

(3) A score of zero indicates an equal number of hits and misses (20 hits minus 20 misses = 0).

(4) The score is reduced as the number of misses increases (20 hits minus 2 misses = 18; 20 hits minus 12 misses = 8) or as the number of hits decreases (20 hits minus 2 misses = 18; 10 hits minus 2 misses = 8).

(5) The score is increased as the number of misses decreases (20 hits minus 12 misses = 8; 20 hits minus 2 misses = 18) or as the number of hits increases (10 hits minus 2 misses = 8; 20 hits minus 2 misses = 18).

(6) Parallel increases or decreases in both hits and misses leave the proficiency score unaffected; for example, equal increments (20 hits minus 2 misses = 18; 30 hits minus 12 misses = 18) or equal decrements (30 hits minus 12 misses = 18; 20 hits minus 2 misses = 18).

The proficiency score thus expresses relationships but does not provide information on the actual number of hits obtained or rounds fired. Therefore, to present both aspects of the picture of performance on the proficiency test, data on actual number of hits and misses are presented in conjunction with the proficiency score.

Using the above measures, where applicable, groups were compared on (1) the total course, (2) stationary and moving targets, (3) firing from supported and unsupported positions, (4) each clip of 8 rounds, and (5) firing at various ranges.

Total Course

To determine whether the experimental training method was generally superior to the conventional method in preparing basic trainees for combat firing, the average total test scores of the three groups were compared.

Hits. Group E obtained a significantly¹ greater average number of hits than either C-I or C-II (see Figures 9 and 10). Out of a total of 56 target exposures, the average man in Group E obtained two more hits than did the average man in Group C-I, and four more hits than did the average man in Group C-II. The average number of hits for the groups were: E, 22.8; C-I, 21.1; and C-II, 19.0. C-II, the group which received its first four weeks of training in a training division, performed significantly less well than did C-I.

Misses. Groups E and C-I did not differ to any extent in average number of misses (Figure 11), but both had definitely fewer misses than C-II. The averages for number of misses were 22.1, 23.4, and 26.6 for E, C-I, and C-II, respectively.

Proficiency Scores. An analysis of proficiency scores showed that only Group E obtained a greater average number of hits than of misses (see Figures 12 and 13). Both control groups differed significantly from Group E, and from each other, and had a greater average number of

¹"Significantly" is used in the statistical sense throughout this chapter. See Appendix A.

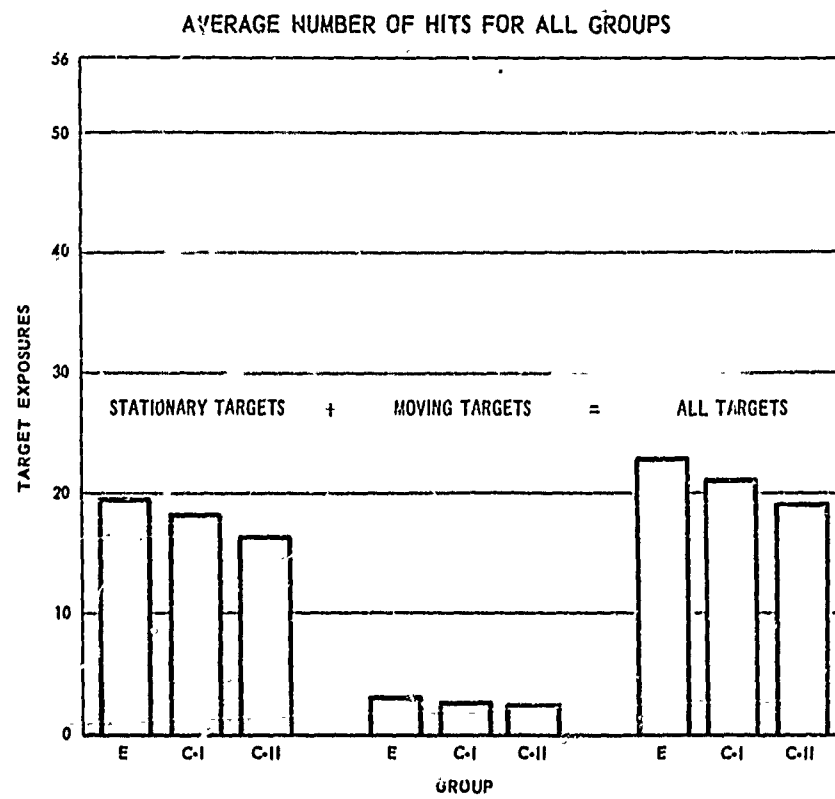


Figure 9

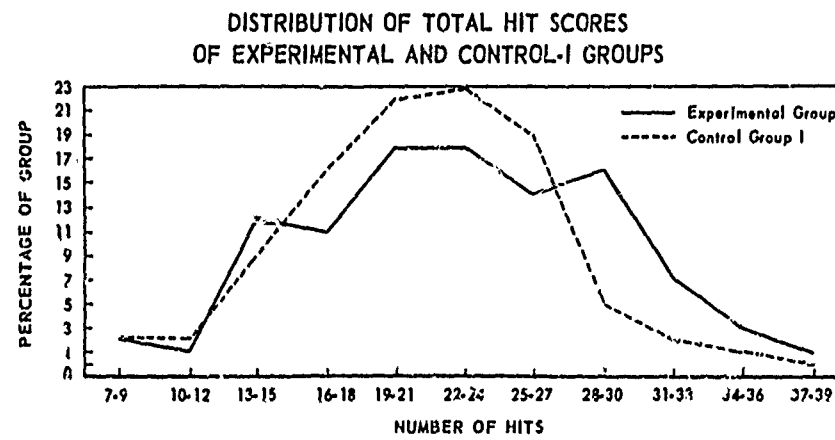


Figure 10

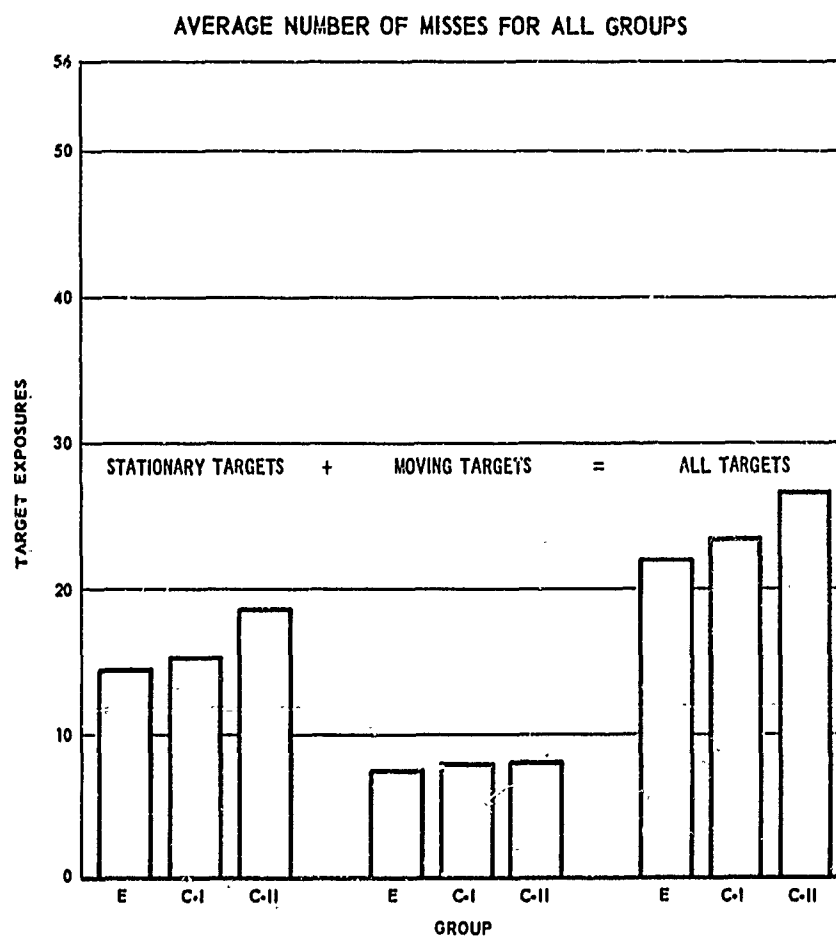


Figure 11

misses than of hits. The average proficiency scores were .7, -2.3, and -7.7 for E, C-I, and C-II, respectively.

Further analyses compared the relative performance of the three groups on specific aspects of the total course. Such analyses were necessary to determine whether the superiority of Group E was, in fact, general or primarily a reflection of marked superiority on specific aspects of the test.

Stationary Targets

F's. Firing against stationary targets, obtained a significantly greater average number of hits than either C-I or C-II. Out of a total

DERIVED PROFICIENCY SCORES ON MARKSMANSHIP FOR ALL GROUPS

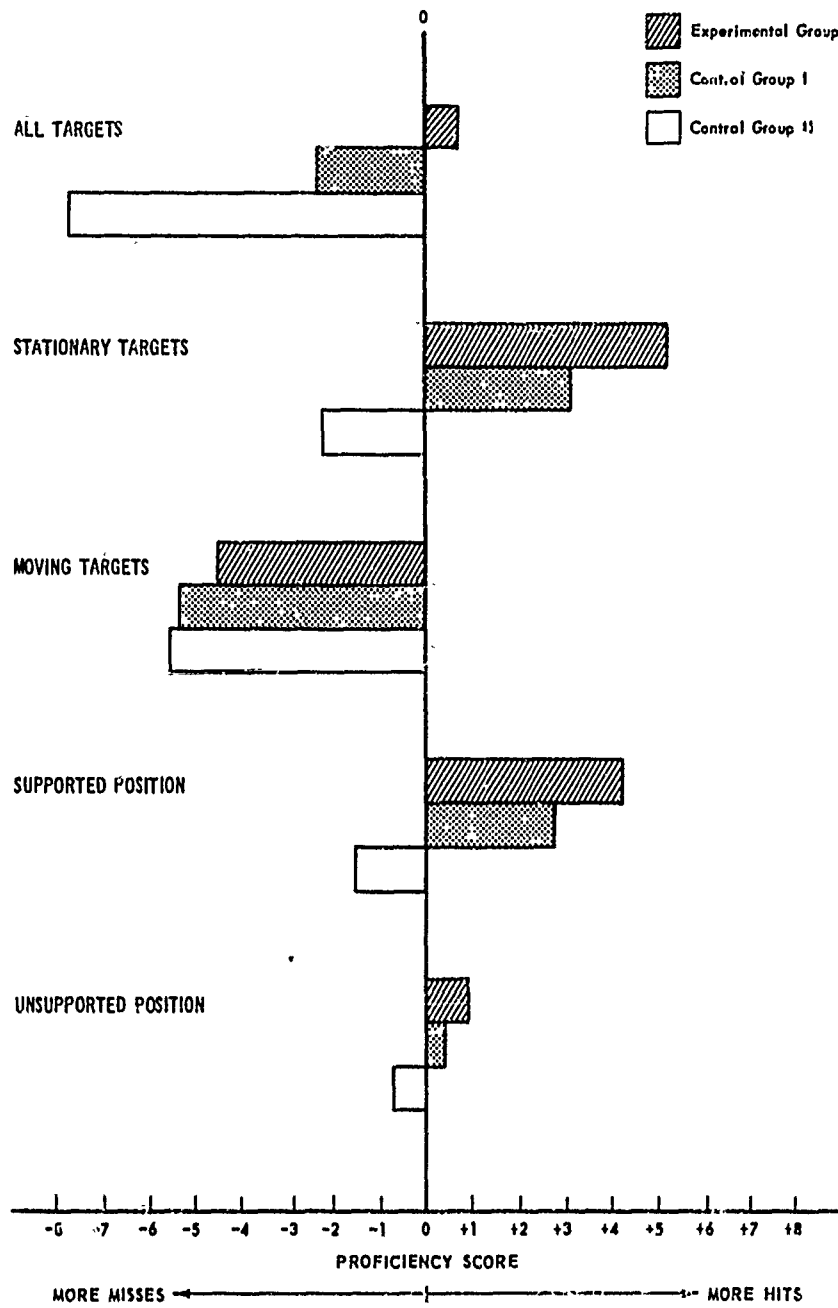


Figure 12

DISTRIBUTION OF PROFICIENCY SCORES (HITS-MISSES)
OF EXPERIMENTAL AND CONTROL-I GROUPS

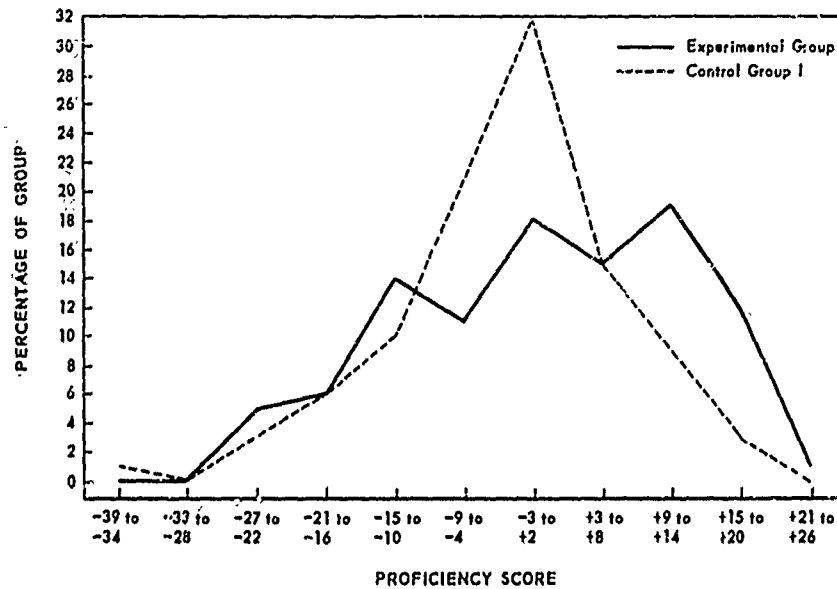


Figure 13

of 44 target exposures, E hit an average of 19.7, while C-I and C-II obtained averages of 18.4 and 16.5, respectively. C-I had a significantly greater average number of hits than did C-II.

Misses. The average number of stationary targets missed was approximately the same for Groups E and C-I, and both groups scored a significantly smaller average number of misses than C-II. The averages were 14.5, 15.3, and 18.6 for E, C-I, and C-II, respectively.

Proficiency Scores. As on the over-all score, the average proficiency score for Group E on the stationary targets (5.2) was positive and significantly superior to the scores of the control groups. In contrast to its negative proficiency score for the total course, C-I had a positive proficiency score of 3.1 on stationary targets; thus, E and C-I both averaged more hits than misses on stationary targets. C-II scored significantly lower than E and C-I, having an average negative proficiency score of -2.2.

Moving Targets

Hits. With a total of 12 target exposures, the average scores were 3.1, 2.7, and 2.5 for E, C-I, and C-II, respectively. The differences among these averages were not statistically significant.

Misses. Average scores were 7.5 for Group E, and 8.0 for both C-I and C-II. These differences were not significant.

Proficiency Scores. The groups did not differ to any extent and they all obtained negative average proficiency scores for moving targets, -4.5 for E, -5.3 for C-I, and -5.3 for C-II. Considering moving targets separately, all groups thus averaged more misses than hits.

Supported Position¹

Hits. In firing from a supported position, the groups differed significantly one from another in mean number of hits, with E scoring the greatest average number of hits and C-II the least. Out of a total of 30 target exposures, the averages were 13.6, 12.7, and 10.8 for E, C-I, and C-II, respectively.

Misses. E and C-I had approximately the same average number of misses on supported firing. C-II made a significantly higher average number of misses than either of the other groups. The averages for E, C-I, and C-II were 9.5, 10.0, and 12.3 for supported firing.

Proficiency Scores. In the supported position, E's average proficiency score was 4.2, which was significantly higher than that of either control group. C-I also obtained more hits than misses on supported firing with an average proficiency score of 2.6. C-II, with an average score of -1.5, had more misses than hits and was significantly below both E and C-I.

Unsupported Position¹

Hits. On unsupported firing, the groups did not differ to any extent. Out of a total of 14 target exposures, averages were 5.9 for E and 5.6 for both C-I and C-II.

Misses. E and C-I had approximately the same number of misses on unsupported firing. C-II scored significantly more misses than either of the other groups. The averages were 5.1, 5.4, and 6.2 for E, C-I, and C-II, respectively.

Proficiency Scores. On unsupported firing, E and C-I both had more hits than misses, and made about the same scores. Group E differed significantly from C-II, which had more misses than hits. The control groups did not differ significantly. The average proficiency scores for E, C-I, and C-II, respectively, were .9, .4, and -.7.

Per Cent Hits Over Clips and Ranges

Supplementary information was obtained by inspection of the percentage of hits scored by the trainees. These data were examined in terms of clips and ranges.

Clips. An examination of the per cent hit scores for clips 1 to 5 shows a gradual increase in per cent hits over successive clips. For

¹The analysis for the supported position (standing foxhole) deals only with stationary targets. The moving targets were pit-scored after each firing order; thus, moving target scores could not be included in the positions analysis.

²The analysis for unsupported positions deals only with stationary targets. The moving targets were pit-scored after each firing order, and thus moving target scores could not be included in the positions analysis.

all three groups combined, 35 per cent hits were achieved on clip 1 as compared with 54 per cent hits on clip 5. The individual group per cents on clip 1 were 40, 35, and 27 for E, C-I, and C-II, respectively, while on clip 5 the corresponding per cent scores were 57, 53, and 4. The increases in percentage of hits from clips 1 to 5 probably were due largely to the trainees learning the placement of the targets.

Ranges. Further examination of the percentage hit scores shows, as might be expected, a marked decrease in hits as range increased for stationary targets. Beginning at 50 yards and increasing the range in 50-yard increments to 350 yards, the combined per cent hit scores were 87, 68, 38, 31, 17, 18, and 17. Examination of the data for the individual groups indicates that the per cent scores of E are higher than those of C-I, which are in turn higher, at most ranges, than the scores of C-II. Although the relative positions of the three groups are generally consistent, a reversal occurs between E and C-I at 350 yards, and between C-I and C-II at 50 and 300 yards.

TARGET DETECTION

The target detection data were analyzed in terms of average number of detections and median phase of detection. Analyses of the average number of detections (Figure 14) yielded comparisons of the relative ability of the groups to detect targets, and reflected differences in the

AVERAGE NUMBER OF TARGET DETECTIONS, BY PHASE, FOR ALL GROUPS

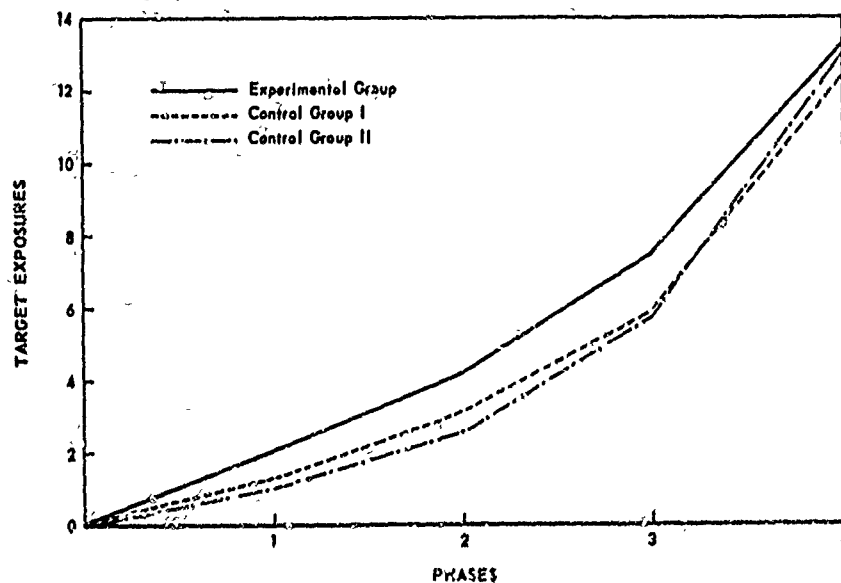


Figure 14

ability to detect targets of varying degrees of difficulty. Consideration of the median phase of detection provided further knowledge of relative performance in detection problems varying in difficulty. Performances in Phases 1, 2, and 3 are the most significant since these not only were more difficult but involved detection of targets prior to the targets firing on the observers. Fourteen targets were presented; therefore, a maximum score of 14 was attainable.

Number of Detections

In Phase 1, the most difficult phase, in which the camouflaged human target was motionless, Group E detected a significantly greater average number of targets than either of the control groups. The control groups did not differ to any extent. The averages were 2.0, 1.3, and 1.0 for E, C-I, and C-II, respectively.

Group E again achieved a significantly greater average number of detections than either of the control groups by the end of Phase 2, in which the target moved slightly and slowly. The respective averages for E, C-I, and C-II were 4.2, 3.1, and 2.6. C-I did not differ significantly from C-II.

By the end of Phase 3, in which movement increased, the average number of detections achieved by E was 7.5, significantly superior to those of the two control groups, with averages of 5.9 and 5.8, respectively.

By the end of Phase 4, which included the target firing a blank, most of the 14 available targets had been detected. The averages were 13.3, 12.5, and 13.0 for E, C-I, and C-II, respectively. The differences between E and C-I, and between C-I and C-II, were significant.

A further indication of the relative ability of the three groups was provided by an analysis of the percentage of individuals able to detect all targets. Fifty-five per cent of Group E detected all targets, compared to 37 per cent of C-I and 32 per cent of C-II. The two control groups were significantly inferior to E and did not differ significantly from each other.

Phase of Detection

An analysis of the median phase of detection scores indicated that the individuals of Group E detected targets in significantly earlier phases than did those of the combined control groups. Median phase of detection scores were 3.2 and 4.0 respectively for E and the combined control groups.

Additional evidence of the superiority of Group E is presented by a comparison of the maximum number of detections achieved during Phase 1. Only two individuals from the control groups, one from C-I and one from C-II, achieved a total of four detections during Phase 1. In contrast, eight men equaled and 10 men surpassed this performance from Group E. This difference between E and the control groups was significant.

RANGE ESTIMATION

To determine the relative ability of the three groups in correctly estimating range, the average number of correct estimations of range of detected targets was compared for the three groups. An estimate was considered correct if it was within 25 yards of the actual range of the target. Out of a possible score of 14 correct, Group E averaged 8.9 correct and both C-I and C-II averaged 7.8 correct. Group E was significantly superior to both control groups.

SUMMARY AND DISCUSSION OF RESULTS

The analyses discussed in the preceding sections revealed a generally consistent pattern in the data which are summarized in the paragraphs that follow. Although this consistency reduces the necessity for detailed discussion, certain features bear additional consideration.

Hits

The experimental group proved superior to the control groups on average number of hits for the total course, as well as for stationary targets and firing from a supported position. On moving targets and firing from unsupported positions the differences in favor of E were not significant. The comparisons between the control groups showed C-I to be significantly superior on the total course, stationary targets, and firing from supported and unsupported positions.

Group E's lack of superiority in unsupported firing probably was due to the fact that less emphasis was placed on this kind of firing practice in the experimental program. Whereas the conventional program allots approximately 68 per cent of the training rounds to unsupported positions, the experimental program apportioned only 36 per cent. In spite of this fact, E's performance measured up to that of C-I and C-II.

Average hit scores on the moving targets, though not significantly different, were in favor of E at both ranges. Such a consistent trend in the data suggests that increasing the present number of rounds (24) allotted to moving-target training in the experimental program would significantly improve the ability to hit these targets.

Misses

The experimental group had the lowest miss scores on the total course, on firing at stationary and moving targets, and on firing from supported and unsupported positions, but none of the differences between E and C-I was significant. In all areas except that of moving targets, C-II had a significantly higher number of misses than either E or C-I. Since in no instance did E have a greater average number of misses, the observed superiority of Group E in average number of hits was not achieved at the expense of a parallel increase in the average number of misses.

Proficiency Scores

Group E had significantly higher proficiency scores on the total course, as well as firing at stationary targets and from supported positions. On firing at moving targets, as well as from unsupported positions, the differences between E and C-I were not significant. In all areas except moving targets, C-II was significantly inferior to E and C-I.

Whereas one or both of the control groups made negative average proficiency scores—more misses than hits—in each analysis, Group E made only one such score, on moving targets.

Consideration of the analyses of these three measures of performance on the marksmanship test range indicates that the better scores made by Group E cannot be attributed to greater volume of fire. Rather, the scores reflect more efficient use of the rifle against combat-type targets.

Target Detection

All target detection differences showed the superiority of the experimental training course. Group E detected a significantly greater number of targets than did the control groups. The individuals of E detected targets in significantly earlier phases of the test than did the men in C-I and C-II, and in addition, a significantly greater number of individuals in E were able to detect all the targets. The maximum number of detections achieved in the earliest phase of the test were significantly in favor of E. Out of seven separate analyses of the data C-I and C-II differed significantly on only one.

The superiority of Group E in detecting targets attests to the effectiveness of only a few hours of this type of training. These results indicate that target detection training, as well as the actual marksmanship training received by E, was an influential variable.

Range Estimation

A significantly greater number of correct range estimations was achieved by the experimental group; C-I and C-II did not differ significantly.

Differences Between Control Groups

The inclusion of two control groups, trained by the same training procedure but at different Army posts, was considered a prerequisite to unbiased evaluation of the experimental marksmanship course. Analysis of the proficiency data showed that the marksmanship of Control Group I, trained at Fort Benning along with the experimental group, was generally superior to that of Control Group II, trained in a regular training division.

Differences in the performance of the two groups had been expected to result from differences in motivation (which were expected to favor C-I) and in the amount of experience of their instructors (which were expected to favor C-II). A precise assessment of the influence of either of these variables is impossible.

In addition, a number of other factors may have affected the groups' performance. Inquiry revealed that despite the request for troops who had completed the first four weeks of training in accordance with ATP 21-114, the troops procured from Fort Jackson had not fired Transition Tables VII and VIII, which are normally given in the fourth week of training. These tables encompass 16 hours of training time and 168 rounds live firing practice, factors which could have accounted for the differences between the two control groups in test performance.

It was also learned that different procedures had been followed for C-I and C-II in qualification firing on the known-distance range, prior to troop testing. Whereas the men in C-I were permitted to fire but once for qualification, those in C-II who failed to qualify on the first firing were re-fired. No information was available on the number of men in C-II who re-fired, nor the number of times they re-fired. Thus, an undetermined number of subjects in C-II fired an additional 42 rounds, or some multiple thereof, during their qualification firing. The effect of this additional known-distance firing on later proficiency testing is unknown, but presumably it would tend to raise the average score of C-II. The two groups were not comparable with respect to known-distance qualification scores. None of C-II failed to qualify, whereas 23 per cent of C-I failed to do so.

The known factors which, logically, would be expected to favor C-I were (1) higher motivation and (2) transition firing experience. The aspects which presumably favored C-II were (1) training under more experienced instructors and (2) higher KD qualification scores, on the average.

In view of these considerations, it is impossible to determine precisely the variables which accounted for the superiority of C-I over C-II in marksmanship proficiency testing.

Chapter 6

PILOT TEST ON TECHNIQUE OF RIFLE FIRE

BACKGROUND

With the completion of proficiency testing, it was possible to conduct a one-day pilot study designed to:

(1) Test trainee ability to apply, against hidden targets, the target detection technique taught in the detection phase of marksmanship instruction.

(2) Test individual readiness for more advanced technique of rifle fire training.

(3) Study the problems involved and facilities required in suitably designed advanced training in technique of rifle fire for small groups (squads). A specific question was: How easily can an existing Technique of Fire Range be modified for use on this problem?

In individual basic training, difficulty of measurement has made it impractical to include safely such elements of combat rifle fire as:

(1) Engagement of hidden targets detectable only by fleeting indications such as dust, noise, and smoke.

(2) Neutralization of dangerous unseen targets.

TEST PROCEDURE AND RESULTS

The general situation involved a squad advancing across an open area and engaging hidden targets which produced cues such as smoke, flash, dust, and sound.

The 10 eight-man squads used in this test were drawn from the two platoons of experimentally trained men used in the marksmanship training study. Since these trainees had never previously fired as a squad, about 20 minutes of preliminary instruction were given to the 10 participating squads.

Although detailed individual records were not kept, about 20 per cent of the rounds fired by each squad hit the targets, or about 50 rounds per squad. The distribution of fire was surprisingly good; all squads hit all targets, except for a single squad which missed one target. The flank targets received fewer hits than the central targets, particularly those in the immediate rear of the machine guns.

The details of this pilot study appear in Appendix G.

The participants advanced rapidly, observed instructions carefully, and hit the ground fast. It was observed that men, unable to see the target after rapidly taking the prone position, often modified their position to a kneel or crouch so as to achieve the minimum exposure compatible with effective fire. Some men moved forward to achieve a better firing position. In addition, trainees corrected their fire on the basis of observation that the bullets were striking the ground. The men displayed an active interest in the problem. Many questions were asked, both prior to the exercise and in the post-exercise critique.

Experienced observers considered these squads better fitted for combat, as far as ability to successfully engage combat-type targets was concerned, than many squads they had seen in actual combat.

The general conclusions for the pilot study are:

(1) Training in target detection given during the experimental marksmanship instruction can be successfully applied to the engagement of hidden targets indicated only by dust, noise, and smoke.

(2) Experimentally trained inductees were qualified for advanced training in technique of fire after one month of basic training.

(3) Existing combat ranges can be modified to permit their use in realistic combat-type firing problems with reasonable minor changes.

(4) The importance of aids, which can be controlled to produce realistic indications of small arms flash, smoke, and sound as well as indications of minor movements, warrants high-priority developmental effort. The dust produced by the measures described was excessive and oversimplified target detection.

(5) The briefing methods used immediately prior to execution of a firing problem proved an effective means of instruction and are warranted as a graphic review even when prior instruction has been given.

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Appendix A

STATISTICAL ANALYSES

This appendix includes tables with measures of central tendency (means and medians) and measures of dispersion (standard deviations). Immediately following each table of means and standard deviations, related tables with summaries of statistical analyses for significant differences are presented. The summaries include statistical ratios, degrees of freedom, and probabilities associated with the ratios and their stipulated degrees of freedom. In all cases, the differences among means were first analyzed by means of the F -ratio and, where probabilities of .10 or less were found, individual comparisons between means were made by use of Student's t . The degrees of freedom associated with the t -tests are identical to the degrees of freedom listed second in connection with the F -values.

When comparisons between the experimental group and either of the control groups deal with hits, proficiency scores, or target detection data, the probability is presented for only one tail of the probability distribution. This procedure was used since the interest of the experiment was to demonstrate superiority of the experimentally trained troops over those conventionally trained. To demonstrate superiority, E necessarily had to obtain a greater number of hits, a higher proficiency score, and also a higher score on target detection than either of the control groups. If the E group was observed to make fewer hits or have a lower proficiency score or a lower score on target detection than the controls, no further consideration of the experimental method would be meaningful. That is to say, the outcome of testing could result in differences in only one direction, E better than C's, if results were to have any usefulness in terms of the objectives of TRAINFIRE. With regard to differences among the groups on miss scores, or differences between the two control groups on any of the four measures, the direction of the differences was not crucial. These latter differences could come out in favor of either training program without damaging the final judgment regarding superiority of the experimental program.

A key to abbreviations used in the appendix tables appears below:

N	Number of cases	F	A statistical ratio which compares differences among means as related to the variability of the scores comprising the means
M	Mean or average score	p	Probability that an obtained F or t could have occurred by chance alone; .01 indicates one chance in 100, .001, only one in 1000, and so on
MDn	Median or middle score	>	Greater than
SD	Standard deviation, a measure of dispersion of scores about the mean	≧	Not greater than
df	Degrees of freedom, associated with the F and t ratios	<	Less than
t	A statistical test of significance where the difference between two means is compared to the variability of the scores comprising the means		

Table A-1
GENERAL BACKGROUND CHARACTERISTICS^a

Background Item	Group		
	E	C-I	C-II
Area Aptitude I Scores			
Mean	101.66	101.35	101.22
SD	19.25	19.14	17.83
Race			
Caucasians	96	92	82
Negroes	16	16	8
Years of School Completed			
Mean	11.76	11.52	10.42
SD	2.89	2.54	2.30
Occupational Experience			
None	46	39	21
Laborers	38	32	20
Agriculturists	5	9	3
Entertainers	0	2	0
White collar	15	20	6
Professional	8	5	0
Age			
Mean	21	21	19
SD	2.48	2.50	1.69
Height			
Mean	5'10"	5'10"	5'9"
SD	2.42	2.75	2.51
Weight			
Mean	153	167	148
SD	25.56	28.90	17.35
General Physical Classification ^b			
A (Above average)	10	10	45
B (Average)	2	2	2
C (Below average but not a serious enough condition to disqualify)	3	1	2
Marital Status			
Single	47	31	45
Married	28	23	3
Separated or divorced	1	4	2
Service Classification			
US	57	37	8
RA	25	21	42
Previous Military Education			(^c)
ROTC	19	12	
Reserve	1	1	
Military School	1	2	
National Guard	2	0	
Average number of months of previous military education	22	22	

(Continued)

Table A-1: (Continued)

GENERAL BACKGROUND CHARACTERISTICS*

Background Item	Group		
	E	C-I	C-II
Home State Recorded at Time of Enlistment or Induction			
Alabama	3	3	6
Arkansas	8	5	4
District of Columbia	1	1	2
Florida	8	10	2
Georgia	2	3	6
Kansas	0	0	1
Louisiana	12	5	4
Maryland	1	0	1
Mississippi	11	15	6
North Carolina	36	37	3
Pennsylvania	15	11	0
South Carolina	2	3	9
Tennessee	11	12	2
Virginia	3	2	3
West Virginia	0	1	1

*The information appearing in this table is based on the original number of men in each group; i.e., 112 in the experimental group, 108 in Control I, and 50 in Control II. All figures are frequencies unless specified as means or standard deviations.

No classification was available for one man in Group C-II.

No information available for C-II.

Table A-2

TRAINEES NOT INCLUDED IN ANALYSIS

Reason	Group	
	E	C-I
Returned to Fort Jackson* because of:		
Emergency leave	1	3
Physical disability	4	10
Omitted because of mechanical failure of weapon or target during testing	4	5
Total	9	18

*According to the Fort Jackson SOP, a trainee is eliminated when he misses three consecutive days of training.

Table A-3

MEASURES OF CENTRAL TENDENCY AND STANDARD DEVIATIONS
FOR HITS, MISSES, AND PROFICIENCY SCORES ON ALL TARGETS*

Group	Hits			Misses		Proficiency Scores	
	M	Mdn	SD	M	SD	M	SD
E	22.77	23.00	6.35	22.10	7.22	+ .67	11.81
C-I	21.11	21.00	5.11	23.44	6.61	-2.33	9.68
C-II	18.96	19.50	5.74	26.58	6.58	-7.70	10.36

*Number of target exposures: 56.

Table A-4

ANALYSES OF DIFFERENCES AMONG MEANS (F 's) AND BETWEEN MEANS (t 's)
FOR HITS, MISSES, AND PROFICIENCY SCORES ON ALL TARGETS

Item	F	df	p	Comparison	t	p *
Hits	7.34	2,241	<.001	E vs C-I	1.98	<.025
				E vs C-II	3.81	<.0005
				C-I vs C-II	2.11	<.05*
Misses	7.09	2,241	<.01	E vs C-I	-1.35	>.10*
				E vs C-II	-3.76	<.001*
				C-I vs C-II	-2.57	<.02*
Proficiency Scores	10.08	2,241	<.001	E vs C-I	1.92	<.05
				E vs C-II	4.48	<.0005
				C-I vs C-II	2.81	<.01*

*All probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Table A-5

GROUP MEANS AND STANDARD DEVIATIONS FOR HITS, MISSES,
AND PROFICIENCY SCORES ON STATIONARY TARGETS*

Group	Hits		Misses		Proficiency Scores	
	M	SD	M	SD	M	SD
E	19.68	5.73	14.51	6.34	+5.17	10.31
C-I	18.44	4.59	15.33	5.60	+3.11	7.92
C-II	16.46	5.26	18.56	6.10	-2.18	9.22

*Number of target exposures: 44.

Table A-6
ANALYSES OF DIFFERENCES AMONG MEANS (F 's) AND BETWEEN MEANS (t 's)
FOR HITS, MISSES, AND PROFICIENCY SCORES ON STATIONARY TARGETS

Item	F	df	p	Comparison	t	p^2
Hits	6.33	2,241	<.005	E vs C-I	1.64	<.05
				E vs C-II	3.55	<.0005
				C-I vs C-II	2.14	<.05*
Misses	7.70	2,241	<.001	E vs C-I	-.94	>.30*
				E vs C-II	-3.89	<.001*
				C-I vs C-II	-3.02	<.01*
Proficiency Scores	10.51	2,241	<.001	E vs C-I	1.54	<.07
				E vs C-II	4.57	<.0005
				C-I vs C-II	3.23	<.01*

*All probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Table A-7
GROUP MEANS AND STANDARD DEVIATIONS FOR HITS, MISSES,
AND PROFICIENCY SCORES ON MOVING TARGETS*

Group	Hits		Misses		Proficiency Scores	
	M	SD	M	SD	M	SD
E	3.09	1.96	7.51	2.21	-4.47	3.83
C-I	2.69	1.80	8.01	2.10	-5.28	3.68
C-II	2.50	1.53	8.02	1.82	-5.52	2.97

*Number of target exposures: 12.

Table A-8
ANALYSES OF DIFFERENCES AMONG GROUPS (F 's)
FOR HITS, MISSES, AND PROFICIENCY SCORES ON
MOVING TARGETS*

Item	F	df	p
Hits	2.11	2,243	<.10
Misses	1.73	2,249	<.10
Proficiency Scores	1.94	2,249	<.10

* t -tests were run only where F 's were found significant.

Table A-9

GROUP MEANS AND STANDARD DEVIATIONS FOR
HITS, MISSES, AND PROFICIENCY SCORES FOR
FIRING ON STATIONARY TARGETS FROM THE SUPPORTED POSITION*

Group	Hits		Misses		Proficiency Scores	
	M	SD	M	SD	M	SD
E	13.61	4.34	9.47	4.63	+4.24	7.73
C-I	12.74	3.74	9.98	4.15	+2.76	6.26
C-II	10.80	3.91	12.32	4.76	-1.52	7.09

*Number of target exposures: 30.

Table A-10

ANALYSES OF DIFFERENCES AMONG GROUPS (F 's) AND BETWEEN
GROUPS (t 's) FOR HITS, MISSES, AND PROFICIENCY SCORES WHEN
FIRING ON STATIONARY TARGETS FROM THE SUPPORTED POSITION

Item	F	df	p	Comparison	t	p^*
Hits	8.19	2,243	<.001	E vs C-I	1.49	<.07
				E vs C-II	4.03	<.0005
				C-I vs C-II	2.71	<.01*
Misses	6.98	2,241	<.005	E vs C-I	-.78	>.40*
				E vs C-II	-3.70	<.001*
				C-I vs C-II	-2.96	<.01*
Proficiency Scores	11.10	2,241	<.001	E vs C-I	1.45	<.08
				E vs C-II	4.68	<.0005
				C-I vs C-II	3.42	<.001*

*All probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Table A-11

GROUP MEANS AND STANDARD DEVIATIONS FOR
HITS, MISSES, AND PROFICIENCY SCORES FOR
FIRING ON STATIONARY TARGETS FROM THE UNSUPPORTED POSITION*

Group	Hits		Misses		Proficiency Scores	
	M	SD	M	SD	M	SD
E	5.92	2.21	5.05	2.49	+.92	4.13
C-I	5.64	1.88	5.35	2.07	+.35	3.19
C-II	5.58	1.96	6.24	1.95	-.66	3.16

*Number of target exposures: 14.

Table A-12

ANALYSES OF DIFFERENCES AMONG GROUPS (F 's) AND BETWEEN GROUPS (t 's) FOR HITS, MISSES, AND PROFICIENCY SCORES WHEN FIRING ON STATIONARY TARGETS FROM THE UNSUPPORTED POSITION

Item	F	df	p	Comparison	t	p ^a
Hits	1	2,246	>.20			
Misses	4.76	2,241	<.025	E vs. C-I	-.94	>.30*
				E vs C-II	-3.05	<.01*
				C-I vs C-II	-2.22	<.05*
Proficiency Scores	3.10	2,241	<.05	E vs C-I	1.08	>.10
				E vs C-II	2.51	<.01
				C-I vs C-II	1.55	>.10*

^aAll probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Table A-13

ABSOLUTE PERCENTAGE OF HITS* MADE BY THE THREE GROUPS ON THE FIRST FIVE CLIPS WHILE FIRING FROM THE SUPPORTED POSITION

Group	Clip				
	1	2	3	4	5
E	40	47	37	47	57
C-I	35	42	37	46	53
C-II	27	36	27	41	49
E, C-I, and C-II	35	43	35	45	54

*Absolute percentages of hits were obtained by division of total hits by total possible hits.

Table A-14

ABSOLUTE PERCENTAGE OF HITS* AT EACH RANGE FOR FIRING ON STATIONARY TARGETS FROM THE SUPPORTED POSITION

Group	Range (in yards)						
	50	100	150	200	250	300	350
E	89	72	40	36	20	20	18
C-I	85	69	39	30	16	16	20
C-II	88	55	31	23	16	19	10
E, C-I, and C-II	87	68	38	31	17	18	17

*Absolute percentages of hits were obtained by division of total hits by total possible hits.

Table A-15
MEANS AND STANDARD DEVIATIONS FOR THE NUMBER OF TARGETS
DETECTED BY EACH GROUP BY THE END OF EACH PHASE*

Group	Phase I		Phase II		Phase III		Phase IV	
	M	SD	M	SD	M	SD	M	SD
E	2.02	1.77	4.21	2.02	7.51	2.41	13.32	.91
C-I	1.28	1.05	3.06	1.75	5.87	2.30	12.46	1.90
C-II	1.00	1.02	2.64	1.60	5.76	2.17	13.04	.85

*Number of targets presented: 14.

Table A-16
ANALYSES FOR DIFFERENCES AMONG MEANS (F 's) AND BETWEEN MEANS (t 's)
FOR THE NUMBER OF TARGETS DETECTED AT THE COMPLETION OF EACH PHASE

Phase	F	df	p	Comparison	t	p^a
I	11.39	2,248	<.001	E vs C-I	3.72	<.0005
				E vs C-II	4.23	<.0005
				C-I vs C-II	1.14	>.20*
II	15.67	2,248	<.001	E vs C-I	4.39	<.0005
				E vs C-II	4.94	<.0005
				C-I vs C-II	1.30	>.10*
III	15.77	2,248	<.001	E vs C-I	4.97	<.0005
				E vs C-II	4.36	<.0005
				C-I vs C-II	.27	>.70*
IV	10.02	2,248	<.001	E vs C-I	4.46	<.0005
				E vs C-II	1.19	>.10
				C-I vs C-II	2.43	<.02*

*All probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Table A-17
PROPORTION OF EACH GROUP WHICH DETECTED
FOURTEEN TARGETS OR LESS THAN FOURTEEN*

Number of Targets Detected	Group		
	E	C-I	C-II
14	.55	.37	.32
Less than 14	.45	.63	.68

*The frequencies from which these proportions were obtained yielded a χ^2 value of 9.83. With 2 df , such a χ^2 is significant at the .01 level of confidence.

Table A-18

FREQUENCY DISTRIBUTIONS OF MEDIAN PHASES OF DETECTION
AROUND THE MEDIAN OF 4 OVER THE THREE GROUPS COMBINED*

Group	Median Score							
	1	2	2.5	3	3.5	4	4.5	5
E	2	4	7	10	17	36		
C-I and C-II			3	36	13	91	1	1

*An arbitrary score of 5 was assigned when a trainee failed to detect a target.

Table A-19

NUMBER OF MEN WHOSE MEDIAN PHASE OF DETECTION
WAS ABOVE OR NOT ABOVE THE TOTAL MEDIAN*

Position	Group E	Groups C-I and C-II
>Median	18	48
≤Median	88	27

*The χ^2 obtained from this table was 7.40, $df = 1$, $p = <.01$.

Table A-20

NUMBER OF MEN WHO DETECTED
FOUR OR MORE TARGETS DURING PHASE 1^{a,b}

Group	Targets Detected	
	4 or more	Less than 4
E	18	88
C-I and C-II	2	143

*The χ^2 obtained from this table was 18.26, $df = 1$, $p = <.001$.

^bThe categories employed here were selected on the basis of the maximum score (4) attained by any member of the combined Control Group.

Table A-21

FREQUENCY DISTRIBUTIONS FOR THE THREE GROUPS
ON NUMBER OF TARGETS DETECTED DURING PHASE 1

Number of Targets	Group		
	E	C-I	C-II
9	1		
8	1		
7	0		
6	3		
5	5		
4	8	1	1
3	16	13	3
2	21	25	11
1	32	29	15
0	19	27	20

Table A-22

AVERAGE NUMBER OF CORRECT RANGE ESTIMATIONS
AND THEIR STANDARD DEVIATIONS

Group	M	SD
E	8.85	2.48
C-I	7.79	2.47
C-II	7.60	2.33

Table A-23

ANALYSES OF DIFFERENCES
AMONG MEANS (F 's) AND BETWEEN MEANS (t 's)
FOR CORRECT RANGE ESTIMATION DATA

F	df	p	Comparison	t	p^*
5.64	2,248	<.005	E vs C-I	3.05	<.005
			E vs C-II	2.49	<.01
			C-I vs C-II	-.03	>.90*

*All probabilities are presented for a one-tailed t -test unless accompanied by an asterisk.

Appendix B
TASK TRAINFIRE MASTER SCHEDULE*
(For Period 17 September - 18 October 1954)

Subject	Pre-Cycle		Stages of Training												Totals ^b					Post-Cycle	
			First Week			Second Week			Third Week			Fourth Week									
	J	B	A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	C-II	B	
Achievements and traditions of the Army	1																1				
Character guidance				1	1	1	1										3	2	2		2
Military courtesy and customs	1		2	2	2	1											3	2	2		2
Troop information (Command conference)	1		1	1	1	1						1					3	2	2		2
Concealment and camouflage																	4	4	4		5
Dismounted drill and ceremonies	2		5	6	6	6	2	4	4	6	2	2	2	1	2		10	12	12		15
Field sanitation			2	2	2	2											2	2	2		2
First aid			4	4	4	4							2				6	4	4		4
Guard duty				4	4	4	4				1						5	4	4		4
Individual protective measures against CBR attack			4	2	2	2		3									6	10	10		10
Inspections	1		2	1	1	1	1	1	1	1	1	1	1	1	1		5	3	3		3
Intelligence training			3														3				
Maintenance, supply economy, and cost consciousness			1				1	1									1	1	1		1
Military justice			2	2	2	2											2	2	2		2
Personal hygiene			1	1	1	1											1	1	1		1

(Continued)

Appendix B (Continued)

TASK TRAINING MASTER SCHEDULE*
(For Period 17 September - 18 October 1954)

Subject	Pre-Cycle		Stages of Training																Totals ^b					Post-Cycle	
			First Week				Second Week				Third Week				Fourth Week										
			A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	C-II	A	J	C-I	E		C-II
Physical training	2		6	5	5	5	4	4	4	5			2	2	4	2	1		14	11	11	13		B	
Signal communication, elementary			2					6									6	6	2	6	6	6			
Individual day training																	4	4		4	4	4			
Individual night training															4				4						
Marches and bivouacs			2				4												6						
Bayonet				3	3	3		3	3	5					2		0		2	6	6	9			
Grenades (all types)												8							8						
Individual weapon qualification (Rifle, cal. .30, M1)			6	7	12	12	26	21	34	25	40	44	36	36	18	14	8		90	86	90	74			
Individual weapon familiarization (Machine, cal. .30)																	8	8		8	8	8			
Company commander's orientation	8	6	3	1	1	1	2	1	1	3	2				2	2	1	3	9	4	3	7	14	4	
Miscellaneous orientation ^c	(1)	(3)																							
Processing and deprocessing	(6)																								
Other	(2)																							(3)	
In-cycle processing	(1)	(1)	(1)	(1)	(1)		(1)	(1)	(1)	(3)						(2)	(1)	(3)	(14)	(4)	(3)	(7)	(14)	(1)	
Orientation	3		2	2	2															2	2	2			
	(1)																								

Appendix B (Continued)

TASK TRAINFIRE MASTER SCHEDULE^a
(For Period 17 September - 18 October 1954)

Subject	Pre-Cycle	Stages of Training																Totals ^b					Post-Cycle	
		First Week				Second Week				Third Week				Fourth Week										
		B	A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	A	J	C-I	E	C-II	J	C-I	E		C-II
In-cycle processing (Continued)																								
Immunization	(1)																			(2)	(2)	(2)		
Re-enlistment interview	(1)																							
Proficiency testing				(2)	(2)	(2)																		
Advanced rifle transition							2																	
Orientation and rifle zeroing																								
Weapons demonstration	1																							
Travel (estimated time)	12½																							
Questionnaire Testing ^c				44	49	49	48	44	49	49	48	44	44	44	48	44	49	43½						
Totals	20	18½	48	44	49	48	44	49	48	44	49	48	44	44	48	44	49	43½	192	176	191	191	43½	13½

^aThe training is itemized in hours under the following symbols:

A-Training as outlined in ATP 21-114 (30 January 1954)

B-Training of all TRAINFIRE personnel, to be conducted at Fort Benning

C-I-Training of 110-man Control Group, to be conducted at Fort Benning

C-II-Training of 50-man Control Group, to be conducted at Fort Benning

E-Training of Experimental Group, to be conducted at Fort Benning

J-Training as outlined in Master Schedule (ATP 21-114), Training SOP "B," Headquarters, 101st Airborne Division, Fort Jackson, dated 26 July 1954

Totals do not include pre-cycle and post-cycle periods.

^bIncludes safety lecture (1 hour), fire prevention (1/2 hour), history 101st Airborne Division (1/2 hour), personal affairs orientation (1 hour), regimental personnel interview (1 hour), chaplain's orientation (1 hour), CHR and fire plan (1 hour).^cAfter completion of proficiency testing, individuals will utilize any remaining hours allotted to such testing for individual weapon familiarization (carbine, caliber .30).^dFor Human Research Unit Nr 2, to obtain additional validation, against training criteria, of the data collected in that Unit's Task FIGHTER.^eTotals shown are not exact, since estimated travel time is included.

Appendix C
RIFLE MARKSMANSHIP COURSE
PRESENTED TO CONTROL GROUP (C-I)
(90 Hours; 377 Rounds)

MECHANICAL TRAINING (4 Hours)

Period 1. Mechanical Training (Description, disassembly, assembly, operation, functioning, stoppages, immediate action, and care and cleaning) (4 hours)

- a. Description of the U.S. Rifle, caliber .30, M1. Explanation of its history, capabilities, and general characteristics.
- b. Explanation, demonstration, and practical work in disassembly and assembly. Use of disassembly (nomenclature) mats (Graphic Training Aid 9-58). Explanation of classifications of disassembly. Caution against unauthorized disassembly.
- c. Introduction to, and showing of, TF 8-172, "Principles of Operation of the M1 Rifle."
- d. Explanation and demonstration of functioning by use of working models.
- e. Explanation and demonstration of stoppages and immediate action. Practical work in applying immediate action and reduction of stoppages.
- f. Explanation, demonstration, and practical work in care and cleaning and in use of spare parts. Emphasis on care and cleaning before, during, and after firing.
- g. Explanation, exhibition, and demonstration of the various types of rifle ammunition.
- h. Summary and review of mechanical training.

PREPARATORY MARKSMANSHIP (PRI) (26 Hours)

Period 2. Sighting and Aiming (4 hours)

- a. Explanation of preparatory marksmanship training; its purpose and importance.
- b. Explanation and demonstration of sighting and aiming and use of the M15 sighting device. Explanation, demonstration, and practical work in the 1st and 2d sighting and aiming exercises (Paragraphs 78 and 81, FM 23-5, 2 October 1951).
- c. Explanation, demonstration, and practical work in the 3d sighting and aiming exercise (Paragraph 82, FM 23-5, 2 October 1951).

Note: Practical work in each step of instruction was completed prior to progressing to the next step. (Mimeographed shot-group (triangle) critique sheets for 3d sighting and aiming exercise issued.)

Period 3. Positions and Sling Adjustment (4 hours)

a. Explanation, demonstration, and practical work in adjustment of the loop sling; the prone position with loop sling; and duties of the coach in the prone position. (Mimeographed lists of duties of the coach for the prone position issued.)

b. Explanation, demonstration, and practical work in the sitting position with loop sling; and duties of the coach in the sitting position. (Mimeographed lists of duties of the coach for the sitting position issued.)

c. Explanation, demonstration, and practical work in the kneeling position with loop sling; and duties of the coach in the kneeling position. (Mimeographed lists of duties of the coach for the kneeling position issued.)

d. Explanation, demonstration, and practical work in adjustment of the hasty sling; the standing position with hasty sling; and duties of the coach in the standing position. (Mimeographed lists of duties of the coach for the standing position issued.)

Note: Instructions in assuming the standing position with the M1 rifle differed from those contained in Paragraph 101, FM 23-5 (2 October 1951) by prescribing that "the firer faces his target and then takes a half-right position so that his feet are 10 to 14 inches apart. He then adjusts this position so that his rifle points naturally at his target without muscular effort to force it there." The remaining points of instruction in assuming this position were as prescribed in Paragraph 101, FM 23-5 (2 October 1951).

Period 4. Trigger Squeeze (In the prone, kneeling, sitting, and standing positions) (3 hours)

Explanation, demonstration, and practical work in the three (3) trigger squeeze exercises including breathing, in the prone, kneeling, sitting, and standing positions and duties of the coach in each position and exercise. Emphasis on duties of the coach. (Paragraph 109, FM 23-5, 2 October 1951.)

Period 5. Sustained Fire Exercises (Taking the prone position rapidly, and reloading in the prone position) (3 hours)

a. Explanation, demonstration, and practical work in taking the prone position from the standing, by the numbers. (Paragraph 113, FM 23-5, 2 October 1951.)

b. Explanation, demonstration, and practical work in reloading in the prone position.

c. Explanation, demonstration, and practical work in sustained fire exercises. Only three-round shot groups were fired. Example: Simulated one round LOCK and LOAD, TARGETS up, trainees went into firing position, fired first round, reloaded full clip and fired second and third rounds.

Period 6. Sustained Fire Exercises (Taking the sitting position rapidly, and reloading in the sitting position) (3 hours)

a. Explanation, demonstration, and practical work in taking the sitting position from the standing, by the numbers. (Paragraph 116, FM 23-5, 2 October 1951.)

b. Explanation, demonstration, and practical work in reloading in the sitting position.

c. Explanation, demonstration, and practical work in sustained fire exercises. Only three-round shot groups were fired. Example: Simulated one round J.O.C.K and LOAD, TARGETS up, trainees went into firing position, fired first round, reloaded full clip and fired second and third rounds.

Period 7. Sustained Fire Exercises (Taking all positions rapidly and reloading in all positions) (3 hours)

a. Explanation, demonstration, and practical work in the third sustained fire exercise. (Paragraph 119, FM 23-5, 2 October 1951.) Nine-round shot groups fired in 70 seconds in the prone and sitting positions.

b. Explanation, demonstration, and practical work in the third sustained fire exercise. (Paragraph 119, FM 23-5, 2 October 1951.) Nine-round shot groups fired in 60 seconds in the prone and sitting positions.

c. Explanation, demonstration, and practical work in the third sustained fire exercise. (Paragraph 119, FM 23-5, 2 October 1951.) Nine-round shot groups fired in 50 seconds in the prone and sitting positions.

Note: Dummy ammunition only was used during these sustained fire exercises. No live firing.

Period 8. Range Procedures and Safety Precautions (1 hour)

a. Explanation and demonstration of range procedures as pertain to operation of the firing line.

b. Explanation and demonstration of range procedures as pertain to operation of the pits.

c. Explanation and demonstration of safety precautions.

Period 9. Review and Examination (4 hours)

a. Review of all rifle marksmanship instruction.

b. A performance-type (country fair system) examination conducted to determine proficiency and readiness of each individual to progress to range firing. Examination conducted of four (4) examining stations as follows:

(1) Sighting and aiming.

(2) Positions, breathing, and trigger squeeze.

(3) Sustained fire.

(4) Range procedure and safety precautions. Practical work in triangulation exercise (third sighting and aiming exercise). (Paragraph 82, FM 23-5, 2 October 1951.)

Period 10. Review Before Firing (Special films on rifle marksmanship) (1 hour)

a. Following films shown in order listed:

(1) Sighting and aiming (3 minutes)

(2) Platform concept (8 minutes)

(3) Loop sling (7-1/2 minutes)

(4) Prone position (6 minutes)

(5) Kneeling position (6 minutes)

(6) Hasty sling (4-1/2 minutes)

(7) Trigger squeeze (4 minutes)

(8) Firing the M1 rifle (5 minutes)

b. Each film introduced and trainees given "points to remember" about each one.

c. Trainees questioned on important points after each film.

RANGE PRACTICE (40 Hours; 179 Rounds)

Period 11. Instruction Practice - 1,000-Yard Firing (Live round triangulation exercise) (4 hours; 9 rounds). (First firing of the rifle on any range.)

Table I. Course D - 1,000-Yard, Slow Fire, fired once for practice.

RANGE	TIME	ROUNDS	POSITION
1,000-Yard	No limit	9	Prone

Note: This was not a zeroing exercise. The purpose of this exercise was to fire triangulation exercises and to provide trainees additional practice in making proper shot-groups. During the firing of this exercise, sight changes were not made unless necessary in order to bring the shot group on to the target.

Use was made of dummy cartridges for detection and correction of flinching as outlined in Paragraph 164, FM 23-5 (2 October 1951).

Sandbag rests were used during the triangulation exercises.

After each shot group of three rounds, the shot group (triangle) was critiqued by coaches and assistant instructors. Trainees whose shot group could not be covered with a quarter were reported to a concurrent training station for additional work in the 3d Sighting and Aiming Exercise as outlined in Paragraph 82, FM 23-5 (2 October 1951). These trainees continued at the 3d Sighting and Aiming Exercise until they demonstrated proficiency. (Mimeographed target critique sheet issued.)

Period 12. Sight Changes, Battle Sight, and Use of Score Card (Sight setting, windage, score card, zeroing, battle sight, and review of range procedure and safety precautions) (4 hours)

- a. Explanation of operation of the M1 rifle sights.
- b. Explanation, demonstration, and practical work in adjusting the rear sight for windage using the deflection rule.
- c. Explanation, demonstration, and practical work in the effects of wind, the wind rule, and applying windage adjustment to the rear sight.
- d. Explanation, demonstration, and practical work in use of the elevation rule and applying elevation adjustments to the rear sight.
- e. Explanation, demonstration, and practical work in combining the deflection and elevation rules and in adjusting the rear sight for combined changes of both elevation and deflection.
- f. Explanation, demonstration, and practical work in the use of the score card.
- g. Explanation of importance of, and use of, battle sight. The necessity of keeping a record of the battle sight settings for each rifle in the floor plate of the trigger housing group was emphasized.
- h. Review of range procedure to include operation of the firing line, operation of the pits, and safety precautions.

Period 13. Instruction Practice—Known-Distance Zeroing (Table I, Course B) (8 hours; 27 rounds). (First firing on the Known-Distance Range—100, 200, and 300 yards.)

Table I, Course B, Instruction Practice, Slow Fire (Modified by adding 300-yard firing), fired once.

RANGE IN YARDS	TIME	ROUNDS	POSITION
100	No limit	9	Prone
200	No limit	9	Prone
300	No limit	9	Prone

Note: Table I fired in three-round shot-groups. Sandbag rest used for all three groups.

Period 14. Instruction Practice—Known-Distance Range (Tables II and III, Course B) (8 hours; 59 rounds)

a. Table II, Course B—Slow Fire, fired once for practice.

RANGE IN YARDS	TIME	ROUNDS	POSITION
100	No limit	8	Standing
200	No limit	8	Prone
200	No limit	8	Sitting
200	No limit	8	Kneeling

b. Table III, Course B—Sustained Fire, fired once for practice.

RANGE IN YARDS	TIME	ROUNDS	POSITION
200	50 seconds	9	Prone from Standing
200	50 seconds	9	Sitting from Standing
200	50 seconds	9	Sitting from Standing

Period 15. Instruction Practice—Known-Distance Range (Tables IV and V, Course B) (8 hours; 42 rounds)

a. Table IV, Course B—Slow Fire, fired once for practice.

RANGE IN YARDS	TIME	ROUNDS	POSITION
100	No limit	3	Standing
200	No limit	8	Prone
200	No limit	8	Kneeling

b. Table V, Course B—Sustained Fire, fired once for practice.

RANGE IN YARDS	TIME	ROUNDS	POSITION
200	50 seconds	9	Prone from Standing
200	50 seconds	9	Sitting from Standing

Period 16. Record Practice—Known-Distance Range (Tables IV and V, Course B), (8 hours; 42 rounds)

a. Table IV, Course B—Slow Fire, fired once for record:

RANGE IN YARDS	TIME	ROUNDS	POSITION
100	No limit	8	Standing
200	No limit	8	Prone
200	No limit	8	Kneeling

b. Table V, Course B—Sustained Fire, fired once for record.

RANGE IN YARDS	TIME	ROUNDS	POSITION
200	50 seconds	9	Prone from Standing
200	50 seconds	9	Sitting from Standing

TRANSITION FIRING (20 Hours; 168 Rounds)

Period 17. Preliminary Instruction for Transition (Table VI, Standard Course) (4 hours; 30 rounds)

Table VI, Standard Course, Preliminary Transition Firing, fired once using battle sight.

RANGE IN YARDS	TIME	ROUNDS	POSITION	TARGET
300	No limit	6	Prone	Silhouette #1
300	No limit	8	Prone	Silhouette #2
200	No limit	4	Prone	E Silhouette on Staff
200	No limit	4	Prone	F Silhouette on Staff
300	No limit	8	Prone	E Silhouette on Staff

Note: Targets arranged as per Figure 122, FM 23-5 (2 October 1951). Three-round shot-groups fired on Silhouette No. 1. One three-round shot-group fired on Silhouette No. 2; thereafter, the target was pulled and marked after each shot. Single rounds fired on E and F Silhouette targets on staff.

Period 18. Transition Firing, Instruction, and Record Practice
(Tables VII and VIII, Standard Course) (16 hours; 168 rounds). (First firing on the transition range.)

a. Table VII, Standard Course, fired twice for practice and once for record.

(Figure 123, FM 23-5, 2 October 1951)

LANE	RANGE	TIME SEC/TGT	ROUNDS	TARGET**	POSITION*
1	150-300	30	4	E & F	Standing foxhole
2	200-400	30	4	E & F	Rubble pile
3	300-400	30	4	E	Stump
4	200-325	30	4	E & F	Window
5	150-250	30	4	E & F	Prone
6	500	60	4	B	Prone
7	125-400	30	4	E & F	Barricade
8	250-350	30	4	E	Ditch
9	175-325	30	4	E & F	Roof top
10	125-275	30	4	E & F	Log

*Hasty sling used except when firing from "rubble pile" and "roof top."
**F Silhouettes used up to and including 200 yards.

b. Table VIII, Standard Course Quick Fire, fired once for practice and once for record.

(Figure 124, FM 23-5, 2 October 1951)

PHASE	LINE	RANGE (YDS)	TIME (SEC)	ROUNDS	TARGET	POSITION
First		20-30	3	8	1E	Shoulder
			3		1E	
			4		2F	
			3		1E	
			3		1E	
Second		15-25	3	8	1E	Shoulder
			3		1E	
			3		1F	
			4		2E	
			4		2F	
Third		15-45	4	8	1E	Shoulder
			3		2F	
			3		1E	
			3		1F	
			3		1E	

Note: Reaction targets representing friendly soldiers were used.
(Five points deducted for each reaction target fired upon.)
Each firer issued 24 rounds for the 21 silhouette targets in Table VIII. The exact number of rounds fired varied with the individual's ability to obtain hit on first round.

QUALIFICATION

a. The qualification score was the total score made in record practice (qualification firing of Tables IV and V, Course B). (Possible 210.)

b. Individual classification and minimum scores required were as follows:

Expert	178
Sharpshooter	157
Marksman	134

c. A total minimum score of 165 points, made by totaling scores for Tables VII and VIII, Standard Course, on the transition range, was required to retain the qualifications established on the Known-Distance Range. (Possible 320.)

Note: The standard Ordnance "A" target was used at 100, 200, and 300 yards. In known-distance firing, the hasty sling was used for all firing from the standing position. The loop sling was used for all other positions.

d. Coaching was not permitted during record firing.

e. Pit scoring was employed during record firing.

Appendix D

REALISTIC TARGETS FOR THE TRAINING AND TESTING OF COMBAT RIFLEMEN

BACKGROUND

Early in the planning phase of Task TRAINFIRE, it became apparent that development of methods of (1) training riflemen to use their weapons efficiently in combat situations and (2) measuring rifle marksmanship in situations closely simulating combat conditions required the utilization of realistic targets. Inasmuch as no existing device fulfilled this requirement, the development of realistic targets was included as a part of Task TRAINFIRE.

Analysis of combat situations and interviews with combat veterans indicated that the majority of visible targets encountered by riflemen are briefly exposed, camouflaged, stationary human silhouettes. Encountered to a lesser extent are briefly exposed, indistinct, fleeting silhouettes. Accordingly, a program was launched to develop devices that would simulate these combat targets.

As a result of this target development program, two devices were designed, and produced in sufficient quantity, to construct (1) a training range and (2) a proficiency testing range as required for Task TRAINFIRE. One of the target devices consisted of an electrically powered, stationary mechanism which presented a pop-up, camouflaged silhouette to the rifleman. The other consisted of a hand-powered, track-mounted carriage which briefly presented a pop-up, camouflaged, moving silhouette to the rifleman. Twenty-one of the moving and 100 of the stationary devices were installed.

STATIONARY TARGET DEVICE

General.

Punchey Pete, the stationary target device, is an electrically powered, remotely controlled mechanism which presents a silhouette target that falls when struck by a bullet. It is designed to simulate a human figure that suddenly appears, remains exposed in the same position, and then disappears. The working mechanism is placed in a hole or trench so that only the silhouette target is visible to the observer, and the structural parts are protected against destruction by direct hits or ricochets. With the device ready for operation, the silhouette is lying on its side below ground level, thus hidden from view. A control operator closes a remote switch, the silhouette is suddenly rotated into a vertical position. It remains locked in this position until a sear mechanism is

released, at which time the target falls back to the horizontal position, disappearing from view. The sear is released either by the control operator's remote switch, or by the impact of a bullet striking the target.

The most notable characteristic of this device is that it presents the trainee with a "killable" target; that is, the target falls when it is hit. This characteristic of responding to the impact of a bullet makes it possible for the firer to have immediate knowledge of his accuracy, thus providing greater realism in field problems. The principle of the "killable" target lends itself equally well to either known- or unknown-distance firing, and operates effectively with all types of small arms presently in use.

Construction

Diagrams of the device appear in Figure 2 (Chapter 3) and Figure D-1. The structural and mechanical components of the device are fabricated of iron and steel. The electrical components consist of pull and pusher solenoids, relays, switches, a six-volt storage battery and the necessary hook-up wire.

Structural and Mechanical Components

Frame. The square, welded, angle-iron frame is designed to permit easy portability, and efficient mounting of the operational elements of the device. It incorporates a base sufficiently large to provide stability for the device without additional support.

Axle. A counterweighted lever system, which raises and lowers the silhouette, is mounted on the axle. At the forward end of the axle, a lever is attached and linked to the pull solenoid which furnishes the power to rotate the target to the up position. A metal sleeve, which accommodates the target stake, is welded to the center of the axle. Opposing this sleeve on the axle is the counterweight. This counterweight is adjustable so that optimum balance with the silhouette target can be attained with a variety of target styles.

Locking Mechanism. The silhouette is maintained in the vertical position by a simple locking system consisting of a latching lever welded to the forward end of the axle, and a spring-activated sear which is mounted on the plate directly beneath the latching lever. Another spring assists the gravity fall of the target when the sear releases.

Plate. The locking mechanism and all electrical components are mounted on a steel plate bolted to the front of the frame; a galvanized iron cover protects the plate and all parts mounted upon it.

Silhouette. The device will accommodate standard E (kneeling) or F (prone) cardboard silhouette targets mounted on wooden staves.

Electrical Components

Operation of the target is achieved through three circuits—a pop-up circuit and a knock-down circuit, both remotely controlled, and a kill circuit which is actuated by the strike of a bullet. Power to operate the remote control system and the three target circuits is derived from the local six-volt storage battery. The use of a DC power supply at each target allows the remote control to be accomplished with very low current. Thus standard Signal Corps field wire (WDI) is adequate for the remote wiring.

Pop-Up Circuit. The pop-up circuit includes a switch located at the control point, a heavy relay, and a puller-type solenoid which raises the silhouette.

STATIONARY TARGET DEVICE (MECHANICAL DETAIL)

NOTE: SEE ALSO FIGURE 2,
CHAPTER 3.

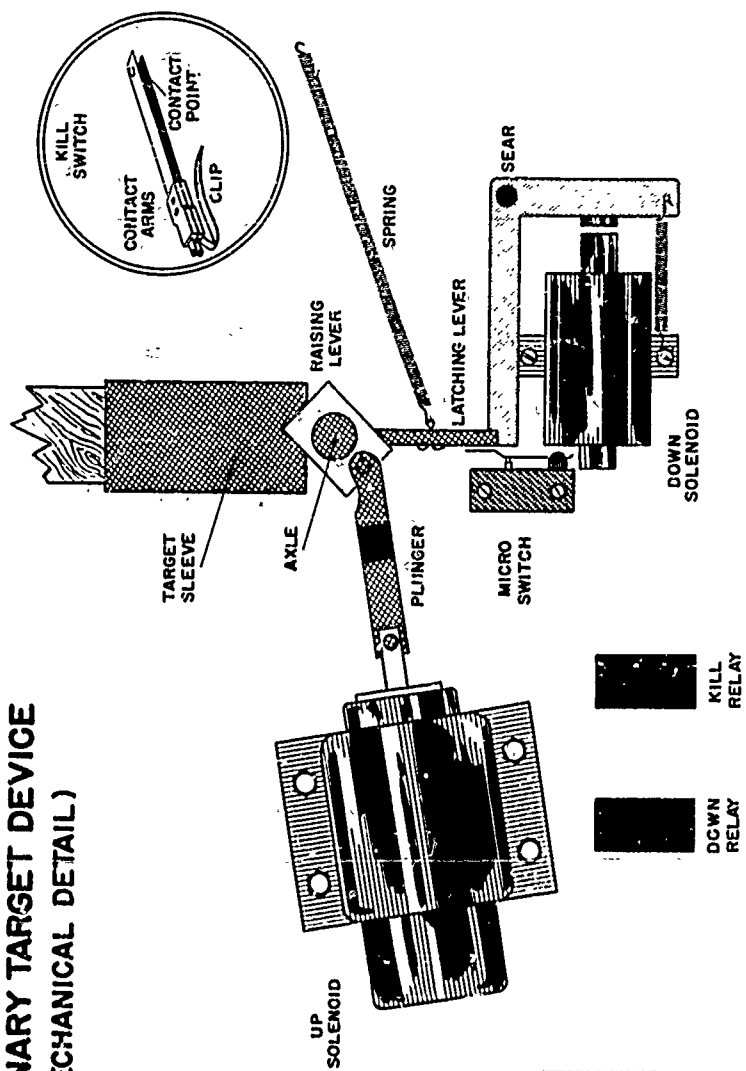


Figure D-1

Knock-Down Circuit. The knock-down circuit also includes a switch at the control point, a relay, and a pusher solenoid which disengages the gear locking mechanism.

Kill Circuit. The kill circuit utilizes the same pusher solenoid as the knock-down circuit, a relay which delivers current to the pusher solenoid, and a normally closed inertia-type switch which momentarily opens when the target is hit.

Installation

To install Punchy Pete, certain preparations of the terrain are necessary. Target holes two feet deep, or mounds two feet high, are needed to protect the vital parts of the target and to conceal the silhouette while it is down. Although the control wires running to the target can frequently be placed where they have natural protection, they may need to be buried. It is necessary to lay all wires near the target area in trenches at least six inches deep.

Circuit preparation requires only the laying of the three remote control wires, hooking into the control panel and the terminals at the target, and connecting in the battery power source.

Care in making all wiring connections, and taking adequate precautions against moisture, will make the remote wiring system virtually foolproof.

Single-Unit Hookup

Only three components are necessary to install a single unit. In addition to the target device itself (complete with battery), a control panel having two switches, and a supply of field wire are needed.

After setting up the target device and the control panel, three lengths of wire are run between them. The remainder of the installation consists of attaching the appropriate wires to the corresponding terminals at the target and the control panel, and hooking up the battery.

Multiple-Unit Hookup

A multiple-unit hookup is merely an expansion of the single-unit hookup to include a group of targets wired in series. In this instance several targets are operated by a single set of switches at the control panel.

Having the option of either single or multiple hookups, all desired combinations of targets can be set up, depending upon the requirements of the specific problem.

Readying the Target for Use

Once the target device is installed, five steps are involved in putting it into operation:

- (1) A cardboard silhouette is securely fastened in the sleeve holder.
- (2) The axle is checked to be sure it moves freely.
- (3) The counterweight is adjusted so that the target is slightly top heavy.
- (4) The kill switch is clamped to the outer edge of the cardboard silhouette and adjusted so that the kill circuit operates when any spot on the target is lightly tapped.
- (5) The raising and lowering of the targets is checked by operating the remote control switches. When these steps have been completed, the device is ready for use.

Operation

The completed range has a centrally located control panel with a separate set of switches for each group of simultaneously operated targets. Each group or bank of silhouettes can be raised and lowered as a unit from this point. When the targets are standing, however, the kill circuit in each target operates independently.

Raising the Target

The remote "up" switch is closed to raise the target. This switch sends current to the up relay. This completes the circuit to the pull solenoid and at the same time breaks the kill circuit, rendering it inoperative.

As the solenoid draws in, it rotates the axle and the target is raised to the point where it is caught and locked in place by the sear. When the target is up, the remote switch is opened, releasing the pull solenoid circuit and allowing current to flow to the kill switch. The target is now ready to be fired upon.

Kill Switch

The "kill" principle is based on the fact that a projectile striking the cardboard silhouette produces an impact that is transmitted to an electrical switch clamped to the silhouette. This kill switch has two flexible arms adjusted so that they touch together lightly at one end. When the target surface is disturbed, the point of contact between the two arms is momentarily broken, activating the kill circuit.

Kill Circuit

The kill circuit is comprised of two component circuits: (1) a circuit including the kill switch and a relay and (2) the pusher-solenoid circuit controlled by this relay. The relay is so utilized that when the kill-switch circuit is closed, no current is delivered to the pusher solenoid. With the target standing ready to be fired upon, current is flowing through the circuit containing the kill switch and the relay; thus, the circuit to the solenoid is open.

When the target is struck, the kill switch is jarred, breaking the circuit to the relay. The clapper of the now inactive relay moves to its alternate position, closing the pusher-solenoid circuit and activating the solenoid.

The plunger of the solenoid strikes the sear, causing it to disengage the latching lever. Since the lever is welded to the axle, the release of the lever frees the axle to turn and thus permits the target to fall.

Since the kill switch closes again after the vibration stops, the system automatically readies itself to operate again when the target is raised.

When the target is down, no current is flowing in any of the circuits. This is accomplished by a micro switch wired into the necessary circuits, so placed that it is closed only when the target is up.

Lowering the Target

The remote "down" switch is closed to lower the target, in the event the firer has missed. Current applied to the down relay closes it. This relay completes a circuit to the pusher solenoid, activating it, and the target falls. When the remote switch is open, no current flows in

either the remote lines or the target circuits. The target is then ready for the next cycle.

Maintenance

The most vulnerable part of the target is the kill switch. Since it is not waterproofed, prolonged moisture is a problem. Making an occasional check of the switch will disclose any adjustment needed and should keep it free from trouble. To protect against moisture, steps should be taken to cover the target unit when not using it and to provide a drainage system for the pit, if necessary.

If the device is kept clean, all bearing and friction surfaces oiled, the battery charge maintained, and a check made periodically for loose thumbscrews, it can be maintained in operation with little effort.

Time limitations prevented the perfection of this device. The development program is being continued to correct the existing limitations.

MOVING TARGET DEVICE

General

This device is designed to simulate a human figure that suddenly appears, briefly exposes itself while moving laterally to the line of sight of the observer, and then disappears. The working mechanism is set in a trench so that only the cardboard silhouette is visible when the target is in motion, and the rest of the parts are protected against destruction by direct hits or ricochets.

With the carriage at the starting end of the track, the silhouette is lying in a horizontal position, hidden from view. As the carriage begins to move along the track, the silhouette is suddenly raised and locked in the vertical position. The silhouette remains in this position, exposed to view, until the carriage reaches the far end of the track. At this point, the locking mechanism is tripped and the silhouette falls back to the horizontal position, disappearing from view. This completes the run of the target. To ready the carriage for the next run, it is returned unseen to the starting end of the track with the silhouette in the horizontal position.

Construction

Diagrams of the device appear in Figure 3 (Chapter 3) and Figure D-2. The device is fabricated of iron and steel. The carriage is constructed of angle-iron, rod and sheet steel, and cast-iron pulleys. The track and track supports are made exclusively of angle-iron. Cast-iron pulleys and steel cable comprise the motive system.

Carriage

The carriage consists of a square, angle-iron frame suspended between the rails of the track assembly by four U-groove pulley wheels. A counterweighted lever system, which raises and lowers the silhouette target, is fixed to a rotating axle with bearing surfaces in the two sides of the carriage frame. The silhouette is maintained in the upright position by a simple locking system. This locking mechanism consists of a latching lever, welded to the left end of the rotating axle, and a spring-activated sear mounted on a steel plate directly beneath the latching lever.

MOVING TARGET DEVICE (MECHANICAL DETAIL)

NOTE: SEE ALSO FIGURE 3,
CHAPTER 3.

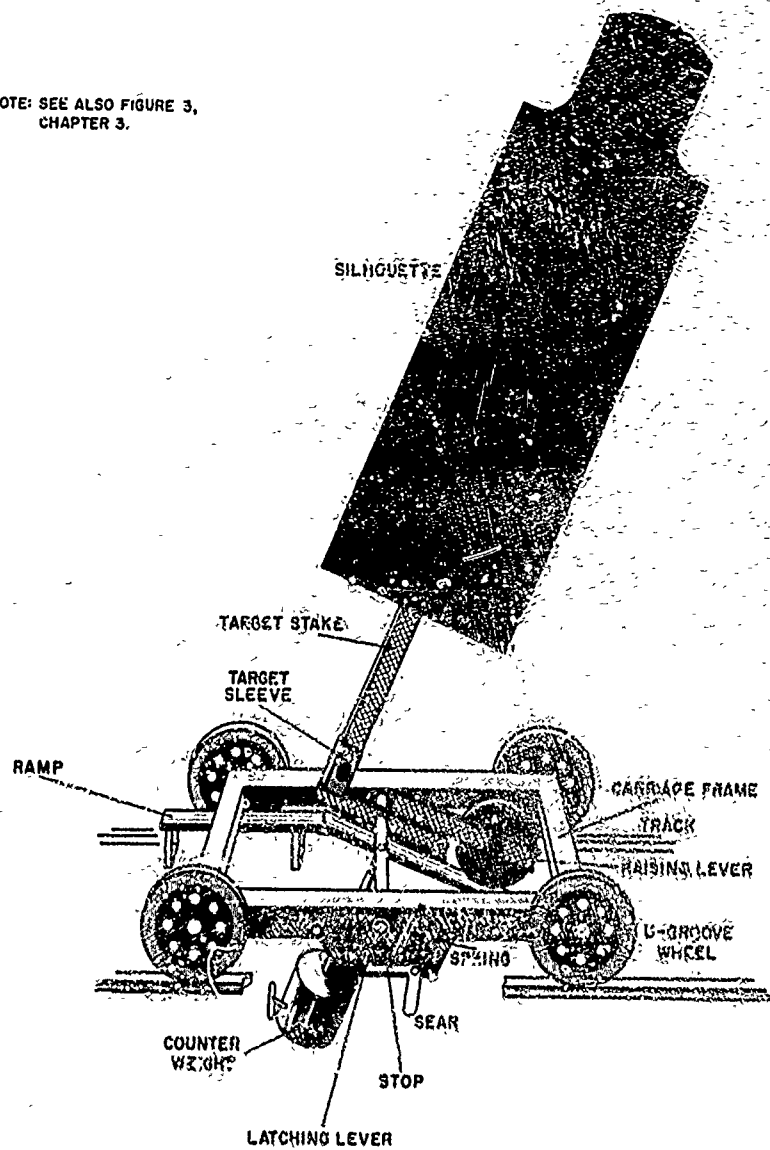


Figure D-2

The target itself is a stake-mounted E silhouette narrowed down to approximate a side view of the upper body of a human. A metal sleeve, opposite the counterweight on the raising lever, accommodates the target stake. The counterweight is adjustable so that optimum balance with the silhouette target can be obtained with a variety of target styles.

Track Assembly

The track assembly consists of two parallel lengths of angle-iron bolted to angle-iron spanners. The spanners are constructed so that the attached rails are approximately a foot above the bottom of the trench. Thus, when the carriage wheels are placed upon the rails, the suspended carriage frame and counterweighted raising lever clear the bottom of the trench. At the starting-end of the track a hinged ramp is clamped to the right-hand rail. This ramp is positioned so that the raising lever rides up the ramp, and the silhouette is raised to the vertical position, as the carriage begins to move along the track. Bumpers are installed at both ends of the track to stop the carriage. The bumper at the far end of the track includes a trip-peg to disengage the locking mechanism.

Motive System

The carriage is moved along the track by a cable-pulley system. A pulley is mounted at each end of the track with the drive pulley equipped with a hand crank. The cable is fed through both pulleys and fastened to the front and rear of the carriage. This, in effect, attaches the carriage to an endless cable which can be run either forward or backward.

Installation

A diagram of the installation employed for Task TRAINFIRE is presented in Figure 3, Chapter 3.

Track Assembly

The dimensions of the track assembly require a trench no less than two feet deep by two feet wide, with the length depending upon the requirements of the particular firing problem. A depth of two feet puts all parts of the mechanism several inches below ground level, giving sufficient clearance to prevent their destruction during firing. A width of two feet provides a tight fit for the track over the full length of the trench. The trench must extend a few feet beyond each end of the track to permit the carriage to run to the end of the track when the silhouette is in the horizontal position.

The bumpers at both ends of the track may be improvised from sandbags, logs, or target staves. For the purposes of Task TRAINFIRE, wooden staves driven into the ground were sufficient.

The hinged ramp is clamped to the right-hand rail at the starting end of the track. The ramp must be positioned at least two feet from the end of the track so that in the starting position the carriage is between the end of the track and the ramp.

Operator's Pit

The operator's pit may be of any design suited to the terrain, within the specifications provided by D/A TM 9-855. The target device is operable from either end of the trench, so the pit should be placed at the higher end to prevent its filling with surface water. Field wire laid from pit to pit, and to the control point, provides remote control of target operation.

Motive System

The two pulleys for the motive system are mounted at each end of the trench. The hand-cranked drive pulley is bolted to a wooden frame which fits across the pit opening facing the trench. The frame is constructed so that it rests upon a sill on the bottom of the trench and extends across the opening into the two side walls of the pit. Thus the pulley is operable from inside the pit.

The anchor pulley is mounted on a four-foot log, or other suitable support, at the far end of the trench. At the end of the trench, slots are dug into each of the two sidewalls to accommodate the log as it is laid across the trench. The log crosses the trench approximately at the level of the rails and is held in place by the slots dug in the sidewalls. The return pulley is mounted in the middle of this log.

After both pulleys are installed, the cable is fed through the pulleys and fastened to the two ends of the carriage. One end is fastened directly; the other through a turnbuckle which provides slack adjustment.

Operation

In the ready position the carriage is at the starting end of the track with the silhouette horizontal. Upon command from the control point, the operator begins to drive the carriage along the track by turning his hand crank. As the carriage moves along the track, the raising lever rides up the hinged ramp. As the raising lever rides up the ramp, the silhouette and opposite counterweight are rapidly rotated about their common axle. This causes the silhouette to appear suddenly. When the lever reaches the top of the ramp, the spring-activated sear engages the latching lever, and locks the silhouette in the vertical position. The silhouette remains in this position, exposed to view, while the carriage traverses the track. As the carriage reaches the bumper at the far end of the track, the spring-activated sear is rotated out of position by the trip-peg. Thus the locking mechanism is disengaged, and the silhouette falls back to the horizontal position, disappearing from view. To ready the carriage for the next run, the direction of the carriage is reversed, and it is returned to the starting end of the track, with the silhouette horizontal. As the carriage nears the starting end of the track, the raising lever passes under the hinged ramp, displacing it upward. After the lever passes beyond the ramp, the ramp drops back into the inclined position. At this point the device is ready for the next run.

Maintenance

The track assembly requires periodic inspection for bolts loosened by carriage-produced vibrations. An application of heavy oil on the hinge of the ramp will reduce friction.

The various bearing surfaces on the carriage require heavy oil or graphite lubrication.

Axle grease on the bearing surfaces of the drive and return pulleys is the only lubricant necessary for the motive system. To prevent cable stretching, the turnbuckle should be loosened when the device is not in operation.

Appendix E
RIFLE MARKSMANSHIP COURSE
PRESENTED TO EXPERIMENTAL GROUP (E)
(74 Hours; 343 Rounds)

FIRST WEEK

Period 1. Orientation (2 hours)

- a. General introductory remarks (50 minutes)
 - (1) Historic development of the rifle
 - (2) Changing role of the rifleman
 - (3) Excerpts from combat films
 - (a) Discussion
- b. Comments specific to the M1 (70 minutes)
 - (1) Operational procedures
 - (a) Function
 - (b) Safety features
 - (c) Advantages of M1
 - (2) Personal relationship of soldier and rifle

Period 2. Care and Cleaning of M1 (2 hours)

- a. Explanation and demonstration of care and cleaning procedures (30 minutes)
 - (1) Use of cleaning materials
 - (2) Use of lubricants
 - (3) Use of preservatives
- b. Practical work (90 minutes)
 - (1) Disassembly of weapon
 - (2) Cleaning of parts
 - (3) Lubrication of parts
 - (4) Assembly of weapon

Period 3. Introduction to Firing the M1 (4 hours; 3 rounds)

- a. Orientation on range and safety procedures (20 minutes)
 - b. "The rifle won't hurt you" firing demonstration (10 minutes)
 - (1) Cadre fire the rifle placed on thigh, stomach, and chin.
- The purpose of the demonstration is to alleviate and prevent fear of the weapon.
- c. Explanation and instruction on the prone firing position (20 minutes)
 - (1) Cadre demonstrate on 1000" half-bull's-eye target.

d. Explanation, demonstration, and practical work in shot-group procedure (150 minutes)

(1) Shot-group explained and illustrated.

(2) Trainees fire 3-round shot-group, with single round loading on 1000" half-bull's-eye target, using prone fire position.

(3) Critique of performance, pointing out significance of sighting errors and superiority of cadre firing.

e. Demonstration of the pop-up, knock-down target (20 minutes)

(1) One cadre and five volunteer trainees each fire one clip on 175-yard target. Purpose is to illustrate the fact that seemingly small errors in sight alignment and sight picture at 1000" are enlarged at greater ranges and result in misses.

f. Critique of firing to show trainee present level of proficiency and level of proficiency he can obtain (20 minutes)

Period 4. Mechanical Training (4 hours)

a. Description, disassembly, assembly, operation, functioning, care, and cleaning (180 minutes)

(1) Description of the U.S. Rifle, caliber .30, M1. Explanation of its capabilities and general characteristics.

(2) Explanation, demonstration, and practical work in disassembly and assembly. Use of disassembly (nomenclature) mats. Explanation classifications of disassembly. Caution against unauthorized disassembly.

(3) Explanation and demonstration functioning by use of working models.

b. Explanation of stoppages and application of immediate action (30 minutes)

c. Care and cleaning (30 minutes)

SECOND WEEK

Period 5. Preliminary Rifle Instruction in Components of Shooting, Part I (8 hours; 18 rounds)

a. Shooting as an integrated act (30 minutes)

(1) Introductory remarks

(2) "Slow-motion" firing demonstration

(3) Normal firing demonstration

b. Rifle steadiness and holding (60 minutes)

c. Principles of sighting and aiming (110 minutes)

(1) Dry triangulation exercises followed by live firing on half-bull's-eye target (9 rounds)

d. Practice in speed of fire (160 minutes)

(1) Dry firing exercises in trigger control, followed by live firing (9 rounds)

e. Weapon single-round loaded

Period 6. Preliminary Rifle Instruction in Components of Shooting, Part II (8 hours; 24 rounds)

a. Demonstration and practical exercises in supported and unsupported firing positions (480 minutes)

- (1) Live firing triangulation exercises
 - (a) Weapon single-round loaded
 - (b) Firing schedule:

	Position	Rounds
Prone	Unsupported	3
	Supported	3
Kneeling	Unsupported	3
	Supported	3
Sitting	Unsupported	3
	Supported	3
Standing	Unsupported	3
	Foxhole	3
Total		24

Period 7. Target Detection (4 hours)

- a. Preliminary practical work in location of camouflaged, human targets (30 minutes)
 - (1) Demonstration of necessity for this type of training
 - (a) Four men are previously camouflaged and placed in open area.
 - (b) Trainees are then requested to locate and estimate range of these targets. Resultant errors demonstrate need for appropriate training.
- b. Instruction and practical work in target detection and range estimation (210 minutes)
 - (1) Instruction in terrain-searching procedure
 - (2) Instruction and demonstration of observing and recording procedure
 - (3) Practical work in detection and range estimation of 16 human targets, in four successive phases of appearance from difficult to easy detection at ranges of 20 to 300 yards and at various locations. Six targets were shown in the first series, and 10 in the second.

Period 8. Behind the Lines Instruction (2 hours)

Sighting and aiming exercises (120 minutes)

Period 9. Zeroing Procedure (2 hours)

- a. Sight setting, windage, score card, zeroing, battle sight, and review of range procedure and safety precautions (120 minutes)
 - (1) Explanation of operation of the M1 rifle sights
 - (2) Explanation, demonstration, and practical work in windage and elevation adjustments to the rear sights
 - (3) Explanation, demonstration, and practical work in use of the score card
 - (4) Explanation of importance and use of the 200-yard battle sight
 - (5) Instruction on range procedure, platoon operation, and safety precautions

Period 10. Zeroing on Known-Distance Range at 200 Yards (4 hours; 18 rounds)

- a. Zeroing weapon in six 3-round shot-groups on half-bull's-eye targets. Targets pulled, disked, and spotted after each shot-group (240 minutes).

- (1) One platoon on the firing line and one platoon on pit detail
- (2) Weapon single-round loaded

THIRD WEEK

Period 11. Introduction to Realistic Stationary Targets (8 hours; 56 rounds)

a. Introduction to field-type firing (480 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one platoon behind the line receiving concurrent training which included sighting and aiming, and critique of previous firing scores on the 1000" range. Wearing of field uniform, with combat pack and steel helmet, introduced at this stage of training, and continued through remainder of training.

(2) Slow fire practice conducted in three phases, with both platoons completing one phase before proceeding to the next.

(3) Firing conducted on silhouette pop-up, knock-down targets.

(4) Weapon single-round loaded.

(5) Firing schedule:

Phase 1

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
75	Standing	3
75	Kneeling or Sitting	3
75	Standing Foxhole	3
100	Standing Foxhole	3
100	Kneeling or Sitting	3
100	Standing	3

Phase 2

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
150	Kneeling or Sitting*	5
150	Standing Foxhole	5
175	Standing Foxhole	5
175	Kneeling or Sitting*	5

Phase 3

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
300	Standing Foxhole	9
300	Kneeling or Sitting	9

Total 56

*Supported

Period 12. Simulated Approach of Stationary Targets (4 hours; 40 rounds)

a. Introduction to firing on an approaching target (240 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one platoon behind the line receiving concurrent training which

included sighting and aiming exercises, practice in assuming positions, and 1000" firing practice for unqualified firers.

(2) Fire practice conducted in two phases, with both platoons completing the first phase before proceeding to the second.

(3) Firing practice on silhouette pop-up targets appearing successively at ranges of 300 to 75 yards, simulating approach.

(4) Firing included practice in shifting point of aim as successive targets appeared.

(5) Weapon clip loaded.

(6) Firing schedule:

Phase 1		
Range	Position	Rounds
300	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
100	Kneeling or Sitting*	1
75	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
		Reload
Range	Position	Rounds
100	Kneeling or Sitting*	1
75	Kneeling or Sitting*	1
300	Standing Foxhole	1
175	Standing Foxhole	1
150	Standing Foxhole	1
100	Standing Foxhole	1
75	Standing Foxhole	1
300	Standing Foxhole	1
		Reload
175	Standing Foxhole	1
150	Standing Foxhole	1
100	Standing Foxhole	1
75	Standing Foxhole	1
*Supported	Total	20

Phase 2

Repeat Phase 1, giving total of 40 rounds fired.

Period 13. Timed Fire Exercise, Using Surprise Targets (4 hours; 48 rounds)

a. Practice in engaging surprise targets (240 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one platoon behind the line receiving concurrent training which included sighting and aiming exercises, and 1000" practice where indicated.

(2) Firing was conducted in two phases, with both platoons completing the first phase before proceeding to the second.

(3) Surprise element introduced by presenting targets in a mixed order of ranges, with varying intervals between appearances, and with different exposure times, targets at 75 to 100 yards appearing for 5 seconds, those at 150, 175, and 300 yards for 10 seconds.

(4) Weapon clip loaded.

(5) Firing schedule:

Phase 1		
Range	Position	Rounds
100	Standing	1
75	Standing	1
100	Standing	1
100	Standing	1
75	Standing	1
75	Standing	1
100	Standing	1
175	Kneeling or Sitting*	1
Reload		
100	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
75	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
Reload		
100	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
75	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
75	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
Reload		
300	Kneeling or Sitting*	1
100	Kneeling or Sitting*	1
150	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
175	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
300	Kneeling or Sitting*	1
Reload		
*Supported		
Phase 2		
Range	Position	Rounds
100	Standing Foxhole	1
300	Standing Foxhole	1
150	Standing Foxhole	1
300	Standing Foxhole	1
75	Standing Foxhole	1
150	Standing Foxhole	1
150	Standing Foxhole	1
300	Standing Foxhole	1
Reload		

Phase 2 (Continued)

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
100	Standing Foxhole	1
175	Standing Foxhole	1
75	Standing Foxhole	1
300	Standing Foxhole	1
175	Standing Foxhole	1
300	Standing Foxhole	1
75	Standing Foxhole	1
150	Standing Foxhole	1
<u>Total</u>		<u>48 Rounds</u>

Period-14: Timed Fire Exercise, Using Surprise Targets, With Firer Assuming Appropriate Position (4 hours; 32 rounds)

a. Practice in assuming prescribed positions as surprise targets appear (240 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one platoon behind the line receiving concurrent training, assuming positions to engage surprise targets.

(2) Firing conducted in two phases, with both platoons completing the first phase before proceeding to the second.

(3) Surprise targets again used, similar to those used in Period 13.

(4) Firer began from standing position, then moved forward and assumed a prescribed position when the target appeared. This procedure was repeated for each target, with rifle single-loaded.

(5) Weapon single-round loaded.

(6) Firing schedule:

Phase 1

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
75	Standing	1
100	Standing	1
75	Standing	1
100	Standing	1
100	Kneeling or Sitting	1
75	Kneeling or Sitting	1
150	Kneeling or Sitting	1
150	Kneeling or Sitting	1
300	Kneeling or Sitting	1
300	Kneeling or Sitting	1
175	Kneeling or Sitting	1
175	Standing Foxhole	1
300	Standing Foxhole	1
150	Standing Foxhole	1
300	Standing Foxhole	1
<u>Total</u>		<u>16</u>

Phase 2

Repetition of Phase 1, giving total rounds fired, 32.

Period 15. Firing Practice on Silhouetted Moving Targets (4 hours; 8 rounds)

a. Dry and live firing practice on laterally moving silhouette targets at 200 yards, silhouetted against white backdrop (240 minutes)

(1) Explanation of firing schedule. One platoon on firing line and one platoon behind the line receiving concurrent training in tracking a moving target.

(2) Practice fire on targets moving lateral to the line of sight at a speed of about five feet per second for a distance of 40 feet.

(3) Three men were assigned per moving target, with one man live firing, and two men dry firing.

(4) Eight rounds were fired from the standing, foxhole position, in 2-round shot-group, with target spotted after each shot-group. Lateral direction of target was reversed after each shot-group.

(5) Weapon single-round loaded.

Period 16. Firing Practice on Non-Silhouetted Moving Targets (4 hours; 16 rounds)

a. Dry and live firing practice on laterally moving silhouette targets at 200 yards, without white backdrop (240 minutes)

(1) Sixteen rounds were fired, following procedure of Period 15. Concurrent training in assuming positions and sighting and aiming.

(2) Surprise element introduced by removing white backdrop, and by initiating target appearance from a hidden position.

(3) Weapon single-round loaded.

Period 17. Firing While Advancing Upon Surprise Stationary Targets (4 hours; 32 rounds)

a. Practice in advancing on surprise targets and assuming prescribed positions as they appear (240 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one behind the line receiving concurrent training in target detection and range estimation.

(2) Firing practice was conducted in two phases, with both platoons completing the first phase before proceeding to the second.

(3) Firer advanced to fire five rounds from a foxhole position then continued advance, firing an additional 11 rounds from kneeling or sitting positions, engaging surprise targets as they appeared at various ranges from 75 to 300 yards.

(4) Weapons clip loaded.

(5) Firing schedule:

Phase 1

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
100	Standing Foxhole	1
300	Standing Foxhole	1
150	Standing Foxhole	1
300	Standing Foxhole	1
75	Standing Foxhole	1
150	Kneeling or Sitting	1
150	Kneeling or Sitting	1

Phase 1 (Continued)

<u>Range</u>	<u>Position</u>	<u>Rounds</u>
300	Kneeling or Sitting	1
100	Kneeling or Sitting	1
175	Kneeling or Sitting	1
75	Kneeling or Sitting	1
300	Kneeling or Sitting	1
175	Kneeling or Sitting	1
300	Kneeling or Sitting	1
75	Kneeling or Sitting	1
150	Kneeling or Sitting	1

Total 16

Phase 2

Repetition of Phase 1, giving total rounds fired, 32.

Period 18. Firing Upon Distant Stationary Targets (4 hours; 48 rounds)

a. Practice in engaging distant surprise targets at ranges of 175 and 300 yards, using a defensive position (240 minutes)

(1) Explanation of firing schedule. One platoon on the firing line and one platoon behind the line receiving concurrent instruction in target detection.

(2) Firing practice was conducted in three phases, with both platoons completing one phase before proceeding to the next.

(3) In Phase 1, 16 rounds were fired from a standing foxhole position on 175 and 300-yard targets appearing in a mixed order.

(4) In Phase 2, 16 rounds were fired from the foxhole position on targets at 175 yards.

(5) In Phase 3, 16 rounds were fired from the foxhole position on targets at 300 yards.

(6) Weapon clip loaded.

Appendix F

PROFICIENCY TESTING PROCEDURE

TROOP MOVEMENT

Testing took place over a period of three days. All subjects were randomly assigned to firing orders and firing points in such manner that each platoon was represented as equally as possible in each order and at every point.

The first day of testing included the first and second squads of each platoon. On the second day, the third and fourth squads and part of the Fort Jackson control group were tested, and on the third day, the remainder of the Fort Jackson group.

All subjects were tested on the Marksmanship Proficiency Range, and on the Detection Proficiency Range. Prior to testing, the troops were kept in ready areas out of view of both ranges.

MARKSMANSHIP TESTING

Testing Procedure

The Marksmanship Proficiency Range has been described in detail elsewhere.¹ Briefly, the range was of transition type, and consisted of eight lanes. Camouflaged pop-up and moving silhouette targets appeared suddenly at unknown distances and were exposed momentarily. All firers were previously given familiarization firing on the pop-up targets, on a separate range. The firer was instructed to fire one round only at each target. The random sequence of targets is listed on the accompanying score sheet at the end of this appendix. The frequency of occurrence at various ranges is presented in Table F-1. Pop-up targets at 50 to 200 yards were exposed for five seconds, those at 250 to 350 yards for 10 seconds. Moving targets at 100 yards appeared for five seconds, and those at 300 yards for 10 seconds.

Five clips of ball, M2, ammunition were fired from a supported standing foxhole position. The firer then moved down-range to a 50-yard marker and fired an additional two clips from an unsupported firing position of his own choice.

¹See Chapter 4.

Table F-1

FREQUENCY OF TARGETS AT VARIOUS RANGES

Firing Position	Range in Yards*										Total
	50	100	100*	150	200	250	250*	300	300*	350	
Supported	4	6	6	4	6	4		2	4	4	40
Unsupported	3	2	0	3	2	2	2	2	0	0	16

** Indicates moving targets.

Scoring Procedure

Scorers were trained prior to troop testing. As shown on the score sheet, there were three scoring categories: (1) hit, (2) miss, and (3) no-fire.

The pop-up target was designed to drop when hit. In the event that a firer did not hit his target, the target was dropped from the remote control point upon termination of exposure. The scorers were informed by a whistle signal when the targets were dropped by the operator at the control point. The moving targets were designed to drop when hit, and were scored by moving-target operators in concealed pits down-range.

The firing line was cleared after each series of eight targets was exposed, and all unused ammunition returned to the scorers. Scorers were instructed to refrain from conversation with firers during testing.

Firer Orientation

The firers were briefed in the rear areas, weapons were checked, sights blackened, and battle sights set. The experimental troops used a 200-yard sight setting and the control troops used the conventional 300-yard battle sight. All firers were given the following orientation:

Safety

"Keep your rifle pointed down-range and when not firing, have it locked. Whenever you hear 'Cease Firing' you will lock and clear your weapon. You will take your own action in clearing stoppages."

Range Set-Up

"There are eight firing lanes on this range. It is like a transition range in that each lane has two markers down-range, between which all of the targets for that lane will appear. For example, if you are firing in Lane 4, you will see two large markers down-range, each with the number 4 on it. All of your targets would appear between the two 4's. You will also have the number of your lane on a small stake just in front of your firing point, to remind you of the lane in which you are firing.

"On this range there are pop-up targets which drop when hit, and moving targets which do not drop when hit."

Firing Procedure

"You will first fire from a supported, standing-foxhole position. You will fire five clips from this position, and will fire only one round at each target you see. Do not lock your weapon between rounds.

"After you have loaded a clip and are ready to fire, you will hear the command 'Targets.' At this time, you will commence firing at any targets you see, one round only for each target. When you hear the command 'Cease Firing' you will lock and clear your weapon. The firing line will be cleared after each clip is fired, and you will return all unused ammunition to your scorer.

"After you have fired five clips from your foxhole position, you will be given the command to move down-range, with your scorer, to a fifty-yard marker. You will move only on command. You will fire two clips from this new position. After loading the first clip, you will be given the command 'Move Out.' At this time, you will begin moving forward down your lane. When you hear the command, 'Targets' you will stop all forward movement and commence firing on any targets you see. Do not lock your weapon between rounds. You may assume any firing position you wish, and may move to one side or the other, but DO NOT move forward. Keep your rifle pointed down-range at all times. Upon the command 'Cease Firing' you will lock and clear your weapon and return all unused ammunition to your scorer.

"This procedure will be repeated for the second clip that you fire.

"While you are firing, you will hear a whistle. Pay no attention to this whistle. It is for the scorer's use and does not concern you. Any questions?"

TARGET DETECTION PROCEDURE

Testing Procedure

The Detection Proficiency Range, described in detail in Chapter 4, was located on rolling terrain which provided cover out to a range of 350 yards. The subjects were given 14 trials of four phases each (Table F-2). The target indications occurred in order during the four phases of each trial, ranging from difficult to easy. During each phase the men were given 30 seconds to search for a target. After Phase 4, they faced away from the observation field while the soldier representing the target proceeded to a new location. When the target reached the new location a new trial began.

Table F-2

PROFICIENCY TARGET DETECTION AND RANGE ESTIMATION

Trial No.	Where	Range	Target Indications by Phases
1	B,E	20	(1) Be slightly exposed at start of trial; remain still. (2) Raise and lower head and shoulders slowly. (3) Move head and shoulders side to side slowly. (4) Fire blank.
2	E,F	67	(1) Be slightly exposed in prone position at start of trial; remain still. (2) Raise and lower head and shoulders slowly. (3) Do same with shiny helmet liner. (4) Fire blank.
3	A,C	149	(1) Be exposed, crouching and motionless. (2) Raise up slowly and go down slowly. (3) Step to side slowly; remain still, then step back (each 5 seconds). (4) Fire 2 blanks from standing position (10 seconds apart).

(Continued)

Table F-2 (Continued)

PROFICIENCY TARGET DETECTION AND RANGE ESTIMATION

Trial No.	Where	Range	Target Indications by Phases
4	G,H	89	(1) Be slightly exposed (kneeling) at start of trial; remain still. (2) Raise head and shoulders slowly; drop quickly. (3) Rustle bush every 5 seconds. (4) Fire blank.
5	E,F	130	(1) Be exposed in kneeling position; motionless. (2) Drop head abruptly, raise slowly (each 5 seconds). (3) Do same with shiny helmet liner. (4) Fire 2 blanks from kneeling position (10 seconds apart).
6	E,G	33	(1) Be slightly exposed at start of trial; remain still. (2) Raise and lower head and shoulders slowly. (3) Move head and shoulders slowly from side to side. (4) Fire blank.
7	I	190	(1) Be partially exposed at start of trial; remain motionless. (2) Move out and back from chimney slowly. (3) Move out and back fast (each 5 seconds). (4) Fire 2 blanks from side of chimney (10 seconds apart).
8	C,D	110	(1) Be exposed in standing position at start of trial; remain motionless. (2) Walk forward slowly, 1 yard each 10 seconds. (3) Up and down fast, each 5 seconds. (4) Fire 2 blanks (10 seconds apart).
9	E,G	42	(1) Be slightly exposed at start of trial. (2) Move head and shoulders slowly from side to side. (3) Raise head slowly, then drop abruptly (each 5 seconds). (4) Fire blank.
10	A,C	200	(1) Be exposed in standing position at start of trial; remain motionless. (2) Drop quickly; raise head slowly (each 5 seconds). (3) Step to side (each 5 seconds). (4) Fire 2 blanks (10 seconds apart).
11	G,H	90	(1) Be exposed in kneeling position; remain motionless. (2) Move forward 1 yard (each 5 seconds) very slowly. (3) Move to side and back slowly every 5 seconds. (4) Fire blank (kneeling).
12	E,G	24	(1) Be slightly exposed (prone) at start of trial; remain still. (2) Move head and shoulders up and down slowly. (3) Move head and shoulders slowly from side to side. (4) Fire blank.
13	B,E	53	(1) Be slightly exposed in prone position at start of trial; remain motionless. (2) Crawl forward 1 yard (each 10 seconds). (3) Do same with shiny helmet liner. (4) Fire blank.
14	H	180	(1) Be slightly exposed in prone position at start of trial; remain motionless. (2) Move head and shoulders up and down slowly. (3) Up fast, remain still; down fast, remain still (each 5 seconds). (4) Fire 2 blanks (10 seconds apart).

C. Tentation and Scoring Procedure

"Today we are going to test your proficiency in detecting human targets. These targets may be motionless or moving, hidden or exposed, and well or poorly camouflaged. Pick up your clipboard and answer sheets, please. You will be given 14 trials in today's exercise. Each trial will consist of four phases, each phase being consecutively easier to detect than the others.

"When you hear the words: 'Observe Trial 1, Phase 1,' look out to your immediate front and try to pick up a target somewhere in the observation field. You will be given 30 seconds in which to do this. If you see the target during this period, step back three paces and remain there during the rest of the trial phases. Once you have seen the target, you need not do any more observing, since the target will appear in the same place for all four phases of the trial. Do not do any recording until you hear the words, 'Record Phase 1.' Then, if you saw the target during that phase, put a check mark under the appropriate trial and phase number. Under the column headed 'Where,' put in the letter (A, B, C, etc.) nearest the target. Under the column headed 'Range,' put in the distance from you to the target. However, if you are not positively sure that you saw the target, check your observation during the next phase. If what you saw was the target, you should see some definite movement during the succeeding phases. If you did not see the target, put an 'X' under the appropriate phase and trial number. Do the same for Phases 2, 3, and 4. After Phase 4, you will be told to face about. At this time you will face away from the observation field to allow the target to take up a new position.

"The detection range is to your immediate front. Let me point out all of the landmarks so there will be no confusion on these points. [Point out landmarks and check to see if everybody sees them. Also emphasize the left (Letter B) and right (old chimney) limits of the observation field.] You will use these landmarks to locate the position of the target. Always use the landmark nearest the target for location purposes. For instance, if you see a target near the letter 'B,' B will indicate the proper location. If the target is between A and B, either letter will be correct. You have also been asked for the range from you to the target. Estimate that range in yards as best you can. As sample range estimations, the distance to the letter 'B' is 40 yards and to the letter 'C' is 200 yards.

"Are there any questions? If not, let us run through the first few phases of Trial 1 slowly; the umpire will check your recording and answer any questions you might have."

MARKSMANSHIP SCORE SHEET

Name of Firer _____ Platoon _____ Squad _____

Name of Scorer _____ Point _____ Sling _____

SUPPORTED FIRING

Target No.	Round	Range	Hit	Miss	No-Fire	Target No.	Round	Range
1	1	250				25	1	50
2	2	300				26	2	350
3	3	100 M				27	3	100
4	4	150				28	4	200
5	5	50				29	5	300 M
6	6	350				30	6	250
7	7	100				31	7	100 M
8	8	200				32	8	150

RELOAD _____ NO. OF UNUSED ROUNDS _____

RELOAD

9	1	300 M				33	1	50
10	2	250				34	2	350
11	3	100 M				35	3	100
12	4	150				36	4	200
13	5	50				37	5	300 M
14	6	350				38	6	100 M
15	7	100				39	7	100
16	8	200				40	8	200

RELOAD

RELOAD _____ NO. OF UNUSED ROUNDS _____ UNSUPPORTED FIRING

17	1	300 M				1	1	250
18	2	100 M				2	2	300
19	3	100				3	3	150
20	4	200				4	4	350
21	5	250				5	5	100
22	6	300				6	6	200
23	7	100 M				7	7	300 M
24	8	150				8	8	250

RELOAD _____ NO. OF UNUSED ROUNDS _____

RELOAD

9	1	200			
10	2	300			
11	3	150			
12	4	350			
13	5	100			
14	6	200			
15	7	300 M			
16	8	100			

NO. OF UNUSED ROUNDS _____

TARGET DETECTION & RANGE ESTIMATION ANSWER SHEET

Instructions

1. Results will not be graded individually. Important statistics will however be based upon the averages obtained. Hence do not change your answers to indicate anything not actually seen.
2. a. Targets will each be presented four (4) times, each time constituting a new phase in the same location. In the appropriate space for each phase of each trial, place either a ✓ if you saw the target or a X if you failed to see it.
 b. Under the "Where" mark the identifying letter of the landmark nearest the target. If you are in doubt as to the identity of the nearest landmark, hold up your hand and the instructor will check with you.
 c. Under range enter your estimate to the target to the nearest 25 yards.
3. For your instruction after each trial (4 phases) the enemy will stand to mark his location—then again take cover and rapidly repeat all four (4) phases. Do not enter these demonstrations.

TRIAL NO.	PHASE NUMBER				WHERE (Letter of Nearest Landmark)	RANGE (How far?) Nearest 25 yards
	1	2	3	4		
1						
2						
3						
4						
5						
6						
7						
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9						
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11						
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Appendix G

PILOT TEST ON TECHNIQUE OF RIFLE FIRE

DESCRIPTION OF RANGE

In the pilot study involving a squad advancing across an open area and engaging hidden targets, an existing Technique of Fire Range (NINNINGER RANGE) of The Infantry School was modified for use (see Figure G-1). The Infantry School employs this range by carrying out all firing from an initial position at several groups of visible targets. The modified problem involved the advance of the participating squads over 400 yards of broken, overgrown terrain. Targets were presented at three different stages of this advance. The target areas were in favorable firing positions likely to be occupied by defenders. For this purpose, visible targets on the range were replaced by 1000" machine gun targets, 3' high and 5' wide, so dug in that 30" of height (estimated height of effective fire) was exposed. These targets were hidden by camouflaging with natural vegetation. Machine guns were placed within the target areas. These were aimed to fire ball ammunition into the ground at an angle designed to throw dust in simulation of that created in combat. The machine guns could be fired by remote control by pit details in existing installations. Dependable telephonic communication existed between the initial position and all pits. Loud-speaker communication was set up for emergency control of the advancing squad. This loud-speaker was audible in the two closest pits.

The first target to engage the squad (T1) was a lineal target some 20 yards in length representing a group of riflemen and a machine gun. It was situated at a position about 400 yards from the line of departure, to the right of the squad's axis of advance.

The second target (T2) was located 250 yards from the line of departure, to the right of the axis of advance, and consisted of three of the camouflaged machine-gun targets.

The third target (T3) was located at the edge of a woods about 600 yards from the line of departure and was on the axis of advance. This target consisted of six of the 3' x 5' screens dug in to leave 30" in height exposed.

Engineers' tape, invisible except upon close approach, marked the line of maximum advance, about 400 yards from the line of departure.

PRELIMINARY INSTRUCTION

The preliminary orientation included diagrammatic instruction covering the methods by which the squad's fire is converged upon a narrow target or distributed to cover a wide target.

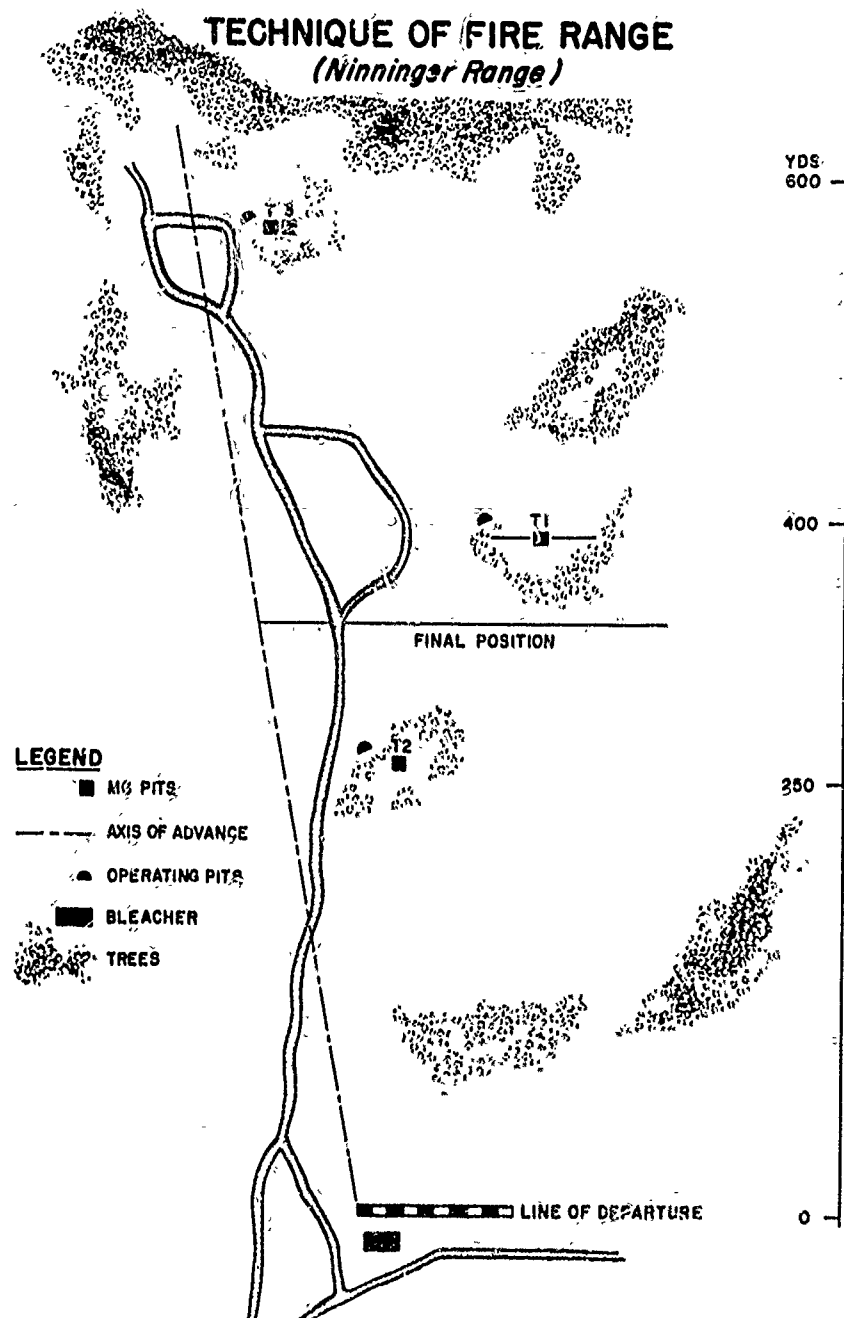


Figure G-1

Safety measures were stressed in demonstration and conference. Particular emphasis was given to the necessity for keeping the rifle locked at all times except when actually in the firing position and about to fire, the use of the "Cease Fire" signal and order, the execution of the movements "Down" and "Up," the maintenance of a fast-walk gait in a reasonably straight line, and the maintenance of an axis of advance with the left flank man as the base of the squad. In addition, the tactical situation was sketched on the ground showing the route from the line of departure to the objective. The importance of fire superiority was stressed.

Previously taught techniques of target detection were reviewed. These included the "marking" of targets on a visible aiming point and the determination of the nature and width of targets by observing the volume of hostile fire, extent of favorable firing position, and other indications. Trainees were instructed to take cover and open fire without order if the fire was short range and deadly, but otherwise to await order. They were told that the line of maximum advance was marked by engineer tape and that they were to halt upon reaching this line, if not already halted.

The combat situation described to the trainees involved a squad which, as part of a general advance, had been stopped by fire on a strong initial firing position. The advance was to be renewed after a pause to permit the squad to reorganize and to permit neutralization of resistance by supporting fire.

PROCEDURE

The problem was designed for an eight-man trainee squad. In command of each squad was one of three experienced cadre NCO's who had been taken over the problem several times in the afternoon prior to firing. These men alternated duties; in addition to the non-firing squad leader, one acted as a control accompanying each squad while the third rested. All three had whistles.

Each trainee was issued four eight-round clips when on the line of departure. One of these was loaded on order and the other three were carried in the cartridge belt.

On the initial command "Up," the squad advanced in line at five-pace intervals with the squad leader and control to the rear. When the squad had advanced approximately 50 yards, the pit detail controlling the first target opened fire with the machine gun and projected fire-crackers by sling shot to give flash and smoke indications of rifle fire along the skirmish line. The hostile fire caught the advancing squad in a poor firing position on a sharp downgrade which complicated the securing of cover and good firing positions. The command "Down" was immediately given and was followed by a fire order. The squad rapidly opened fire against the clearly visible smoke, flash, and noise indications. When the squad leader observed the first trainee reloading the third clip, he gave the commands "Cease Fire," "Lock," and "Up" and the advance was resumed.

After another 50-yard advance, which placed the squad on low ground, the second target to the direct front of the squad opened heavy fire. The men hit the ground and opened fire without order upon being surprised by the machine gun fire from this target. When the machine gun ceased fire (on telephone direction to simulate neutralization) the advance was resumed on order.

The final phase involved another 300-yard advance through rough terrain with heavy brambles. As the advance crossed an intermediate crest, two machine guns in the third target (T3) opened fire from the left front of the squad. On command, the advance took cover and opened fire. A number of times inequalities in advance placed some members of a squad astride the crest requiring individual modifications in the firing position, while in other cases, a short further advance was necessary before the target could be effectively engaged. When all ammunition was expended, the final "Cease Fire" was given, weapons inspected, and the squad double timed the 400 yards back to the line of departure. Squads completing the problem were permitted to observe the advance of the remaining squads.

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