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Human Research Unit Nr 1, CONARC
Fort Knox, Kentucky

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The George Washington University
HUMAN RESOURCES RESEARCH OFFICE
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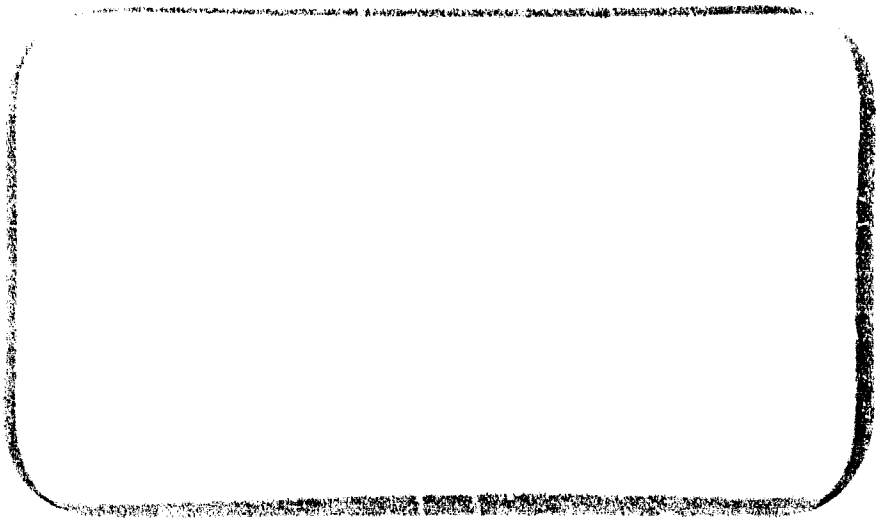

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Unclassified

CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

ORT NUMBER | 2. GOVT ACCESSION NO. | 3. RECIPIENT'S CATALOG NUMBER

(2) Staff memo

TITLE (and Subtitle)

"Retention of Basic Combat Skills by Active Duty Personnel"

5. TYPE OF REPORT & PERIOD COVERED

Staff Memorandum

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)

Robert A. Baker and Eugene Winograd

(15)

8. CONTRACT OR GRANT NUMBER(s)

DA-49-106-qm-1

9. PERFORMING ORGANIZATION NAME AND ADDRESS

Human Resources Research Organization(HumRRO)
300 North Washington Street
Alexandria, Virginia 22314

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS

Department of the Army, Office of the Chief of Research and Development
Washington, D.C. 20310

(11)

12. REPORT DATE

Mar 1957

13. NUMBER OF PAGES

45

14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office)

(12) 54p.

15. SECURITY CLASS. (of this report)

Unclassified

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

This research was conducted by HumRRO Armor HRU under Project SKILLHOLD, "A Study of the Retention of Combat Skills Acquired in Basic Training."

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

Basic Combat Skills
Infantryman
Performance Test
Aptitude Area Scores

4 The study sought to obtain

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

The objectives of this study were to obtain an integrated body of data on how well, at the end of each stage of training, the typical infantryman knows the essential combat skills, and on how much of each skill he retains at various intervals after basic combat training. A performance test, composed of subtests in 17 combat skills, was given to approximately 4500 active duty personnel in five of the six Army areas. Aptitude Area scores, as well as other personal history data, were collected on each man.

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DD FORM 1 JAN 73 1473 EDITION OF 1 NOV 65 IS OBSOLETE

405260

Unclassified

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

20. Continued. (for p. 1473A) Among the findings—

Some of the over-all findings and implications from this research were:

(1) In general, level of skill increased with length of service despite the fact that the average aptitude level of the men tested was lower at each successive stage of training.

(2) The failure of the trainees at every training level to pass more than 70% per cent of the basic combat skills measured by the subtests indicates the gap between the goals specified by the Army Training Program and Infantry experts and the performance of the average trainee.

(3) The retention level was high for all subjects except: Range Estimation, Tactics, Signal Communications, Mine Warfare, Rocket Launcher, ML Rifle Skills, and First Aid.

The fact that some combat skills are being learned more effectively at one post and some at another suggests that wider adoption of the most effective techniques might result in greater over-all achievement.

1473B

United States Army Armor Human Research Unit
Continental Army Command
Fort Knox, Kentucky

Retention of Basic Combat Skills by Active Duty Personnel

Robert A. Baker
Eugene Winograd

Staff Memorandum
March 1957

A report of work done for SKILLHOLD, Task No. 53/1.10

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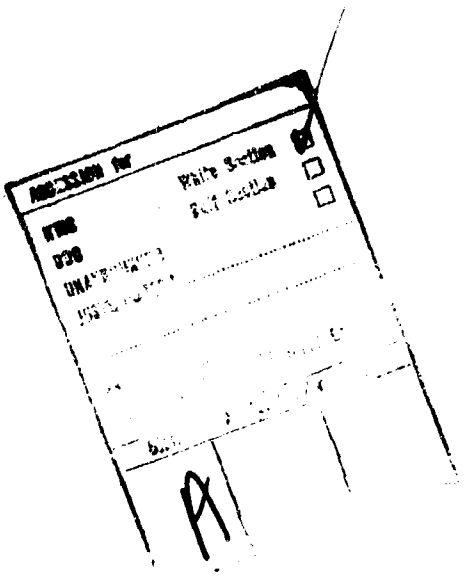
Research under the technical supervision of
HUMAN RESOURCES RESEARCH OFFICE
The George Washington University
operating under contract with
The Department of the Army

Invaluable assistance and advice in the administration of the performance tests at the various posts was given by Ivan Scheier and William Montague of Training Methods Division, Human Resources Research Office.

SKILLHOLD research was begun and data collected under the direction of Stanford C. Ericksen and F. J. McGuigan, former Directors of Research at Human Research Unit Nr 1.



BRIEF

The objectives of this study were to obtain an integrated body of data (1) on how well, at the end of each stage of training, the typical infantryman knows the essential combat skills, and (2) on how much of each skill he retains at various intervals after basic combat training. The study was also designed to discover which of these skills he learns and retains least effectively, and how such factors as intelligence, education, and Army experience affect the level of skill he reaches.

A performance test, composed of subtests in 17 combat skills, was given to approximately 4,500 active duty personnel in five of the six Army areas. The men tested included inductees with no formal military training, Basic Combat trainees, Advanced Infantry trainees, and T/O&E Infantry personnel. Aptitude Area scores, as well as other personal history data, were collected on each man.

Some of the over-all findings and implications from this fact-finding study were the following:

(1) In general, level of skill increased with length of service despite the fact that the average aptitude level of the men tested was lower at each successive stage of training.

(2) The failure of the trainees at every training level to pass more than 70 per cent of the basic combat skills measured by the subtests indicates the gap between the goals specified by the Army Training Program and Infantry experts, and the performance of the average trainee.

(3) The retention level was high for all subjects except Range Estimation, Tactics, Signal Communications, Mine Warfare, Rocket Launcher, M1 Rifle skills, and First Aid, in which some forgetting occurred in varying stages of the training.

(4) The fact that some combat skills are being learned more effectively at one post and some at another suggests that wider adoption of the most effective techniques might result in greater over-all achievement.

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RETENTION OF BASIC COMBAT SKILLS BY ACTIVE DUTY PERSONNEL

PART I

SUMMARY AND CONCLUSIONS

THE MILITARY PROBLEM

One of the problems which confront military leaders is the need to know how well the typical infantryman remembers the essential combat skills at various points in his Army career. Are the Basic Combat skills well retained? Does the level of skill maintained meet the standard set up in training? These are crucial questions.

The infantry training program devotes a total of 16 weeks to Basic Combat and Advanced (Light) Infantry training. The trainees are then assigned to duty with a regular infantry division. Men with 16 weeks of training are sometimes assigned directly to combat infantry battalions without intervening experience; the Army does not approve this practice as regular procedure but finds that, on occasion, units must be manned with whatever resources are available. Non-infantry personnel, on the other hand, receive little or no instruction in the essential combat skills after eight weeks of basic training. Similarly, large numbers of reserves are out of service for extended periods without a chance to practice the combat skills they learned in service.

In any such emergency as the Korean situation, or whenever large-scale mobilization is necessary, not only trained infantry personnel but also non-infantrymen are likely to see combat duty. Military leaders are thus faced with two problems: (1) they need to know at all times how well infantry and non-infantry personnel remember the combat skills which they learned during their training and (2) they need to plan for necessary retraining in accordance with existing deficiencies in the essential combat skills.

As a step in solving this twofold problem, Headquarters Continental

Army Command (at the time, OCAFF) established the requirement for this study in August 1953.[1/]

THE RESEARCH PROBLEM

It was decided that a study of how well the typical infantryman, at every level of training, remembers the essential combat skills would be a good foundation for similar studies on reserves and other military personnel, as well as for further work on the infantryman. This study had two chief purposes: (1) To determine how well the typical infantryman, at the end of each stage of training, knows the essential combat skills, and (2) to determine how well he remembers these skills at various times after Basic Combat training. The study was also designed to discover which of these skills he learns and retains least effectively, and how such factors as Army experience, intelligence, and education affect the level of skill he reaches. The research was carried out in close association with an allied Task, KNOWHOLD, conducted by the Training Methods Division, Human Resources Research Office. That task dealt with the retention of military knowledge, whereas this task was concerned with military skills.

Conducting the study meant (1) selecting the best available test of the essential combat skills, (2) administering the test to groups of active duty personnel, (3) scoring the tests, and (4) analyzing and interpreting the results. This report summarizes the completed study.

The test selected was The Individual Proficiency Test: Basic Combat,

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1/ Letter, ATDEV-4 200.1, OCAFF, 27 August 1953, Subject: "Research Proposals, AFF Human Research Unit No. 1 . . ."

developed during this Unit's study PROFICIENCY,[2/] with the assistance of the Personnel Research Branch, TAGO, and Human Research Unit Nr 2. This test, which is composed of subtests in 17 combat skills, was given to approximately 4,500 active duty personnel in five of the six Army areas. The testing was conducted at Fort Knox, Fort Dix, Fort Ord, Fort Jackson, Fort Benning, and Fort Carson. The groups tested were made up of inductees who had no formal military training, men who had just completed Basic Combat training, men who had just finished Advanced Infantry training, and T/O&E personnel. Aptitude Area I scores (general intelligence) were recorded and background information obtained for each soldier tested.

FINDINGS

(1) The average score of the pre-cycle trainees on the proficiency test was 38.2 points, out of a possible 170. Trainees at the end of Basic Combat training averaged 105.2; men at the end of Advanced Infantry training, 109.1; and the T/O&E personnel, 118.9. Thus not even at the T/O&E level did the average soldier achieve more than 70 per cent of a perfect score, though the test dealt with the fundamentals of the training program and required little knowledge of the technical portions.

(2) There was a general improvement at each successive training level. However, T/O&E personnel did no better than Advanced Infantry trainees on three subtests, Compass, Field Fortifications, and Light Machine Gun Disassembly and Assembly. They did not do as well as Advanced Infantry trainees

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2/ Technical Report 19 of the Human Resources Research Office, Development of Proficiency Tests for Basic Combat and Light Infantry Training, by Robert A. Baker, Guy Scott, and Eugene F. MacCaslin, Human Research Unit Nr 1, CONARC, July 1955.

on four subtests: Signal Communications, Mines and Booby Traps, Range Estimation, and Rocket Launcher, even after the difference in intelligence was taken into account.

Similarly, Advanced Infantry trainees did no better than Basic Combat trainees in Care of Clothing and Equipment, and Squad Formations. On seven subtests, they did not do as well as Basic Combat trainees: First Aid, Observation and Military Intelligence, Individual Tactics, Squad Tactics, M1 Rifle Disassembly and Assembly, M1 Rifle Sight Adjustment, and Rocket Launcher. (Except for Squad Tactics and Rocket Launcher, no additional training in these subjects is given to Advanced Infantry trainees.)

(3) There were significant differences in test performance between posts, at both the Advanced Infantry and Basic Combat levels of training, on the 17 combat skills and on the total test, even after allowances were made for differences in intelligence.[3/] For example, on the Rocket Launcher subtest, the average Basic Combat trainee made 9.5 points out of a possible 10 points at Fort Jackson, and 6.1 out of a possible 10 points at Fort Dix. Similarly, on the Mines and Booby Traps subtest, the average Advanced Infantry trainee made 8.4 out of a possible 10 points at Fort Dix, and 7.3 out of a possible 10 at Fort Jackson.

(4) In general, the performance of T/O&E personnel in the essential combat skills was found to improve with time in service. The retention level was as high among men who had been out of basic training for three years as it

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3/ There were significant differences between posts in intelligence (Aptitude Area I). Fort Dix was highest, with an average Area I score of 106.1. The others follow: Fort Ord, 102.5; Fort Knox, 96.8; Fort Jackson, 92.8; Fort Benning, 92.1; and Fort Carson, 90.3.

was among men who had been out only a month. The greatest loss of skill was found to come between 12 and 36 months after basic training. The definite improvement observed in some of the skills can probably best be interpreted as the result of practical experience rather than of additional formal training

(5) A significant relationship was found between skill in combat subjects and knowledge about them. This relationship was rather high for Basic Combat trainees (.68) and for T/O&E personnel (.62), and fairly high for Advanced Infantry trainees (.47). That is, men who performed well on the proficiency tests also did well on a paper-and-pencil test covering the same subject matter. On both tests, at the T/O&E level the Infantry personnel did better than Infantry-associated personnel.

(6) Most of the background variables studied were found to have little relationship to performance on the essential combat skills, but there were three exceptions. Performance improved with amount of formal education and with previous military experience. Performance was also related to enlistment status, Regular Army personnel making better scores than draftees

(7) As expected, intelligence and proficiency were found to be in general closely related. This relationship was rather high at the Basic Combat level; it was less strong, though still considerable, at the Advanced Infantry and T/O&E levels.[4/]

4/ The pre-cycle trainees' average Aptitude Area I score (ACB) was 98.9. The Basic Combat trainees averaged 102.1; the Advanced Infantry trainees, 97.1; and the T/O&E personnel, 91.1.

CONCLUSIONS AND IMPLICATIONS FOR THE ARMY

The findings reported above make possible certain conclusions, each of which has some related implications:

(1) While the degree of proficiency increases as the amount of ATP training increases, accomplishment—as evaluated for the purpose of this study—appears to be falling short of training objectives.1/ Consequently, although ATP instruction is in general effective, an improvement in performance could be expected, especially in certain subjects, if training were expanded and techniques of training improved.

(2) The decrement in skill after Basic Combat training occurs in the skills included in seven subtests, as measured after Advanced training: First Aid, Observation and Military Intelligence, Individual Tactics, Squad Tactics, M1 Rifle Disassembly and Assembly, M1 Rifle Sight Adjustment, and Rocket Launcher. The decrement in skill after Advanced Infantry training occurs in Signal Communications, Mines and Booby Traps, Range Estimation, and Rocket Launcher. It follows that additional instruction and/or refresher training in these skills at the appropriate training level would assist in offsetting the forgetting noted above.

It should be noted, however, that many of the differences in the average scores are quite small. Although they are of statistical significance, there is some question of their practical significance. It is nevertheless apparent that all of the scores are lower than the level of proficiency desired.

(3) Training effectiveness varies from post to post; some of the essential combat skills are more effectively learned at one post, and some

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1/The proficiency test used was designed to cover 17 fundamental skills which had been agreed upon, by a group of Army training experts consulted, as essential for the combat infantryman to know. Yet the maximum performance recorded did not exceed 70 per cent of the items.

at another. Over-all performance might therefore be improved if effective training techniques, developed at one post in presenting a particular combat subject, were adopted at every post.

(4) In general, T/O&E personnel improve as time goes on, though there is some loss in proficiency between one and three years after the end of Basic Combat training. Hence refresher training might offset the forgetting which occurs during this period in some subjects.

(5) Trainees who perform the essential combat skills best also tend to have more knowledge about them. Infantry personnel have both more knowledge and more skill than Infantry-associated personnel. Tests of both knowledge and skill, given frequently at every level of training, would therefore reveal the deficiencies in training and hence the subject areas which require review.

(6) Performance levels improve as the amounts of formal education, military experience, and motivation due to enlistment status increase. Moreover, the effect of experience more than makes up for lower aptitude among T/O&E personnel. Therefore, to the extent that these background factors could be considered in assigning personnel to Infantry, proficiency in the combat skills could be expected to increase.

(7) As everyone would expect, the more intelligent the soldier, the more proficient he is in the essential combat skills. Although many high-aptitude personnel are currently assigned to the Infantry branch, many others are sent to technical schools at the end of Basic Combat training and hence are lost to the Infantry. The level of proficiency in the Infantry would almost certainly be increased if the branch received a larger proportion of the high-aptitude trainees.

In addition to these specific conclusions and implications, the results of

the study lead also to certain generalizations. Although these results are important for military planners, additional information obtained on a periodic basis is needed if the Infantry training program is to be made as effective as possible. This study involved only a few thousand men, whereas many thousands are trained and assigned to duty, relieving other thousands, in a year's time. Thus in-service infantry personnel probably vary greatly from time to time in both ability and combat readiness. For this reason the over-all combat proficiency of the Infantry arm can be firmly established only through a periodic, systematic sampling of the trainee and T/O&E population.

This study points out the degree to which the Infantry training goals are being met at present, but the existing situation is probably fluid. Before changes in training policies and procedures are made, deficiencies current at the time should be carefully assessed.

PART II

DESCRIPTION OF THE RESEARCH

INTRODUCTION

The need to know how well the average infantryman retains the essential combat skills taught in basic training presents a continuing problem for the military leader. The degree to which men tend to forget these skills through lack of practice after they have completed basic training—in fact, the degree to which trainees actually achieve the standards established for them—is a factor bearing on many aspects of training and operational planning.

In an emergency warranting full-scale mobilization, for example, deficiencies among men assumed to be ready for combat would present a serious hazard. As a basis for planning to meet such deficiencies, or to prevent them, the Army needs accurate information on the current retention of skills among men at all levels of training.

This study was intended to determine how well the typical infantryman knows the essential combat skills at the end of each stage of his training, and how well he retains these skills at various times after basic training. Its secondary purposes were to find out which skills are learned and retained least effectively, and to investigate the relationships between various background and service factors and the level of skill achieved.

This study was carried out in close association with an allied Task, KNOWHOLD, conducted by the Training Methods Division, Human Resources Research Office, for the purpose of determining the level of retention of basic military knowledge. KNOWHOLD is primarily concerned with knowledge or information, SKILLHOLD with skill or performance. Since basic military

knowledge might well be retained while the basic military skills were forgotten, or vice versa, comparison of these retention rates would be of value to those responsible for the conduct of refresher training and the planning of the various training programs. The amount of time devoted to those subjects in which the level of knowledge and skill is high could be maintained or reduced, whereas the training time assigned to those subjects in which the retention level is low could be increased.

PROCEDURE

The plan of the study involved giving a standard performance test of the fundamental Basic Combat skills to a representative sample of trainees and infantry personnel at four stages of the Army career cycle.

Personnel Included In the Study

The sample of men tested included the following:

(1) Pre-cycle trainees. These men were tested before Basic Combat training; they had been in the Army only a few days.

(2) Basic Combat trainees. These men were tested at the completion of the eight-week Basic Combat training (ATP 21-114) 1/, during which they were taught the combat skills upon which the testing is based.

(3) Advanced Infantry trainees. In addition to eight weeks of Basic Combat training, this group had completed eight weeks of Advanced Infantry training (ATP 7-600) 2/.

1/ Department of the Army, ATP 21-114, Basic Combat Training Program for Male Military Personnel Without Prior Service, Washington, D. C., 26 January 1954.

2/ Office, Chief of Army Field Forces, ATP 7-600, Individual Training Program for Light Weapons Infantryman (MOS 4745), Fort Monroe, Va., 12 September 1953.

(4) T/O&E personnel. This group included all men tested at a later stage in the Army career cycle. Service time for men in this group ranged from four months to several years.

At each training level the personnel tested were chosen from selected Army posts in five of the six Army areas. In order to ensure that the personnel tested at the Basic Combat and Advanced Infantry levels were representative of all Basic Combat and Light Infantry Army personnel, the G-3 and his staff at each post selected typical companies from those which were available. In most instances, all companies which were graduated during the week when the research team was present received the tests.

At the T/O&E level, the companies selected were those which G-3 personnel of the division felt were representative of the division as a whole. So neither the poorest nor the best companies, according to G-3 opinion, were chosen.

The tests were administered to the various groups during the six-month period February-July 1954. The number of men at each level of training tested in each Army area is shown in Table 1.

The Individual Proficiency Test: Basic Combat

Although only in combat can a soldier's fighting skill and behavior be determined beyond question, they can be measured and predicted with some degree of accuracy by means of specially prepared tests. Lacking a combat criterion, researchers must rely on tests which require the soldier to exercise the skills which are generally regarded as most essential to successful combat performance.

Table 1

NUMBER AND GEOGRAPHIC DISTRIBUTION
OF ARMY PERSONNEL INCLUDED IN THE SAMPLE

Level of Training	Total Number Tested	Number Tested In Each Army Area					
		Area 1 (Dix)	Area 2 (Knox)	Area 3 (Jackson)	Area 3 (Benning)	Area 5 (Carson)	Area 6 (Ord)
Pre-cycle	569	144	133	149	--	--	143
Basic Combat	1,365	350	360	360	--	--	295
Advanced Infantry	1,218	305	368	330	--	--	215
Infantry T/O&E	1,364	--	--	--	728	636	--
Total	4,516	799	861	839	728	636	653

At the time this study was undertaken the Individual Proficiency Test: Basic Combat (IPT BC) was the only standardized performance test available with which to measure the fundamental combat skills presented in the Basic Combat Training Program (ATP 21-114). Designed to measure the achievement of men who have finished basic training, this test is quite similar to the proficiency or "sweat" tests normally given at the end of training.

The test had been developed in previous research at Human Research Unit Nr 1 with the assistance of the Personnel Research Branch, The Adjutant General's Office, and of Human Research Unit Nr 2. The test is administered in circuit fashion, with the trainees visiting all 17 stations in turn. At each station, trained examiners check the trainee's performance on a number of specific behaviors essential to a given combat skill. The maximum score at each station is 10 points, a total of 170 points representing perfect performance on the test.[3/]

The 17 combat skills tested, as well as the individual items in the subtests covering these skills, are those which a large group of training experts agreed are essential for the combat infantryman to know. The combat skills included in the test are listed in Table 2.

Because of its comprehensiveness and the specific information it provides about how well the soldier performs the critical combat skills, this test provided a satisfactory measure, for the purposes of this study, of the proficiency the individual has attained.

3/ Technical Report 19 of the Human Resources Research Office, Development of Proficiency Tests for Basic Combat and Light Infantry Training, by Robert A. Baker, Guy Scott, and Eugene F. MacCaslin, Human Research Unit Nr 1, CONARC, July 1955.

Table 2

COMBAT SKILLS INCLUDED IN THE INDIVIDUAL PROFICIENCY TEST: BASIC COMBAT

Subtest	Item Content
1. First Aid	Splinting a broken leg; treating for shock; applying tourniquet; treating injured back; administering morphine
2. Observation and Military Intelligence	Observing and reporting information; handling PW's and captured documents; observing fire
3. Map Reading	Orienting a map; determining azimuth; reading distance scales; reading coordinates; locating points on the map
4. Compass	Shooting an azimuth; setting the compass for night use; reading a compass; determining back azimuth
5. Signal Communications	Connecting the EE-8 telephone, installing batteries, calling switchboard; operating the telephone on common battery; knowledge of phonetic alphabet; use of AN/PRC-6 radio
6. Care of Clothing and Equipment	Care of combat boots, mess kit, cartridge belt, rifle barrel, field bag, rifle stock, fatigue shirt, bayonet, rifle sling, collar insignia
7. Field Fortifications	Selecting fortifications best for certain tactical situations--includes hasty positions, prone shelters, one-man foxholes, etc.
8. Mines and Booby Traps	Locating a buried mine, probing, and clearing trip wires; assembling and booby-trapping an

Subtest	Item Content
8. Mines and Booby Traps (continued)	antitank mine using an M1 fuze, dummy cap, charge, etc.
9. Squad Formations	Identifying and positioning the squad members in squad diamond, squad column, as skirmishers, and march column formations
10. Range Estimation	Estimating range to distant targets at ranges of 100-500 yards
11. Individual Tactics	Hitting the ground, creeping, and crawling; utilizing cover; firing from prone position; rushing; firing from inside buildings; assault with a grenade
12. Squad Tactics	Knowledge of fire commands; identifying various arm and hand signals
13. M1 Rifle: Disassembly and Assembly	Disassembling the M1 rifle in less than 40 seconds; assembling in less than 80 seconds
14. M1 Rifle: Sight Adjustment	Adjusting battle sights to correct fire and to obtain hits on three targets at different ranges
15. Light Machine Gun: Disassembly and Assembly	Disassembling the LMG; assembling and adjusting headspace; immediate action
16. Light Machine Gun: Sight Setting	Setting slide for range and deflection knob for windage; elevating and traversing on designated targets for correct sight picture in 20-25 seconds
17. Rocket Launcher	Assembling the launcher; proper loading procedure; safety precautions; sighting; disassembling the weapon

Biographical Information

Each individual tested also filled in a biographical information sheet, in order to supply information about his service background which might be related to his performance on the proficiency test. This information was supplemented by information from the AGO Form 20.

For Pre-cycle, Basic Combat, and Advanced Infantry trainees, information was obtained on the following topics: Area I scores from the Army Classification Battery, place of birth, age at last birthday, formal education, prior military training, race, and enlistment status. For T/O&E personnel, information was also obtained on the following topics: elapsed time since the completion of Basic Combat training, combat experience, place where Basic Combat training was received, branch of service, length of service, current Army grade, and Military Occupational Specialty.

The Basic Military Proficiency Test (BMPT)

The personnel included in the sample also took a paper-and-pencil test, the Basic Military Proficiency Test (BMPT), on their knowledge of the subject matter given in the Basic Combat training program. The BMPT, developed by the Personnel Research Branch of The Adjutant General's Office, substantially covers the Basic Combat training curriculum. It is divided into seven parts containing 183 multiple-choice items in all; for each item the examinee is required to choose the best of four answers. Following are the areas of knowledge surveyed by the test, and the number of items in each part:

(1) Army Organization and Customs	13 items
(2) Care of Self in Combat	45 items
(3) Combat Training	45 items

(4) Special Skills	15 items
(5) Weapons	30 items
(6) Intelligence and Security	15 items
(7) Care of Self and Personal Equipment	20 items

This test was given in conjunction with the allied Task, KNOWHOLD, which was studying the level of retention of basic military knowledge. The inclusion of the BMPT in the testing program made possible a direct comparison of the retention level of military knowledge with that of military skill.

RESULTS

Differences In Intelligence (Aptitude Area I)

Aptitude Area I scores had been obtained for all of the subjects included in the study, as a measure of over-all intelligence. This score is an average of scores on the reading vocabulary, arithmetical reasoning, and pattern analysis tests of the Army Classification Battery. Inasmuch as training experience and previous research with in-service personnel [4/] indicate that trainees of high intelligence make higher scores on the typical end-of-training proficiency tests, it was necessary to take this factor into account. If large differences in intelligence exist between groups, differences in proficiency scores could be due to intelligence rather than to the amount or level of training.

The average Aptitude Area I score for the men at each level of training is shown in Figure 1. The differences between training levels, tested for their statistical significance, were found to be true differences rather than

4/ For example, see Technical Report 19. See also Technical Report 16 of the Human Resources Research Office, Training Achievement in Basic Combat Squads With Controlled Aptitude, by Donald C. Findlay, Seymour M. Matyas, and Herman Rogge III, Human Research Unit No. 1, OCAFF, January 1955.

differences that could occur easily by chance. The aptitudes for each training level at each post are compared in Figure 2. These differences were also tested for their statistical significance, and in most instances were found to be real rather than chance differences.

As Figure 1 shows, the Basic Combat trainees, as a group, had higher Area I scores than either Advanced Infantry or T/O&E personnel. Under the present classification and assignment system, after basic training large numbers of the higher-aptitude personnel are sent to service schools, given special duty, and so on, with the result that the aptitude level for Advanced Infantry trainees and for T/O&E Infantry personnel is somewhat reduced.

The relationship between aptitude Area I score and total score on the performance test was computed for all personnel. At the Basic Combat level a correlation coefficient of .67 was obtained, and for the Advanced Infantry and T/O&E levels the correlation values were .52 and .53, respectively; these values are statistically significant. These findings thus support the conclusion that trainees of higher intelligence make higher scores on tests of combat skill. The mean scores, standard deviations, tests of statistical significance (t tests), and correlation coefficients for each of the groups tested at each of the training levels may be found in the appendix.

Over-All Proficiency Level

The average scores made on the Individual Proficiency Test: Basic Combat by each group tested at each training level, as well as a comparison of the four training levels, are given in Figures 3 and 4. The level of skill, as expected, increased progressively with the amount of training received, the highest average score being made by T/O&E personnel, and the next highest by

MEAN APTITUDE AREA 1 SCORES FOR EACH LEVEL OF TRAINING

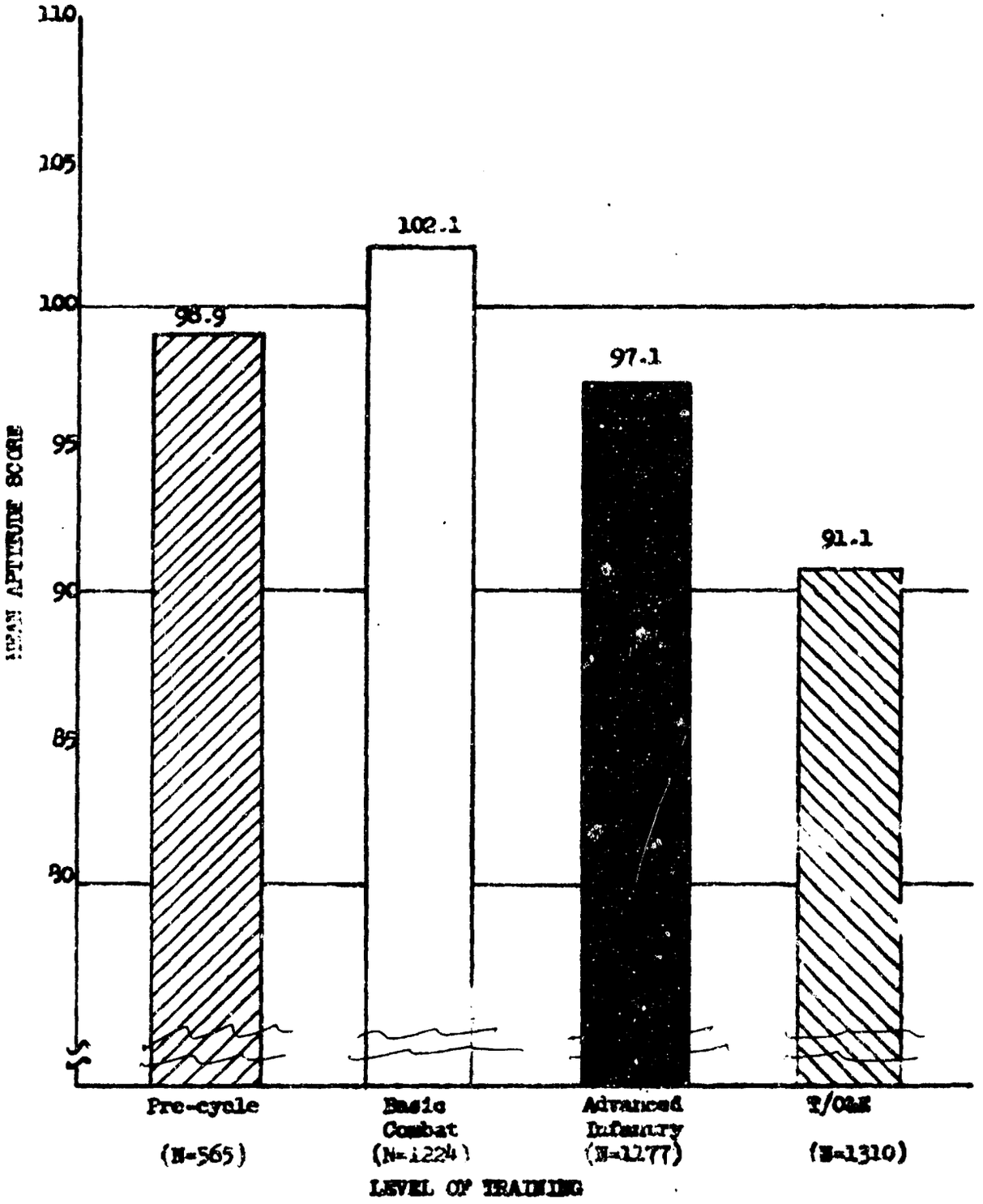
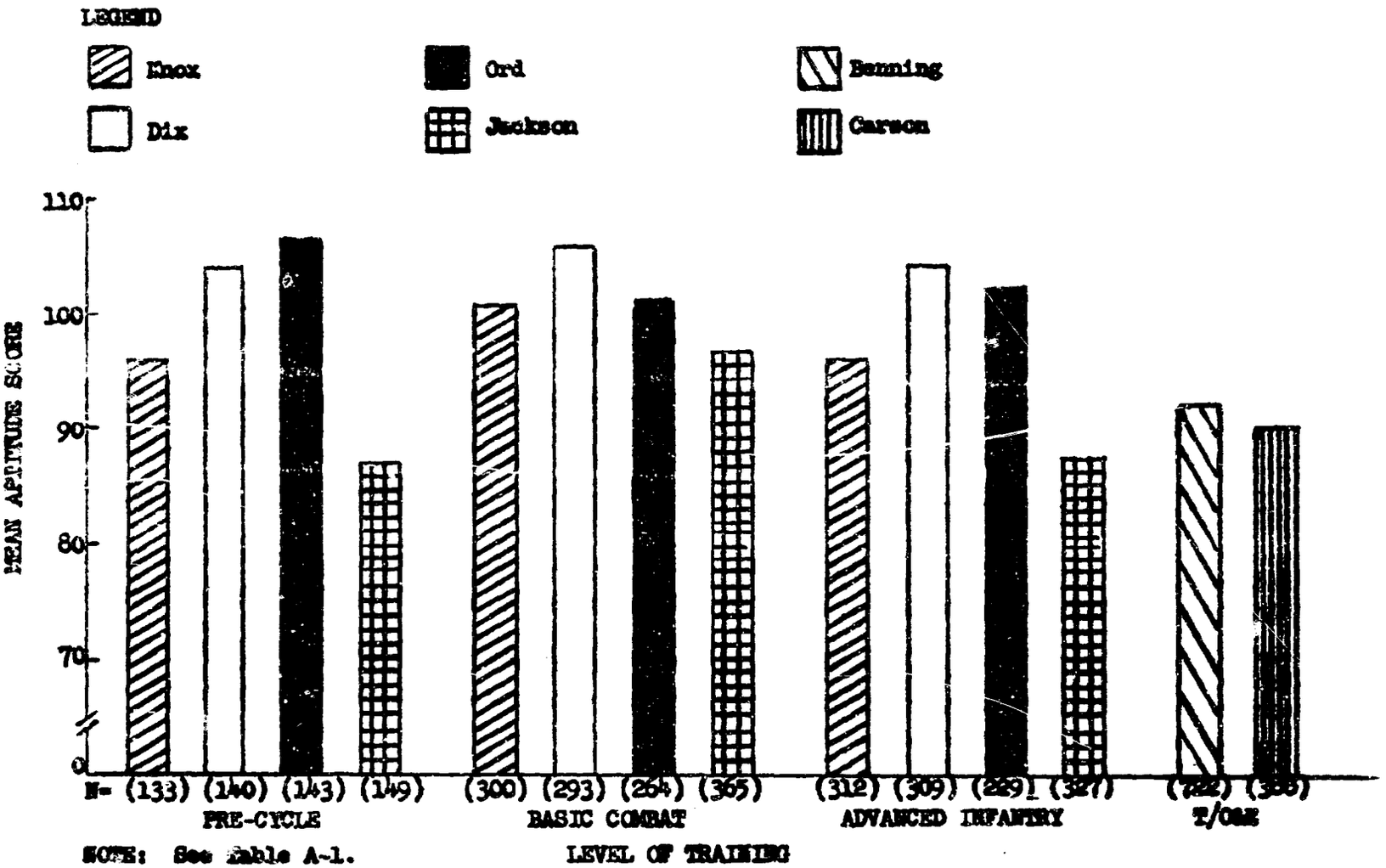


Figure 1

MEAN APTITUDE AREA 1 SCORES AT EACH POST FOR EACH LEVEL OF TRAINING



NOTE: See Table A-1.

Figure 2

Advanced Infantry trainees. It is clear that, in general, the various training programs are successful in raising the typical infantryman's level of combat skill from the time he is inducted until he is assigned to active duty with a T/O&E unit.

It should be noted, however, that even at the T/O&E level the average score is considerably short of 170, which constitutes a perfect score on this test. On the average, the Basic Combat trainees passed only 62 per cent of the items, the Advanced Infantry trainees 64 per cent, and the T/O&E personnel 70 per cent. Inasmuch as the test was designed to test the fundamentals—and only the fundamentals—of the subject matter in the training program, failure to pass at least 80 to 90 per cent of the items indicates that the level of accomplishment of the various groups falls short of training objectives.[5/]

5/ These objectives are specifically stated in ATP 21-114 and ATP 7-600. The latter states them thus in part: "Specific training objectives are to train the soldier in basic military subjects on the fundamentals of infantry combat which will insure that he:

". . . Understands supply economy and maintains his clothing and equipment . . . in the field . . .

"Is able to march varying distances . . .; move in the field using only the compass to maintain direction; locate himself and common objects on a map.

"Understands the meaning and need for basic intelligence; detects and properly reports simple military information; recognizes classified material and properly safeguards it.

"Understands and is able to apply, under simulated or actual combat conditions, the principles of concealment and camouflage, cover and movement, and is able to take individual protective actions against aircraft, armor, and dismounted ground attacks.

"May participate as a member of a patrol or act as an individual scout or observer. . . .

"Is able to act as a messenger and operate radiotelephone and field telephone equipment.

"Is able to use, detect, and disarm mines and booby traps, and accomplish simple demolitions and mine field breaching.

"Is able to fire proficiently any individual infantry weapons . . .

"Can serve as any member of the crew of a crew-served infantry light weapon (machine gun, rocket launcher . . .) in combat, and is familiar with fire direction and fire control for infantry mortars and artillery . . .

"Can serve as any member of an infantry rifle squad and platoon in combat . . ."

Other criteria furnished by training experts may be found in HumRRO Technical Report 19.

MEAN INDIVIDUAL PROFICIENCY TEST SCORES FOR EACH LEVEL OF TRAINING

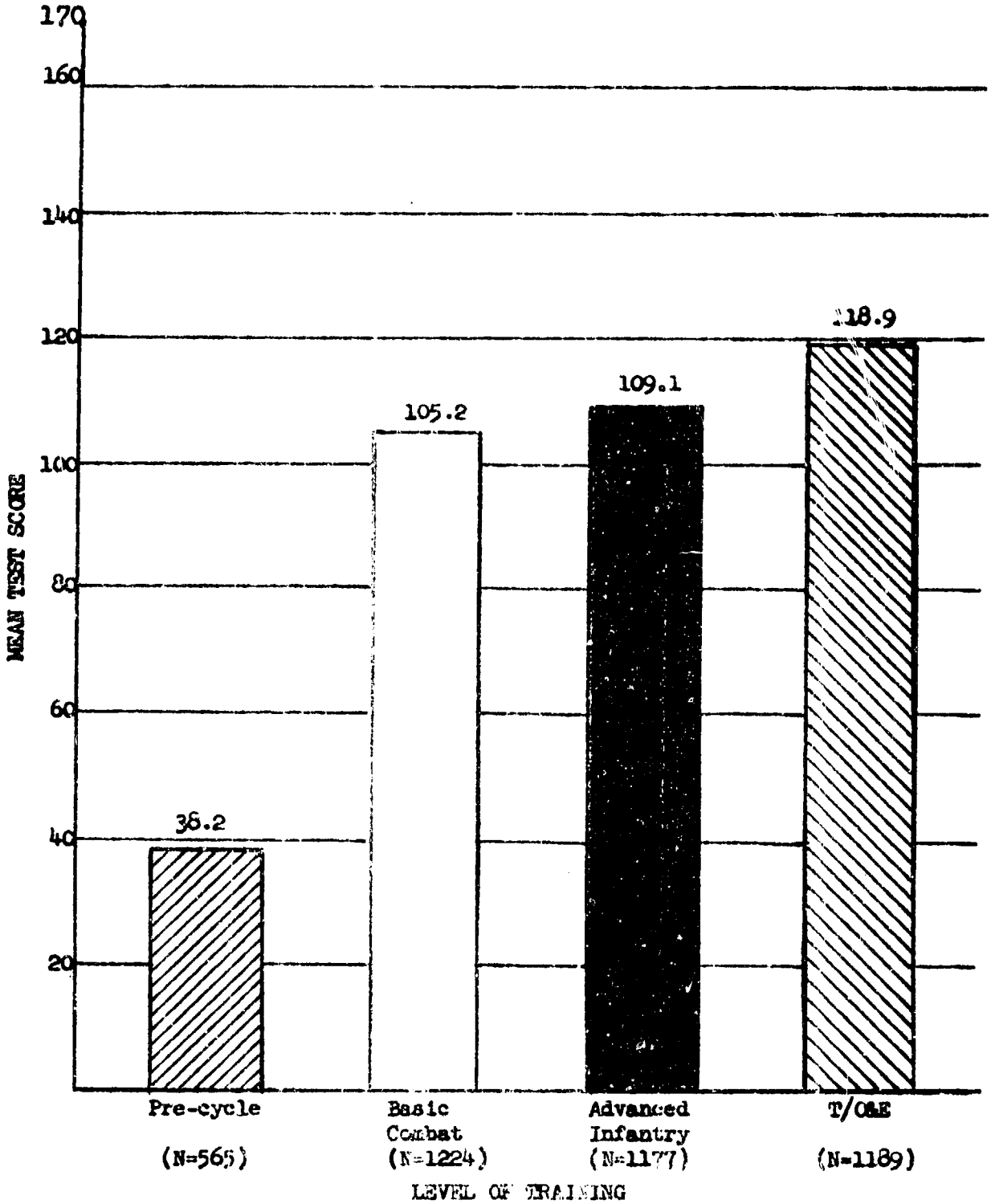
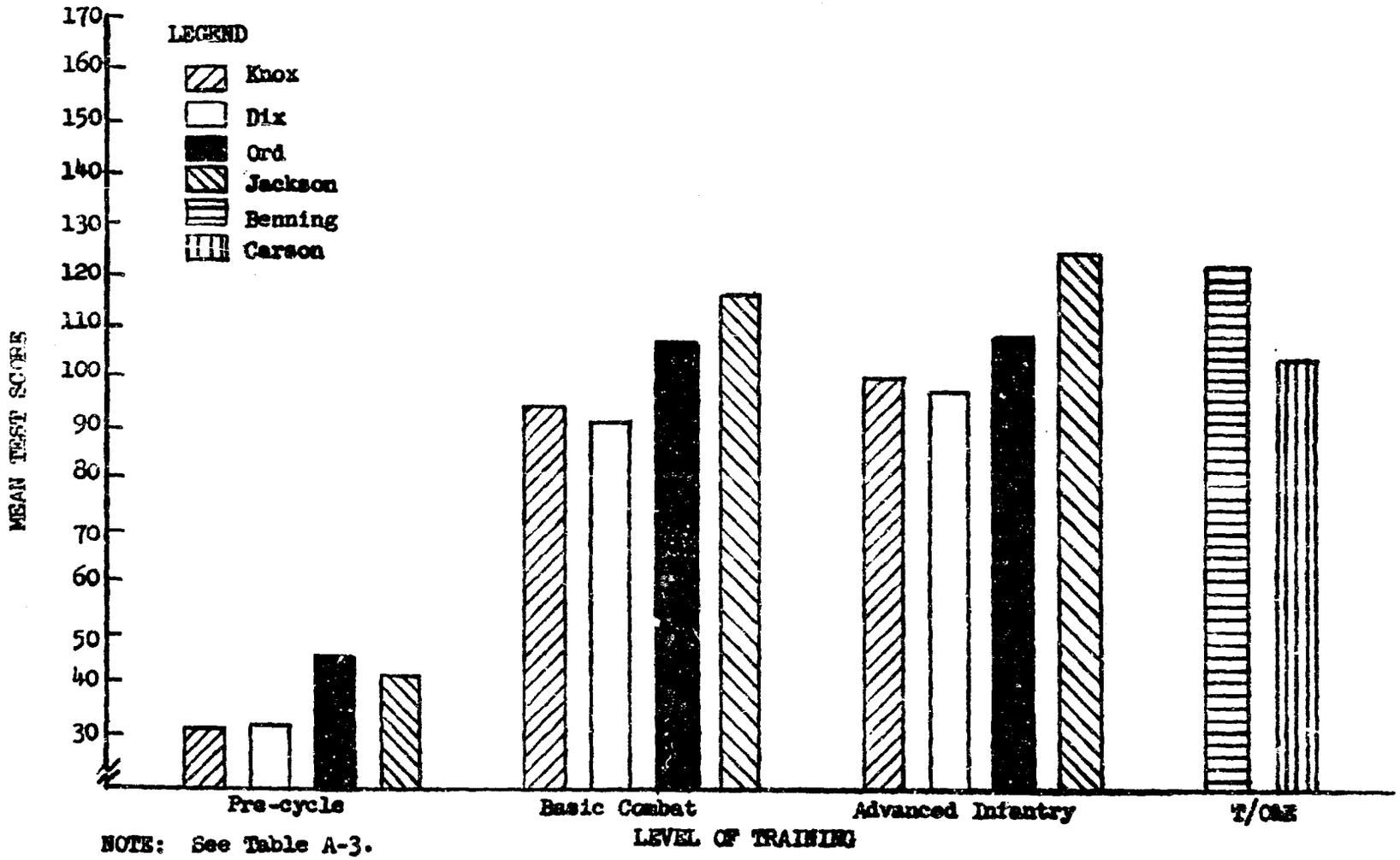


FIGURE 3

MEAN INDIVIDUAL PROFICIENCY TEST SCORES FOR EACH LEVEL OF TRAINING AT EACH POST



NOTE: See Table A-3.

Figure 4

Since scores on the performance test could have been affected by differences in intelligence between the groups as well as by achievement, it is desirable to remove the effects of intelligence to get at a purer measure of achievement. To do this a statistical technique (analysis of covariance), which makes it possible to equate the groups in intelligence, was employed. When this technique was used, the results of the analysis of the test scores reflected differences in achievement uncomplicated by any difference in intelligence.[6/]

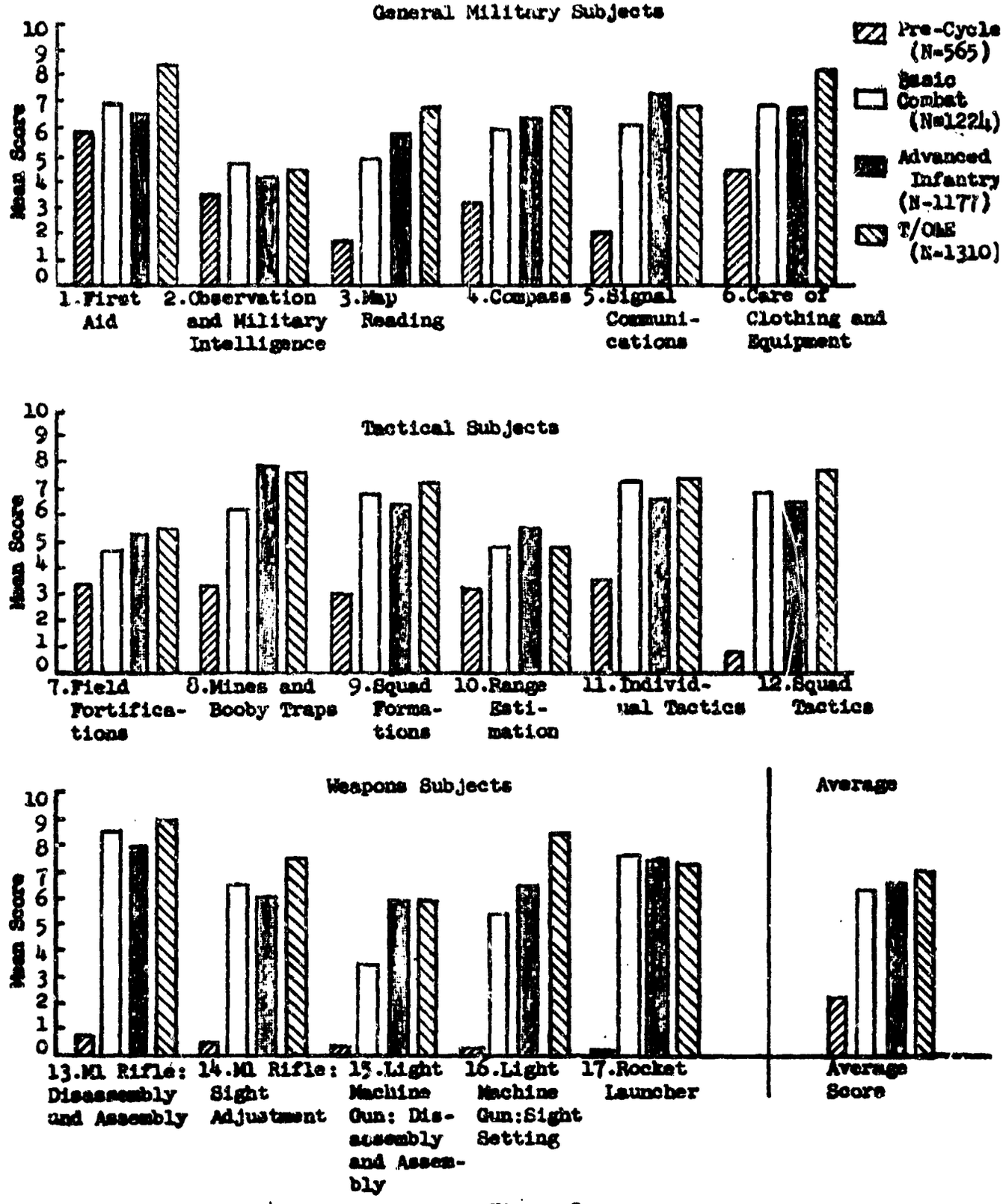
Proficiency in the Various Combat Skills

One of the values of the Individual Proficiency Test: Basic Combat is the fact that it contains separate subtests, each of which furnishes a score on a specific combat subject or skill. To determine which combat skills show the most improvement after additional training and which show the least, the average scores on the 17 subtests for the four training level groups were compared. (See Figure 5.)

These comparisons indicate that, on the average proficiency in a particular subject or skill increases with additional training. T/O&E personnel were found to be equal or superior to Basic Combat trainees in all subjects and skills except Range Estimation and Rocket Launcher. T/O&E personnel were also found to be equal or superior to the Advanced Infantry trainees in all subjects and skills except Signal Communications, Mines and Booby Traps, Range Estimation, and Rocket Launcher. It should be recalled, however, that both the Basic and the Advanced trainees have higher intelligence scores than the T/O&E personnel. Therefore, analyses of covariance

6/ Details of the statistical analysis may be obtained by interested readers on request to the Director's Office, HumRRO.

MEAN SUBTEST SCORES FOR EACH LEVEL OF TRAINING



NOTE: See Table A-4.

Figure 5

were applied to determine whether the higher scores of the Basic and Advanced trainees in these skills represented true superiority of achievement or merely differences in Aptitude Area I scores or chance differences. The results[7] showed that they were truly superior in these skills; that is, their higher scores on these subtests were not due to their higher Area I scores. In average performance on three subtests, Compass, Field Fortifications, and Light Machine Gun Disassembly and Assembly, no significant difference between T/O&E and Advanced Infantry personnel was found.

Advanced Infantry trainees were found to be superior to Basic Combat trainees in about half the subjects and skills tested. The subtests on which the Basic Combat group scored higher than the Advanced trainees were First Aid, Squad Formations, Individual Tactics, Care of Clothing and Equipment, Observation and Military Intelligence, Squad Tactics, M1 Rifle Disassembly and Assembly, M1 Rifle Sight Adjustment, and Rocket Launcher. Again, the fact that the Basic Combat trainees had a higher intelligence level than the Advanced group had to be considered. Therefore, statistical analyses (analyses of covariance) were used here also, to find out if the differences observed represented true differences, rather than variations due to Area I scores or chance factors. These analyses showed that in seven of the skills the Basic Combat trainees were really superior. For two subtests, Squad Formations and Care of Clothing and Equipment, no significant difference between the two groups was found when intelligence differences were taken into account.[8]

Attention should be called to the fact that for some of the curriculum subjects in the Basic Combat program no additional training is given in the

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7/ See Table A-5.

8/ Details of the statistical analyses for the various subjects and skills may be obtained on request to The Director's Office, HumRRO.

Advanced Infantry program. The amount of additional training given at the Advanced Infantry level for subjects tested by the IPT:BC is shown in Table 3. For the subjects in which no additional training was given, the difference between scores made at the end of the Basic Combat program and at the end of the Advanced Infantry program is a true measure of retention; that is, the amount recalled after a period of time without additional practice.

As Table 3 shows, these skills were First Aid, Observation and Military Intelligence, Care of Clothing and Equipment, Individual Tactics, M1 Rifle Disassembly and Assembly, and M1 Rifle Sight Adjustment. The fact that the Advanced Infantry trainees made significantly lower scores on all these subjects except one suggests that some forgetting does occur when there is no practice. The exception was Care of Clothing and Equipment which is, of course, a skill practiced by all military personnel.

Differences Between Posts At the Basic Combat And Advanced Infantry Training Levels

A comparison of the differences between posts at the Basic and Advanced training levels is also pertinent. Post-by-post comparisons for each of the subjects and skills tested are given in Tables 4 and 5.

Since significant differences in intelligence between the trainees from post to post were found, statistical analyses (analyses of covariance) were made to determine if inter-post differences in test performance were a function of intelligence or of training and other factors operative at each post. Again, it was found that differences in performance, at both the Basic and Advanced levels, could not be accounted for by initial differences in Area I scores; in other words, the differences found were not due to differences

Table 3

ADDITIONAL HOURS DEVOTED TO THE BASIC COMBAT SKILLS AT THE ADVANCED INFANTRY TRAINING LEVEL

Subject Tested By the IPT:EC	Hours of Basic Combat Training (ATP 21-114)	Advanced Infantry Training	
		Hours of Light Infantry Training (ATP 7-600)	Hours of Heavy Infantry Training (ATP 7-601)
1. First Aid	5	0	0
2. Observation and Military Intelligence	9/	0	0
3. Map Reading	10[b]/	4[b]/	4[b]/
4. Compass			
5. Signal Communications	6	4	4
6. Care of Clothing and Equipment	12	0	0
7. Field Fortifications	5	4	4
8. Mines and Booby Traps	8	4	4
9. Squad Formations	6	4	4
10. Range Estimation	16[a]/	170[a]/	170[a]/
11. Individual Tactics	8	0	0
12. Squad Tactics	16	46[a]/	46[a]/
13. M1 Rifle: Disassembly and Assembly	9[c]/	0	0
14. M1 Rifle: Sight Adjustment		0	0
15. Light Machine Gun: Disassembly and Assembly	16[d]/	54[d]/	54[d]/
16. Light Machine Gun: Sight Setting			
17. Rocket Launcher	6	4	4

a/ Integrated training.
b/ Map Reading and Compass were combined in one training unit.
c/ M1 rifle instruction made up one training unit.
d/ LAW instruction made up one training unit.

Table 4

MEAN SUBTEST SCORES OF BASIC COMBAT TRAINEES AT EACH POST

Subtest	Knox (N=360)	Dix (N=350)	Ord (N=295)	Jackson (N=360)
1. First Aid	6.9	6.2	6.7	7.8
2. Observation and Military Intelligence	4.7	5.3	4.8	4.8
3. Map Reading	5.2	4.3	4.8	5.6
4. Compass	4.5	5.4	5.6	7.4
5. Signal Communications	5.8	5.6	6.4	6.4
6. Care of Clothing and Equipment	5.0	5.1	8.2	8.6
7. Field Fortifications	3.3	2.3	5.4	7.3
8. Mines and Booby Traps	4.6	6.8	8.4	4.7
9. Squad Formations	6.6	6.6	6.9	6.6
10. Range Estimation	4.1	4.3	4.8	6.6
11. Individual Tactics	6.9	6.7	8.0	7.1
12. Squad Tactics	5.6	5.5	8.6	7.4
13. M1 Rifle: Disassembly and Assembly	8.1	8.6	8.8	9.1
14. M1 Rifle: Sight Adjustment	5.4	6.0	7.4	7.3
15. Light Machine Gun: Disassembly and Assembly	4.7	2.4	1.9	4.6
16. Light Machine Gun: Sight Setting	5.8	3.7	6.4	6.1
17. Rocket Launcher	7.0	6.1	7.7	9.5
Average Subtest Score	5.5	5.4	6.4	6.9

Table 5

MEAN SUBTEST SCORES OF ADVANCED INFANTRY TRAINEES AT EACH POST

Subtest	Knox (N=368)	Dix (N=305)	Ord (N=215)	Jackson (N=330)
1. First Aid	7.1	6.7	5.8	7.0
2. Observation and Military Intelligence	4.9	4.0	3.1	4.8
3. Map Reading	4.5	6.9	5.2	6.1
4. Compass	5.0	4.6	5.8	9.4
5. Signal Communications	7.5	6.3	6.6	8.1
6. Care of Clothing and Equipment	6.1	4.1	7.5	8.6
7. Field Fortifications	5.2	2.3	4.7	8.0
8. Mines and Booby Traps	8.0	8.4	7.7	7.3
9. Squad Formations	6.5	8.0	7.8	3.8
10. Range Estimations	4.3	4.2	4.7	8.2
11. Individual Tactics	6.9	5.9	7.4	6.1
12. Squad Tactics	3.2	6.9	7.9	8.0
13. M1 Rifle: Disassembly and Assembly	7.4	6.2	8.5	9.5
14. M1 Rifle: Sight Adjustment	5.7	5.9	5.7	7.0
15. Light Machine Gun: Disassembly and Assembly	6.0	4.9	5.9	6.6
16. Light Machine Gun: Sight Setting	6.2	5.9	6.8	6.6
17. Rocket Launcher	5.4	6.9	7.4	9.8
Average Subtest Score	5.9	5.8	6.4	7.4

in intelligence. This was true for every skill tested, as well as for the total scores.9/

The fact that significant differences were found between posts at both the Basic and the Advanced training levels suggests that there is considerable variation between posts in the extent to which the training goals for the 17 combat skills are being met. Many factors, such as variations or defects in the training equipment being used, the kind and quality of training techniques, or variations in the caliber of training personnel available, for example, may be responsible for this situation.

In spite of the differential effects of these and other factors, it is probably true that the procedures used at Post 1 for teaching one skill may be such that the trainees learn quickly and well; likewise the procedures used at Post 2 for teaching another skill may be superior. Thus inspection of the procedures used at a post for teaching a subject in which the trainees there excel may disclose training techniques useful to the entire Army. Universal adoption of such techniques might raise the training level for this subject throughout the Army.

Retention After Basic Combat Training

Of major interest in this study is the extent to which T/O&E personnel have retained the various combat skills taught in basic training. As a measure of retention at the T/O&E level, the test scores were grouped according to the number of elapsed months since basic training. These results, shown in Figure 6, indicate a steady decrease in skill for the first 18 months following basic training. After 18 months, however, there is a definite trend toward

9/ Details of the statistical analyses may be obtained on request to The Director's Office, HumRRO.

an increase in the level of skill. After three years it is evident that the retention level is as high as it is one month after Basic Combat training. These trends indicate that during the 18-24 month period following basic training some significant factor is at work. One such factor is the departure of Selective Service draftees following their two years of service; only Regular Army personnel remain in service longer. There is a strong possibility that the lower motivation of the Selective Service group results in a lower level of skill; when only the more highly motivated RA personnel are examined, no loss of skill is noted. In general, nevertheless, the more experienced soldiers know the skills well. Although there is a slight drop in the curve after one or two years, the fact that average T/O&E scores are higher than Advanced Infantry scores clearly shows that there has been no decline in the general level of skill. Instead, the level of skill increases among T/O&E personnel.

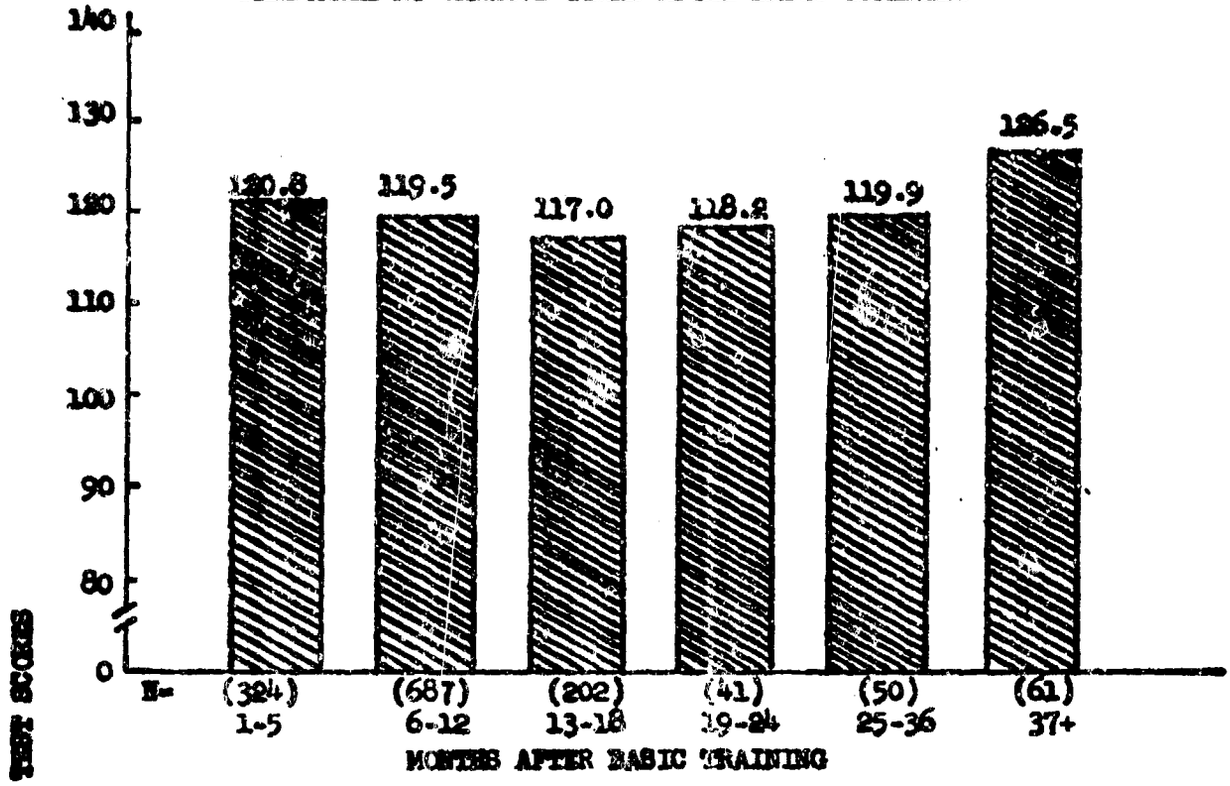
The retention of the skills on each subtest after various periods of time is shown in Table 6. For some of the skills a definite improvement with time in service can be seen; for other skills the reverse is true or the level of skill remains constant.

Relationship Between Knowledge and Skill

Since the personnel included in the study also received a paper-and-pencil test designed to measure their knowledge of the Basic Combat subject matter, it was possible to compare their performance on the knowledge test directly with their performance on the skills test.

For the Basic Combat trainees a correlation of .68 was found between

AVERAGE INDIVIDUAL PROFICIENCY TEST SCORES OF T/O&E PERSONNEL AT VARIOUS TIMES AFTER BASIC TRAINING



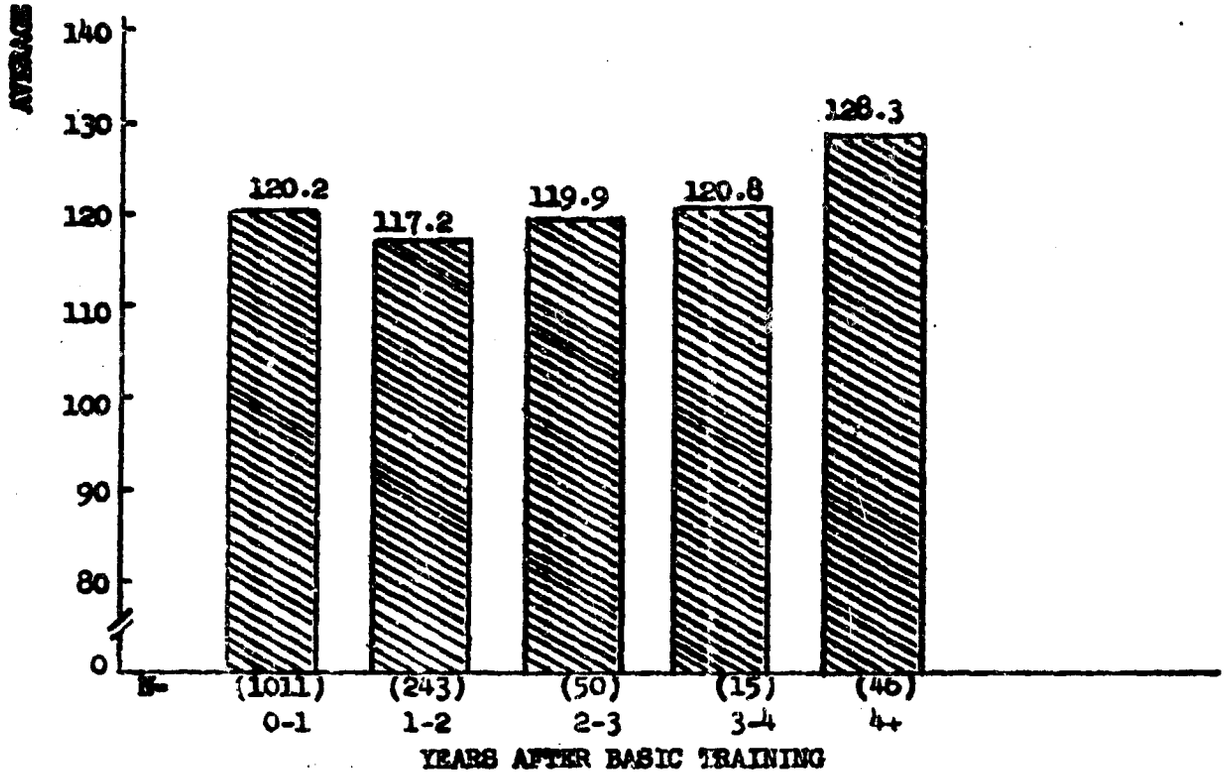


Figure 6

Table 6

AVERAGE SUBTEST SCORES OF T/O&E PERSONNEL
FOR SPECIFIC PERIODS AFTER BASIC TRAINING

Subtest	Months Since Basic Combat Training					
	1-5 (N=324)	6-12 (N=687)	13-18 (N=202)	19-24 (N=41)	25-36 (N=50)	37 (N=61)
1. First Aid	8.8	8.3	7.8	7.9	8.4	8.9
2. Observation and Military Intelligence	4.7	7.0	3.9	4.0	4.4	4.6
3. Map Reading	7.3	7.0	6.7	6.6	7.1	7.8
4. Compass	6.8	6.5	6.9	6.8	6.7	7.3
5. Signal Communications	7.1	6.6	6.5	7.2	7.3	7.3
6. Care of Clothing and Equipment	8.4	8.3	7.7	8.1	7.9	8.8
7. Field Fortifications	4.8	5.1	5.7	5.4	4.8	5.1
8. Mines and Booby Traps	7.4	7.5	7.8	7.8	8.0	8.5
9. Squad Formations	7.6	7.3	6.7	6.8	7.4	8.2
10. Range Estimation	5.0	4.8	5.0	4.8	5.3	5.2
11. Individual Tactics	7.8	7.2	7.0	7.2	7.3	7.9
12. Squad Tactics	7.9	7.8	7.5	7.8	7.3	8.4
13. M1 Rifle: Disassembly and Assembly	8.4	8.8	9.2	9.2	8.9	9.2
14. M1 Rifle: Sight Adjustment	8.2	7.3	6.7	7.3	7.2	7.8
15. Light Machine Gun: Disassembly and Assembly	4.9	6.1	6.1	6.0	6.0	6.8
16. Light Machine Gun: Sight Setting	8.1	8.4	7.9	8.2	7.7	8.1
17. Rocket Launcher	6.9	7.5	7.2	7.6	7.5	7.4
Total	120.8	119.5	117.0	118.2	119.9	126.5

the BMPT and the IPT:BC. For the Advanced Infantry trainees and T/O&E personnel the coefficients were .47 and .62, respectively. It would seem, therefore, that men who do well on the knowledge test tend to perform well on the tests of combat skill.

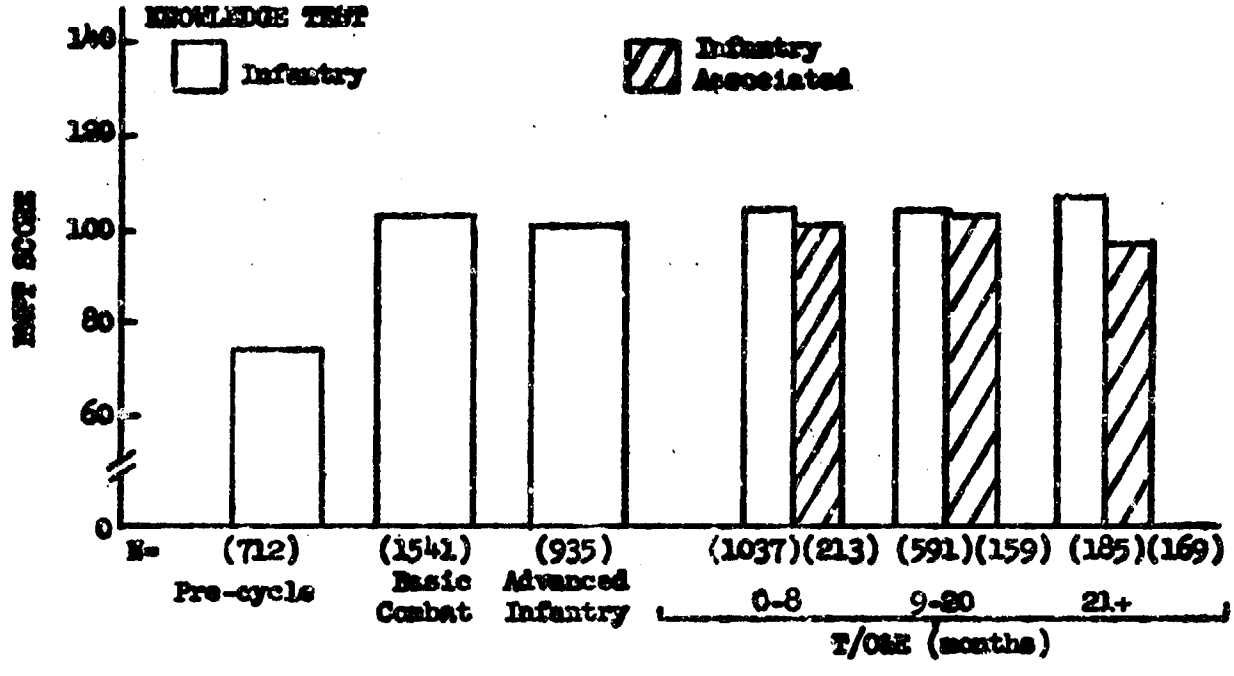
A direct comparison of the scores made at the various training levels on the two tests is shown in Figure 7. The T/O&E personnel were divided into two groups: Infantry and Infantry-associated. All personnel with an MOS of either 4745 (light weapons Infantry) or 1812 (heavy weapons Infantry) constituted the Infantry group. Personnel whose jobs might require that they support or be affiliated with front-line Infantry in combat made up the Infantry-associated group. The two T/O&E groups were also compared for various time periods after the completion of Basic Combat training. These divisions were made according to the procedure adopted by the authors of the allied HumRRO study, KNOWHOLD, "The Retention of Basic Military Knowledge," so that a direct comparison between level of knowledge and level of skill could be made.

A comparison between knowledge and skill after the effects of intelligence have been ruled out is shown in Figure 8. For this comparison, the Aptitude Area I scores of each group have been adjusted at 100—that is, the scores represent the performance of the man of average intelligence on the two tests.

Other Variables and Proficiency

Comparisons of certain background variables with scores on the IPT:BC showed that most of these factors had little relationship to the total score. Of the 13 variables examined there were, however, three exceptions: Previous

COMPARISON BETWEEN KNOWLEDGE AND SKILL
FOR EACH LEVEL OF TRAINING (RAW SCORES)



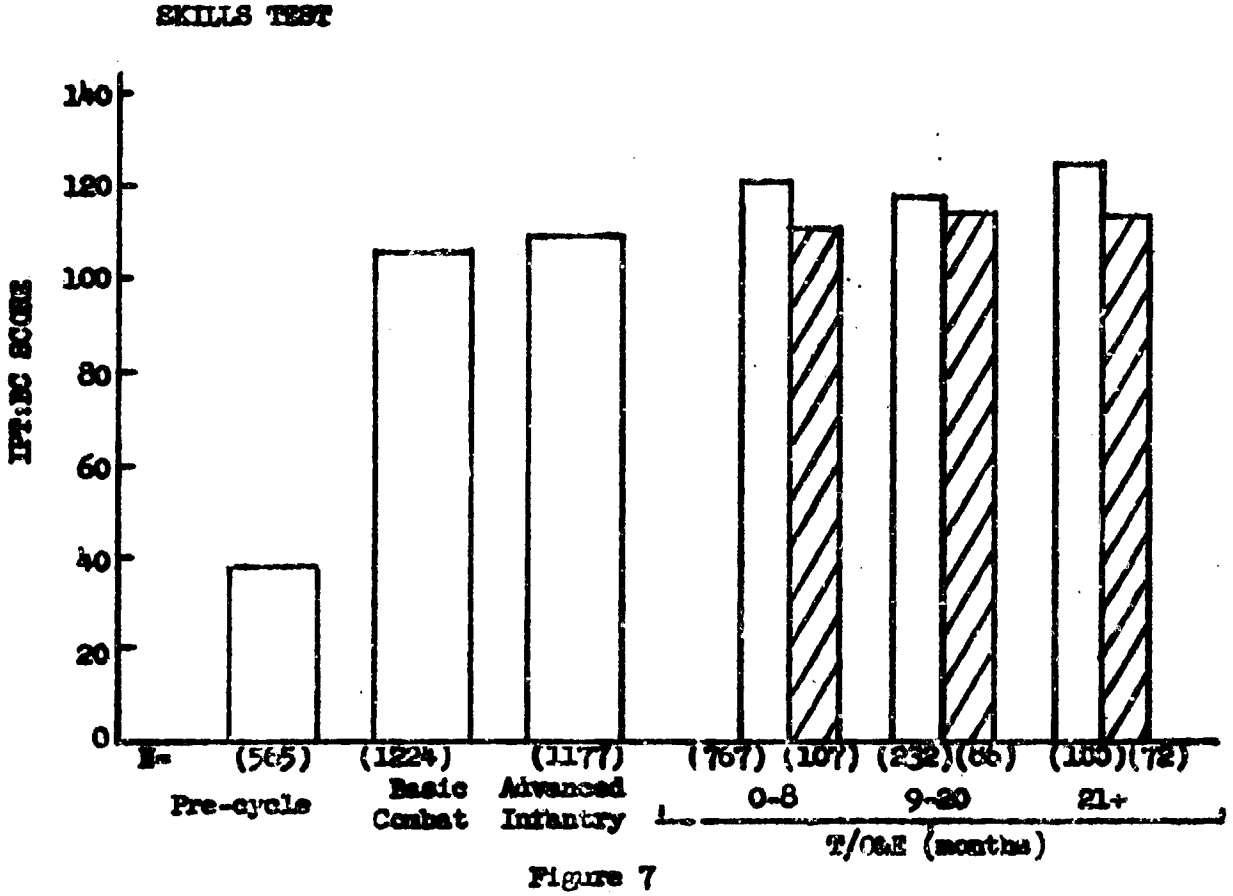
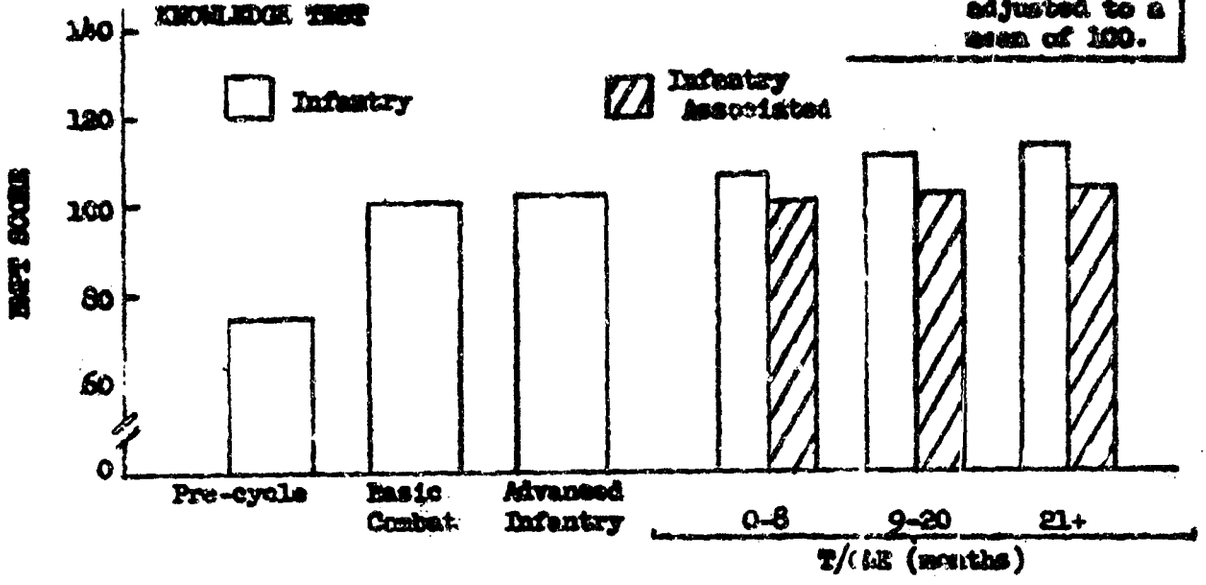


Figure 7

COMPARISON BETWEEN KNOWLEDGE AND SKILL
FOR EACH LEVEL OF TRAINING (ADJUSTED MEANS)

NOTE: Area I scores adjusted to a mean of 100.



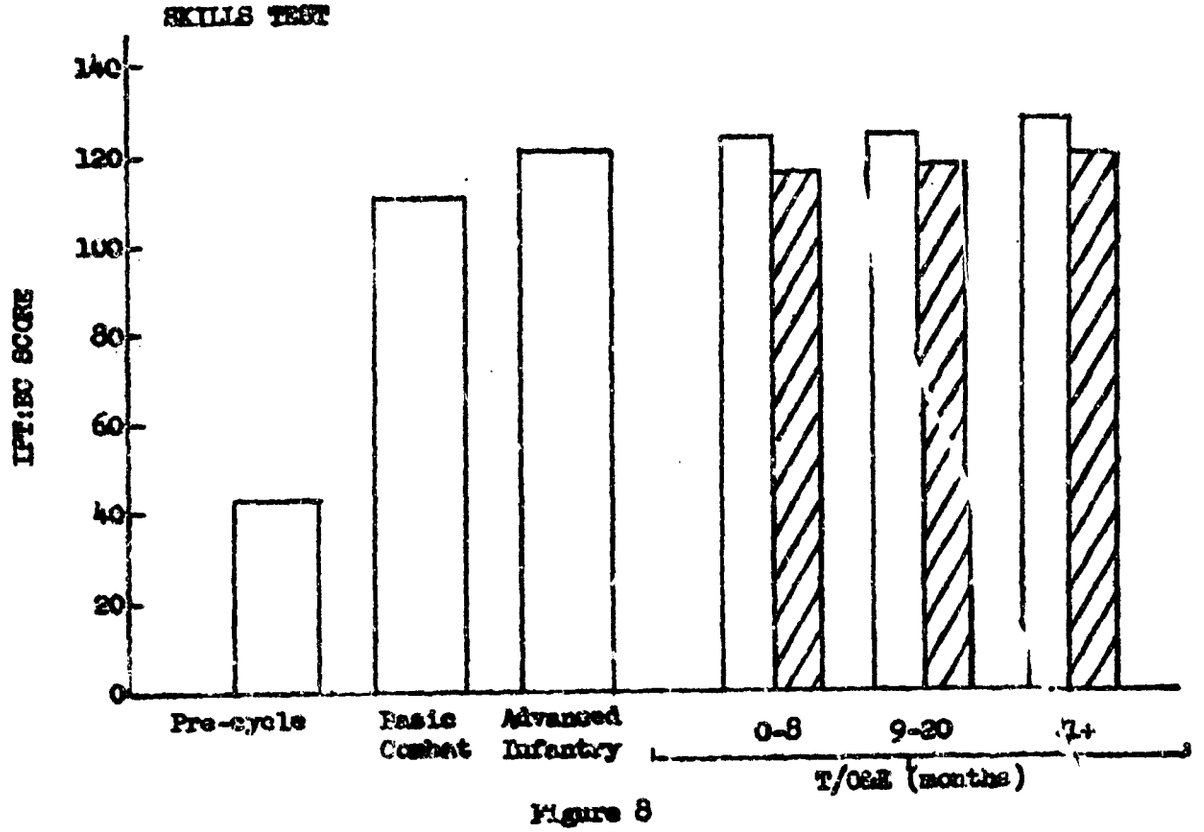


Figure 8

military training, formal education, and regular Army versus draftee status proved to be related to the total score. Personnel with previous military experience made higher scores on the test at all levels of training. Regular Army personnel also performed better than draftees at all levels of training. In addition, it was found that the total score on the test increased with the amount of formal education received. High school graduates made higher scores than primary school graduates, and college graduates made higher scores than high school graduates.[10] These differences were statistically significant.

FINDINGS AND CONCLUSIONS

The results of this study support the following conclusions:

(1) On an over-all basis, it was found that the level of basic combat skill increases with the amount of training received. The training programs are successful in raising the typical infantryman's level of combat skill from the time he is inducted until the time he is assigned to active duty with a T/O&E unit.

(2) The failure of personnel at all the training levels to pass more than 70 per cent of the items on the combat skills performance subtests indicates that the training goals specified by the Army Training Programs and by the Infantry experts are not being realized.

(3) With intelligence differences ruled out, T/O&E personnel were found to be equal or superior to the Basic trainees in all subjects and skills except the following:

(a) Range Estimation

(b) Rocket Launcher

10/ These relationships are shown in Table A-6.

T/O&E personnel were also equal or superior to the Advanced Infantry trainees in all subjects and skills except:

(a) Signal Communications

(b) Mines and Booby Traps

(c) Range Estimation

(d) Rocket Launcher

Similarly, Advanced Infantry trainees were found to be superior to the Basic Combat trainees in all subjects and skills except the following:

(a) First Aid

(b) Individual Tactics

(c) Observation and Military Intelligence

(d) Squad Tactics

(e) M1 Rifle Disassembly and Assembly

(f) M1 Rifle Sight Adjustment

(g) Rocket Launcher

With the exception of Squad Tactics and Rocket Launcher, no additional training in any of these skills had been received by the Advanced Infantry group.

That some forgetting of these skills did take place is therefore indicated. However, the differences between the average scores although statistically significant, are quite small; there is some question concerning their practical significance. It is, in any event, apparent that all of the scores are lower than the level of proficiency desired.

(4) With differences of intelligence ruled out, the fact that significant differences were still found between posts for the various combat skills suggests that the training goals for particular skills are being achieved slightly better at some posts than at others.

No one post, however, was significantly superior to all others in all skills. It appears that particular training techniques may be employed at one post which result in a higher level of performance; inspection of the particular learning situation at each post might lead to a standardization of training techniques and an eventual improvement of the performance level throughout the Army.

(5) It is clear that the proficiency level is highest among the T/O&E personnel. Whether this level is satisfactory is another question. In the event of war, these personnel would probably be assigned to combat immediately; it is not likely that there would be sufficient time to administer any additional training. For this reason, all possible steps should be taken to remove any deficiencies as soon as they are found. The fact that the level of skill declined somewhat between one and three years after Basic Combat training suggests that specific refresher courses might be profitably included in the T/O&E training program.

(6) Results of the paper-and-pencil test of Basic Combat skills agreed with the results of the performance test. On both tests, Infantry personnel scored higher than the Infantry-associated personnel. In general, both knowledge and performance scores increased with longer time in service.

(7) At all levels of training Regular Army personnel were found to do better than draftees. Personnel with previous military experience also made higher scores on the test. In addition, it was found that test performance improved with the amount of formal education received. It can be concluded, therefore, that Army-oriented, experienced, and educated personnel will do better on tests of combat skill than personnel not so qualified.

(8) It was found that, as military instructors are well aware, trainees of higher intelligence make higher scores on performance tests of combat

skill. This difference was found at all posts at all levels of training: Basic Combat, Advanced Infantry, and T/O&E.

Because of a selection effect at the Basic Combat level, with higher-aptitude men being given specialized training at schools, the Area I level for Advanced Infantry and T/O&E personnel is lower than that of Basic Combat trainees. Nevertheless, their performance scores are higher. The correlation values obtained indicate that the level of proficiency among these groups would be still higher if more personnel with high Area I scores were assigned to Infantry.

STATISTICAL APPENDIX

Table A-1

AVERAGE AREA I SCORES AND CORRELATIONS WITH

TOTAL PROFICIENCY TEST SCORES

Level of Training	Post	Number of Men	Average Area I Score	Standard Deviation	Pearson r Between Area I Score and IPT:BC Total Score
Pre-cycle	Knox	133	96.93	16.41	.51
	Dix	140	104.12	16.67	.58
	Ord	143	107.28	18.76	.25
	Jackson	149	87.20	18.46	a/
Basic Combat	Knox	300	100.93	20.48	.75
	Dix	295	108.58	19.28	.66
	Ord	264	101.67	21.40	.64
	Jackson	365	97.04	18.86	.62
Advanced Infantry	Knox	312	96.29	20.25	.61
	Dix	309	104.46	19.30	.49
	Ord	229	100.21	19.38	.46
	Jackson	327	87.73	18.24	.49
T/O&E	Benning	722	92.06	19.71	.51
	Carson	588	90.37	18.38	.54

a/ Total scores for the IPT:BC and Aptitude Area I not being available for some members of this group, it was not possible to compute the correlation coefficients.

Table A-2

SIGNIFICANCE OF DIFFERENCES IN AREA I SCORES BETWEEN TRAINING LEVELS AND BETWEEN POSTS

Group	Comparison	t Test	Statistically Significant
All Levels of Training	Pre-Cycle--Basic Combat	3.242	Yes, .01 level
	Basic Combat--Advanced Infantry	5.925	Yes, .01 level
	Advanced Infantry--T/O&E	7.007	Yes, .01 level
Pre-cycle Posts	Knox-Dix	3.591	Yes, .01 level
	Knox-Ord	4.886	Yes, .01 level
	Knox-Jackson	4.685	Yes, .01 level
	Dix-Ord	1.498	Not significant
	Dix-Jackson	8.186	Yes, .01 level
	Ord-Jackson	9.215	Yes, .01 level
Basic Combat Posts	Knox-Dix	4.310	Yes, .01 level
	Knox-Ord	.193	Not significant
	Knox-Jackson	2.644	Yes, .01 level
	Dix-Ord	3.915	Yes, .01 level
	Dix-Jackson	7.444	Yes, .01 level
	Ord-Jackson	2.720	Yes, .01 level
Advanced Infantry Posts	Knox-Dix	5.524	Yes, .01 level
	Knox-Ord	2.556	Yes, .05 level
	Knox-Jackson	4.546	Yes, .01 level
	Dix-Ord	2.608	Yes, .01 level
	Dix-Jackson	10.337	Yes, .01 level
	Ord-Jackson	6.901	Yes, .01 level
T/O&E Posts	Benning-Carson	1.706	Not significant

Table A-3

PERFORMANCE ON THE IPT:BC FOR ALL TRAINING LEVELS AT ALL POSTS

Level of Training	Post	Average IPT:BC Score	Standard Deviation
Pre-cycle	Knox	32.73	11.91
	Dix	32.97	12.12
	Ord	45.32	13.72
	Jackson	41.59	14.24
Basic Combat	Knox	93.88	15.24
	Dix	91.03	14.03
	Ord	108.47	13.05
	Jackson	116.90	11.24
Advanced Infantry	Knox	100.57	12.13
	Dix	98.32	13.19
	Ord	108.81	11.04
	Jackson	124.89	9.68
T/O&E	Benning	123.49	14.29
	Carson	115.25	15.13

Table A-4

MEAN SUBTEST SCORES FOR EACH LEVEL OF TRAINING

Subtest	Pre-cycle (N=565)	Basic Combat (N=1224)	Advanced Infantry (N=1177)	T/O&E Personnel (N=1310)
1. First Aid	5.8	6.9	6.6	8.3
2. Observation and Military Intelligence	3.2	4.6	4.2	4.5
3. Map Reading	1.6	5.0	5.7	6.8
4. Compass	3.1	5.7	6.2	6.7
5. Signal Communications	2.0	6.1	7.1	6.7
6. Care of Clothing and Equipment	4.1	6.7	6.6	8.1
7. Field Fortifications	3.2	4.6	5.1	5.2
8. Mines and Booby Traps	3.2	6.1	7.8	7.5
9. Squad Formations	3.0	6.7	6.5	7.2
10. Range Estimation	3.1	4.9	5.4	4.9
11. Individual Tactics	3.5	7.2	6.6	7.3
12. Squad Tactics	.9	7.0	6.5	7.7
13. M1 Rifle: Disassembly and Assembly	.7	8.4	7.9	8.9
14. M1 Rifle: Sight Adjustment	.3	6.5	6.1	7.3
15. Light Machine Gun: Disassembly and Assembly	.2	3.5	5.9	5.9
16. Light Machine Gun: Sight Setting	.1	5.3	6.5	8.2
17. Rocket Launcher	.1	7.5	7.4	7.3
Average Subtest Score	2.2	6.1	6.4	7.0

Table A-5

ADJUSTED MEANS AND SIGNIFICANCE TESTS OF THE DIFFERENCES BETWEEN THE THREE TRAINING LEVELS, ON THE SEVENTEEN PROFICIENCY SUBTESTS

Subtest	Adjusted Means			t			
	Basic Combat	Advanced Infantry	T/O&E	Basic Combat vs Advanced Infantry	P	Advanced Infantry vs T/O&E	P
1. First Aid	6.93	6.79	8.36	2.06	.05	23.37	.01
2. Observation and Military Intelligence	4.55	4.31	4.46	3.30	.01	2.09	.05
3. Map Reading	4.78	5.77	6.72	9.57	.01	9.37	.01
4. Compass	5.74	6.35	6.55	5.79	.01	1.93	NS
5. Signal Communications	5.96	7.22	6.68	16.54	.01	7.23	.01
6. Care of Clothing and Equipment	6.75	6.61	8.20	1.61	NS	18.62	.01
7. Field Fortifications	4.72	5.17	5.03	4.03	.01	1.28	NS
8. Mines and Booby Traps	5.98	7.82	7.49	20.98	.01	3.83	.01
9. Squad Formations	6.46	6.40	7.10	.65	NS	7.74	.01
10. Range Estimations	5.04	5.46	4.92	4.82	.01	6.31	.01
11. Individual Tactics	7.11	6.48	7.38	9.06	.01	13.20	.01
12. Squad Tactics	6.87	6.44	7.66	4.24	.01	12.26	.01

Continued

Table A-5 (Continued)

ADJUSTED MEANS AND SIGNIFICANCE TESTS OF THE DIFFERENCES BETWEEN THE THREE TRAINING LEVELS, ON THE SEVENTEEN PROFICIENCY SUBTESTS

Subtest	Adjusted Means			t			
	Basic Combat	Advanced Infantry	T/O&E	Basic Combat vs Advanced Infantry	P	Advanced Infantry vs T/O&E	P
13. M1 Rifle: Disassembly and Assembly	8.67	7.91	8.79	10.44	.01	12.31	.01
14. M1 Rifle: Sight Adjustment	6.50	6.18	7.40	3.75	.01	14.73	.01
15. Light Machine Gun: Disassembly and Assembly	3.52	5.95	5.80	15.63	.01	.98	NS
16. Light Machine Gun: Sight Setting	5.13	6.39	7.95	14.89	.01	18.82	.01
17. Rocket Launcher	7.74	7.50	7.28	2.88	.01	2.69	.01
Total Score	104.79	109.38	118.51	6.87	.01	14.62	.01

Table A-6

RELATIONSHIP BETWEEN PROFICIENCY TEST SCORE AND THREE BACKGROUND VARIABLES, FOR BASIC COMBAT, ADVANCED INFANTRY, AND T/O&E PERSONNEL

Variable	Number of Men	Average IPT:BC Score	Standard Deviation	ω^2	$\underline{t}$	Statistically Significant
Enlistment Status						
RA	960	116.06	15.86	.26	5.51	Yes (.01 level)
US	2056	112.58	16.71	.14		
Previous Military Training						
Yes	373	114.27	15.62	.66	4.59	Yes (.01 level)
No	1042	109.96	15.36	.23		
Formal Education						
8th Grade or less	630	110.21	17.12	.47	5.04	Yes (.01 level)
High School	1853	114.14	16.19	.14		
College and Graduate	583	116.03	15.61	.42	2.53	Yes (.05 level)

ACKNOWLEDGMENTS

Although the authors are indebted to all the Army personnel who served as subjects, assistants, or testers in the collection of the data, they are particularly indebted to the personnel and staff of the G-3 and G-1 sections of the Training Divisions at Fort Knox, Ky; Fort Dix, N.J.; Fort Ord, Calif.; Fort Jackson, S.C.; Fort Benning, Ga.; and Fort Carson, Colo.