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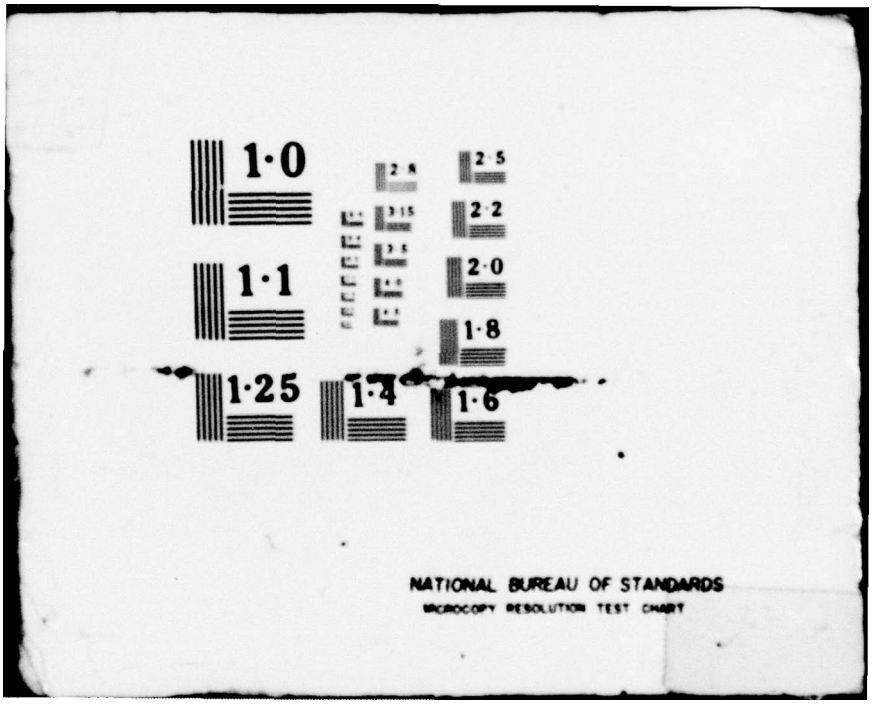
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STUDY OF SOLDIER ATTITUDES AND KNOWLEDGE ABOUT ATOMIC EFFECTS, EXERCISE DESERT ROCK

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A Study of Soldier Attitudes and Knowledge About Atomic Effects

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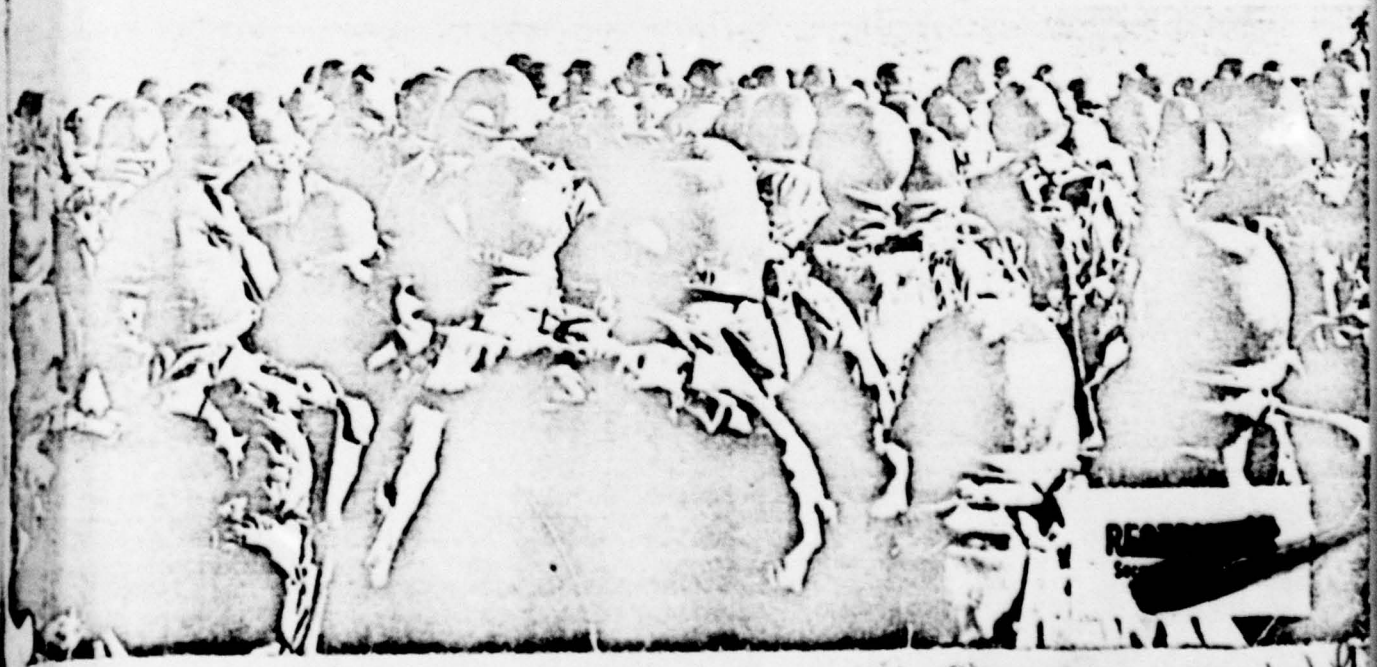

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U.S. Dept. of Defense, Armed Forces Information and Education Division

A Study of Soldier Attitudes and Knowledge About Atomic Effects

-- Exercise DESERT ROCK
(October-November, 1951)

This study was conducted at the request of
the Research and Development Div, AC/S, G-4, D/A

A Joint Report:
(February 1952)

Attitude Research Branch
Armed Forces I&E Division
Department of Defense

Attitude Assessment Branch
Troop I&E Division
Department of the Army

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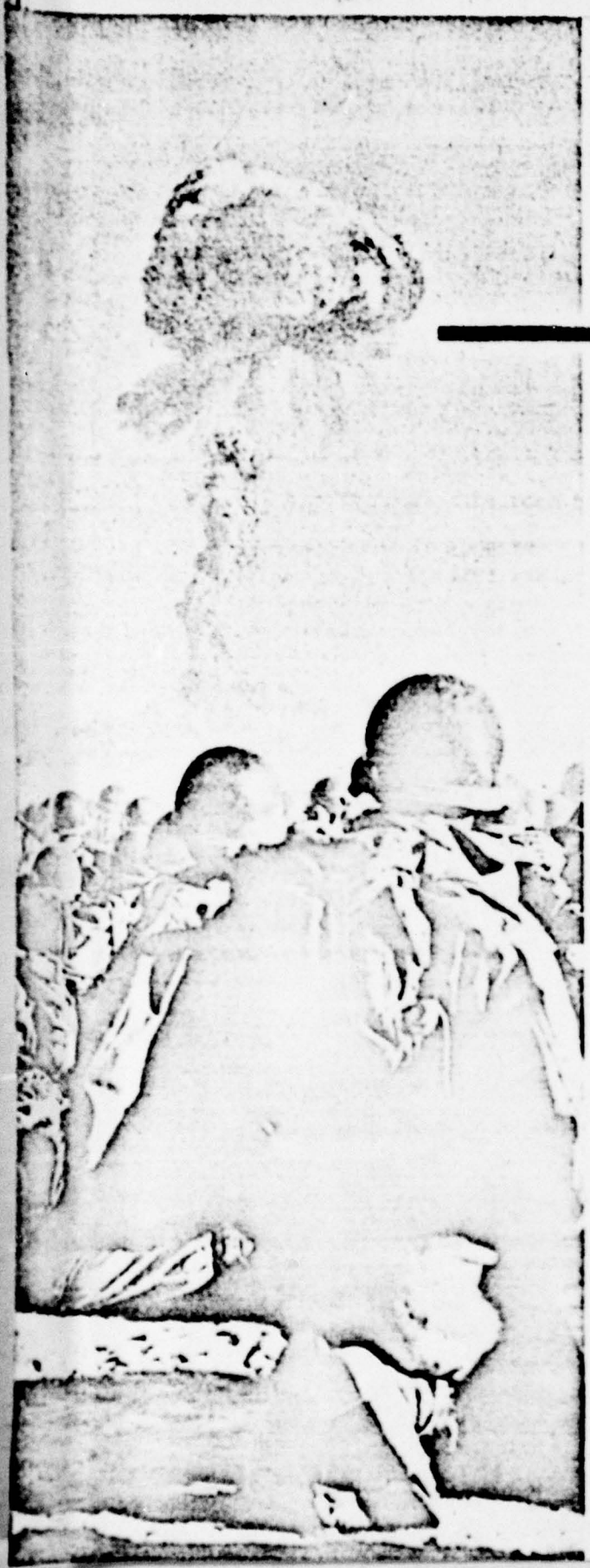
A Study of Soldier Attitudes and Knowledge about Atomic Effects -- Exercise DESERT ROCK



ASSUMED TACTICAL SITUATION

"During the period 1 - 30 August 1951 a strong Aggressor force, estimated as two armies, consisting of four corps each, landed on the northwest coast of the United States and proceeded to drive the U. S. Armies to the southeast...

"By 25 October 1951, the U. S. Sixth Army consisting of three Corps has been forced to withdraw to the general line running from the west coast north of Los Angeles through Southern Nevada...

"The decision has been made to employ an atomic weapon to effect maximum destruction of the enemy in front of III Corps, and to launch an offensive by the III Corps to drive the enemy to the north from his present position...

"The exercise on the ground will be implemented by the employment of one Battalion Combat Team../which/ will initially organize and occupy one battalion defensive position, and, on order, following the employment of the weapon on D Day H Hour, attack into the bombed area."

-- From Exercise DESERT ROCK manual.

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FOREWORD

EXERCISE DESERT ROCK represented an important step by the U. S. Army toward the tactical development of a major new weapon. For the first time an atom bomb was employed in a maneuver involving the actual participation of troops.

The exercise was planned to provide answers to a number of basic questions. Not the least of these pertained to the reactions of the troops themselves. The atomic bomb is a weapon which has had a profound effect on the thinking of people everywhere — and about which some awesome tales have been spread. Soldiers are not intellectually isolated. They are subject to the same sources of information and to essentially the same fears as the rest of the population.

How then did the participant troops feel before, during, and after the maneuver? How did the special training they received and the maneuver experience itself affect their knowledge about and attitudes toward atomic weapons? To what extent did those who were in on the maneuver later influence the views of non-participant troops?

This report presents some answers to these questions and suggests certain conclusions that may be drawn with respect to training troops for atomic warfare. These findings are based on a series of scientific studies conducted jointly by the Attitude Assessment Branch, Department of the Army, and the Attitude Research Branch, Department of Defense, during October and November, 1951, under the general coordination of the Human Resources Research Office, Department of the Army.

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I. THE FINDINGS IN BRIEF — A GENERAL SUMMARY

Here are summarized the principal findings of a series of attitude research studies conducted in conjunction with EXERCISE DESERT ROCK. In essence, the purpose of the research was to determine changes in knowledge and attitudes about atomic effects —

— Among Airborne riflemen participant troops, as a result of

the indoctrination
the actual maneuver experience
the discussion and thought during a three-week period following the maneuver

— Among non-participants, as a result of hearing about the maneuver from participant troops and through other channels of communication.

A detailed analysis of the results, obtained through questionnaires administered at four points of time before, during, and after the maneuver, is presented in subsequent sections of this report. The analysis is designed for the use of those responsible for planning future atomic maneuvers or the development of atomic warfare training.

A. Effects of the Indoctrination

Participant troops received a six-hour indoctrination on atomic effects at their home station plus a special 75-minute briefing at Camp Desert Rock. Time did not permit measuring the separate effects of the two indoctrinations. Instead, men were questioned just before the six-hour series and again just after the Desert Rock briefing. The results:

Confidence in self and the use of the A-bomb	Confidence increased materially in answers to three questions on self-protective measures and unit combat readiness. Answers to two other related questions reflected little change as a result of the indoctrination. A number of questions on confidence in self or the use of the A-bomb were asked for the first time after the indoctrination. Majorities of the men expressed confidence on all these questions,

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just before the final maneuver date:

83 per cent said they were "not worried at all" about the maneuver
80 per cent said they would volunteer for another such maneuver if asked
78 per cent reported they thought the experts really know enough to use A-bombs in military maneuvers without harming troops
73 per cent said either that they preferred being on this A-bomb maneuver to going on another type of maneuver, or that it made no difference
62 per cent indicated they thought they would do "all right" if sent into actual A-bomb warfare

Knowledge of atomic effects

Knowledge improved substantially on most of the points that were covered. One crude over-all indication of the gains in information is the average score on a series of thirty "quiz" questions on atomic effects. This was not a balanced list of all the relevant questions that might be asked. Before the special indoctrination, the average score of the participant Airborne riflemen was 12.05 points out of 30; after the indoctrination, the average score increased to 21.57 points.

Radiation effects

Improvement in knowledge about radiation was particularly marked, with substantial gains in information on 15 out of 17 questions. Further, before the indoctrination, only five questions were answered correctly by a majority. Afterwards, majorities were correct on 14 out of the 17 questions. However, certain points about radiation effects remained unclear to the men after the indoctrination. For example, only 48 per cent recognized that it would be safe in ordinary field clothing to move in to Ground Zero immediately after an A-bomb burst at 2,000 feet. Other such instances are covered in the Findings in Detail.

Flash & blast effects

While there were significant gains in correct information about flash and blast, and in the percentage not worried about these effects, substantial proportions of the participants were still concerned about flash and blast even after the indoctrination.

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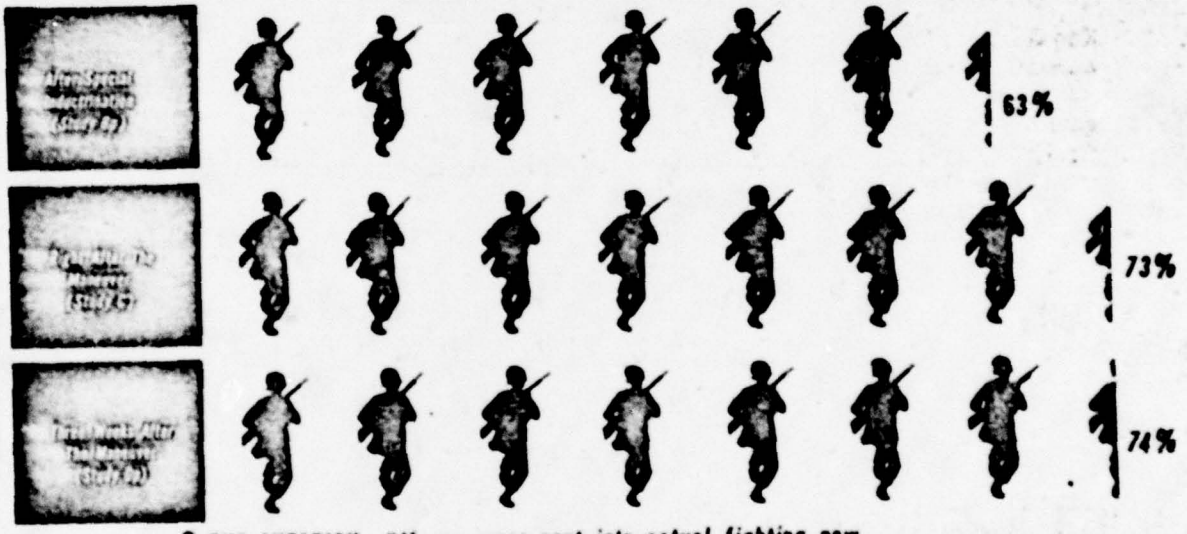
Illustration Of Trends In Airborne Riflemen's Reactions

(Each figure represents 10%)

PSYCHOLOGICAL READINESS FOR ATOMIC COMBAT •



• *THE QUESTION: "If you were sent into actual fighting now in which we used A-bombs against an enemy, how do you think you would do?"*

• *Percentages shown above represent those men who answered: "I think I would do all right."*

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Adequacy of atomic information

In general, the participants themselves were favorably impressed by the indoctrination. Just before the final maneuver:

84 per cent indicated that the talks had helped them "a great deal" to understand protection against atomic attacks

82 per cent reported themselves as less worried about atomic effects as a result of the indoctrination

60 per cent said they found nothing hard to understand in the talks and movies; only six per cent said "many things" were hard to understand

41 per cent said they felt movies and lectures would be sufficient indoctrination for atomic warfare for soldiers well-trained for non-atomic combat; 57 per cent still felt participation in an atomic maneuver would be needed.

On the whole, this particular indoctrination appears to have been unusually effective. Past studies of indoctrination on other subjects have not registered comparable increases in informational levels. Of course, the unique situation here could be expected to produce exceptional results:

Many of the soldiers at the outset were not merely uninformed about atomic effects, but actually had gross misconceptions and superstitions.

The effort expended on this indoctrination was greater than in more conventional maneuvers.

The participant troops would be expected to be highly motivated to learn the "right answers" in this situation.

On the other hand, it is quite evident that the prescribed Phase 3 atomic effects training was not well retained. Men who said they had heard three or more talks on atomic effects before the special indoctrination were generally not significantly better informed than the others.

All the evidence indicates that it is possible to prepare in short form an atomic effects indoctrination that will be effective for troops similar to the participants in this atomic maneuver. The specifics on what information is best retained, and which is poorly retained, are given in the Findings in Detail.

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Illustrations Of Trends In Airborne Riflemen's Reactions

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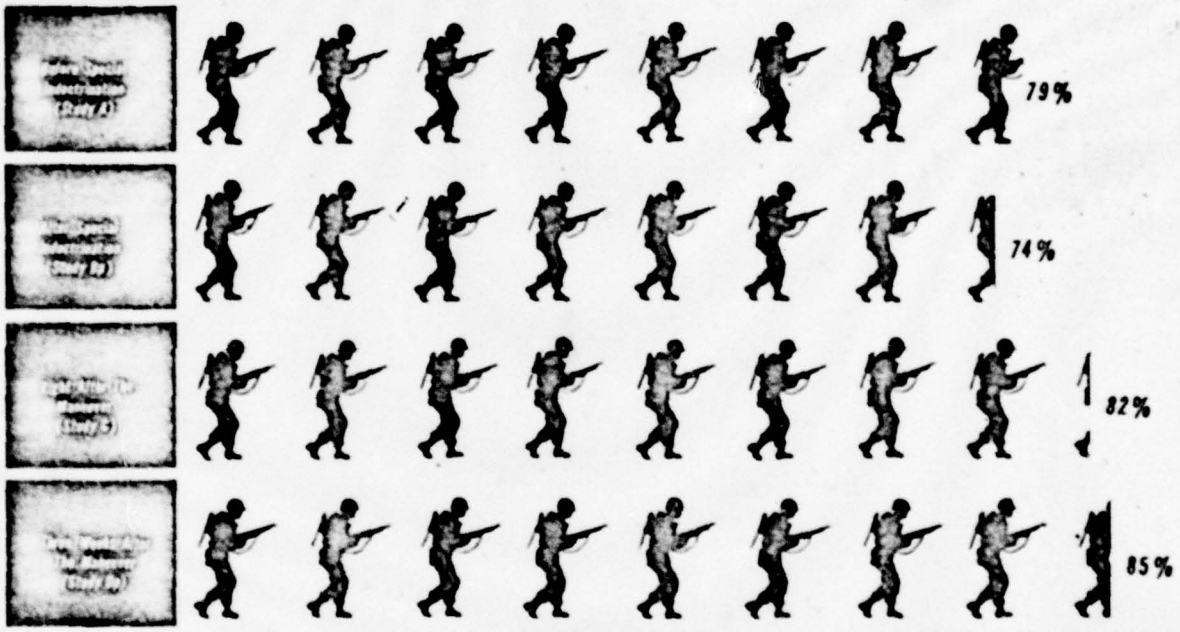
SAFETY OF ENTERING A-BOMBED ENEMY AREA WITHIN A DAY *



* THE QUESTION: "Suppose the A-bomb were used against enemy troops by exploding it 2000 feet from the ground and suppose all the enemy troops were killed. How dangerous do you think it would be for our troops to enter the area directly below the explosion within a day?"

* Percentages shown above represent those men who answered "Not dangerous at all"

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B. Effects of the Final Maneuver

The basic findings in this section are based on answers of one representative group of Airborne infantry riflemen interviewed at Desert Rock three days before the final maneuver, as contrasted with answers of a comparable sample of men from the same rifle companies on maneuver day, immediately after their return from the field.

Confidence in self and the use of the A-bomb — This did not change a great deal from the level measured just before the maneuver. Both before and after, majorities (usually large) expressed confidence on most points.

From one point of view, the indoctrination and the handling of the maneuver were effective in that on no important point did confidence decrease materially as a result of participation in the maneuver.

Illustrative of the high level of confidence are participant riflemen's reactions expressed just after the maneuver:

98 per cent preferred being on this A-bomb maneuver, or would just as soon be on it as on another type of maneuver
87 per cent said they were never in doubt that they would be able to carry out their duties in the maneuver
86 per cent reported they felt the experts really knew enough to use A-bombs in maneuver without harming troops
84 per cent said they were "hardly frightened at all" when the A-bomb went off
81 per cent said they were "not worried at all" about the maneuver
81 per cent said they would volunteer for another such maneuver if asked
80 per cent said there was nothing about the explosion that they did not fully expect
73 per cent checked that they thought they would do "all right" if sent into actual A-bomb warfare.

Anxieties and tensions — Questions on psychosomatic complaints (nervousness, shortness of breath, etc.), one means of measuring anxieties and tensions, revealed no significant changes as a result of the final maneuver.

Of a list of 13 possible adverse physical reactions to the bomb (violent pounding of the heart, feeling sick at the stomach, etc.), in only one instance did as many as ten per cent report experiencing such reactions the day of the maneuver. This one exception ("trouble with your eyes for a few minutes") was reported by 18 per cent. That this reaction was very transitory is indicated by the fact that only one per cent reported trouble with their eyes "for hours".

Knowledge of atomic effects — In general, knowledge showed no real change as a result of the maneuver experience. The average scores on the 30 "quiz" questions on atomic effects were almost identical before and after the maneuver.

Illustration Of Trends In Airborne Riflemen's Reactions

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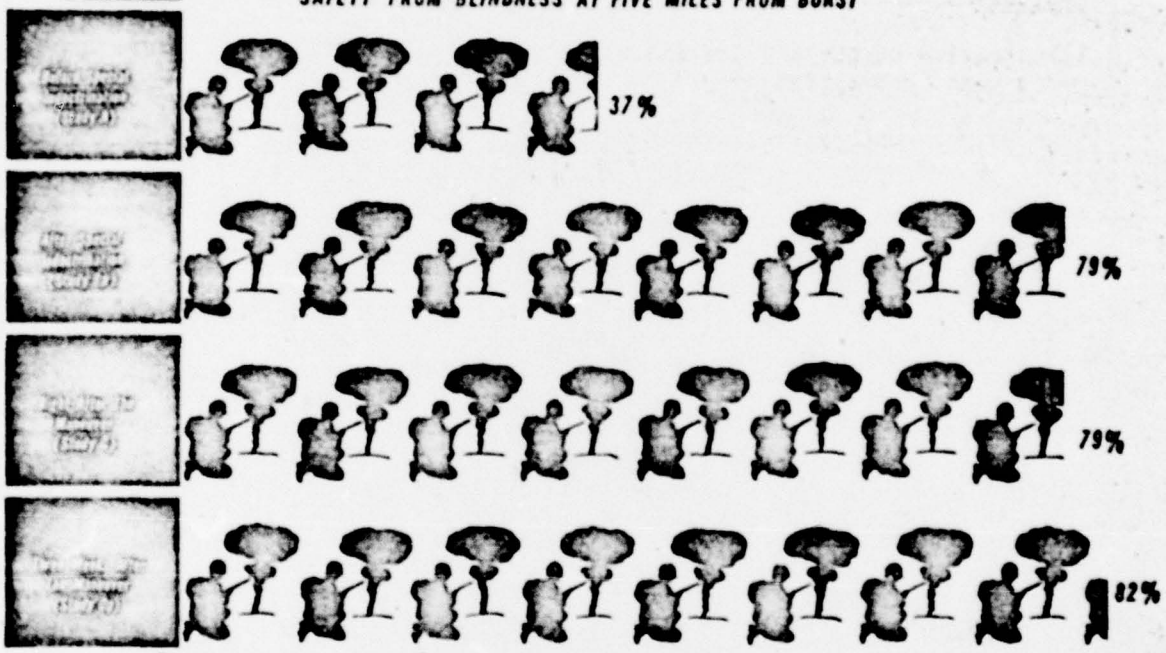
SAFETY FROM BLINDNESS AT FIVE MILES FROM BURST*



* THE QUESTION: "Watching an A-bomb explode five miles away can cause permanent blindness"

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• Percentages shown above represent those men who indicated that the statement is "false"

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Radiation effects

Just after the maneuver, on 15 of the 17 radiation questions a majority answered correctly, as compared to majorities correct on 14 of the questions just before the maneuver. There was a marked gain in correct answers to two questions. The percentage knowing it would be safe to move in to Ground Zero in regular field clothing right after an air burst at 2,000 feet increased from 48 per cent to 62 per cent, and there was an increase from 70 per cent to a final 85 per cent on the question of radiation sickness being not nearly always fatal.

Few men reported having been frightened by the possibility of radiation during the maneuver. Eighty per cent said they were "not at all" frightened about immediate radiation, and 74 per cent said they were "not at all" frightened about residual radiation.

Flash & blast effects

There were no real gains in information on these effects after the final maneuver. Twenty per cent said they were frightened "a lot" and 38 per cent "a little" by the flash. Sixteen per cent said they were frightened "a lot" and 44 per cent "a little" by the blast.

Thus, more "fright" was expressed about flash and blast than about radiation. Perhaps that fright was more "startle" effect following the long wait for the explosion, rather than fear which could affect military efficiency adversely. In any case additional research is needed before it could be stated conclusively that the "fright" was serious enough to warrant more indoctrination emphasis on flash and blast effects — although the evidence points that way.

Adequacy of atomic information

There was no appreciable change right after the maneuver in the confidence expressed by the men in their training. Right after the maneuver:

- 95 per cent could not remember getting any information from official sources that they considered misleading or inaccurate
- 84 per cent could not remember anything they felt unnecessary in the talks or movies
- 76 per cent reported the talks had helped them "a great deal" to understand protection against atomic attacks
- 39 per cent said they felt movies and lectures would be sufficient indoctrination for atomic warfare for soldiers well-trained for other forms of combat; six out of ten felt an atomic maneuver would be needed.

The men were provided with an opportunity to comment in their own words on the maneuver itself. Only 30 per cent of the men wrote in comments. The most frequent suggestions were to waste less time before the final maneuver, and to place the men closer to Ground Zero.

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C. Participants' Reactions Three Weeks After Maneuver

Participant riflemen were interviewed on D-day and again 18 days later, in order to learn whether attitudes or knowledge of facts changed noticeably after they had had a little time to reflect upon their experiences.

Confidence in self and the use of the A-bomb	This changed markedly on only one question, in which reports of being "not worried at all" by the maneuver dropped from 81 per cent down to 56 per cent.

Even so, three weeks after the maneuver two-thirds of these men answered that they would volunteer to stay in a fox-hole two miles from Ground Zero during a burst.

Although changes were slight generally, there was a fairly consistent trend toward decreased confidence three weeks afterward. This retrogression may well be something to be guarded against in future atomic maneuvers where actual dangers may be involved. Perhaps continued briefings coupled with critiques after maneuvers may be indicated for the future.

Knowledge of atomic effects	Knowledge in general changed very little in the three weeks between the two final studies. It is of interest that more

forgetting did not occur, especially on some of the more academic questions on radiation.

Flash & blast effects	Findings showed a significant change in estimates of the danger to the participant troops. On both flash and blast, only

25 per cent rated them as "not dangerous" to troops in the maneuver, whereas on the maneuver day about 40 per cent of these same men considered these effects "not dangerous".

Although the evidence is that extreme anxiety about flash and blast effects was not widespread, the men expressed sufficient concern to suggest that considerably more emphasis is warranted on these effects in future atomic training.

Adequacy of atomic information	Attitudes did not change significantly. Even after three weeks to reflect, very few had criticisms of the adequacy of the training.

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D. Dissemination of Information and Attitudes

1. Participants' role in the dissemination process

About three-fourths of the riflemen participants said that during the three weeks after the maneuver they had described the A-bomb explosion and maneuver to some military non-participants.

Only 22 per cent of the participant group said they remembered having talked to more than six people about their experiences, and only 48 per cent reported that the people they talked to were "very interested" in hearing about it.

All the evidence is that the informal process of communication was not very effective in reaching large proportions of non-participants in units closely associated with the participants' Battalion.

2. Reactions of non-participant enlisted men

Specially-selected samples of non-participant men were interviewed in order to study the effects of participants' discussion of the maneuver upon their return to their home stations. One group (called the "nearest") was drawn from the same Regiment, and the other group (termed "farthest") was drawn from another Regiment located in the same general area as the participant unit.

Sources of information — There were sharp differences between the groups in the percentage who had talked to anyone who had participated in the maneuver. While almost three-fourths of the "nearest" unit had talked to a participant, only 11 per cent of the "farthest" non-participants said they had talked to someone who had been there.

The percentage reporting themselves as "very interested" in learning what took place during the A-bomb maneuver was 62 per cent in the "nearest" and 56 per cent in the "farthest" group.

Confidence in self and the use of the A-bomb — The group in closest contact with returnees from the maneuver was not consistently more confident than the "farthest" group. However, neither do the results indicate that contact with participants deepened the anxieties of the "nearest" group. The main implication: in this case informal word-of-mouth spreading of information had no great effect upon the confidence of non-participants.

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Illustration Of Trends In Airborne Riflemen's Reactions

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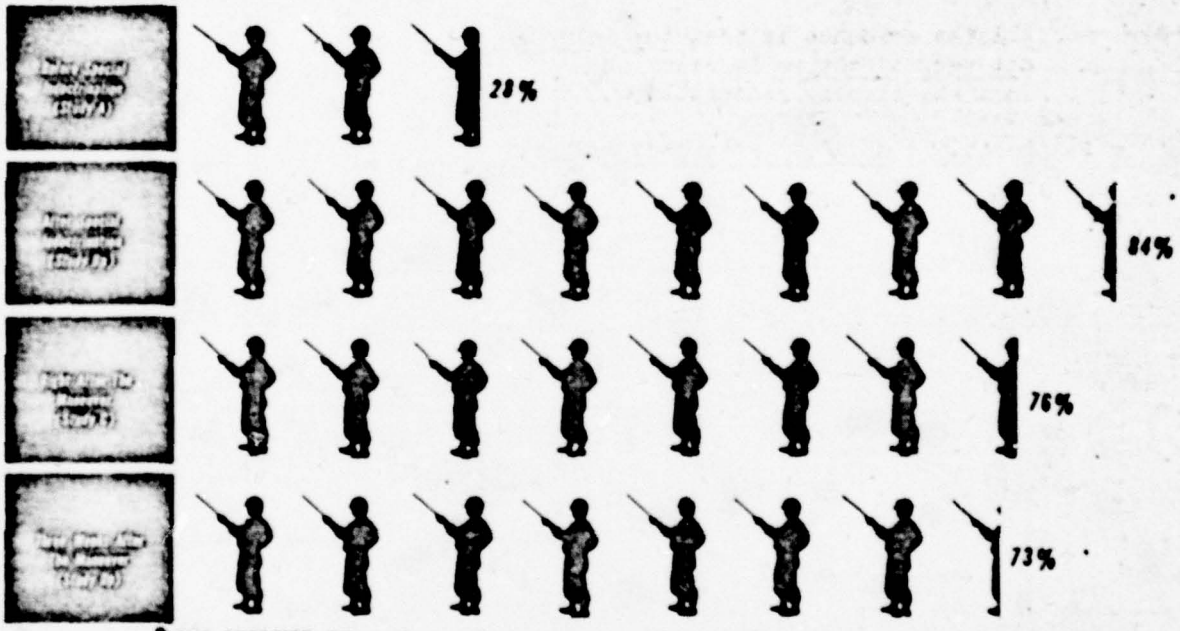
CONFIDENCE IN INDOCTRINATION ON ATOMIC EFFECTS *



* *THE QUESTION "Have these talks (on defense against atomic attacks) helped you to understand how you can best protect yourself in case of such an attack?"*

[redacted] * *Percentages shown above represent those men who answered: "Helped me a great deal"*

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Knowledge of atomic effects

The over-all information level of the group more closely associated with returned participants was not materially higher than for the non-participant group less closely connected to the participants. Nor did either non-participant group make material gains in information in general between the questioning of these same men before the final maneuver and the answering of the same questions three weeks after the maneuver ended.

Thus, word-of-mouth communication between participant and non-participant troops was no more effective in disseminating correct facts than it was in influencing attitudes.

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CONCLUSIONS

Most of the troops involved in this study were highly selected men — volunteers for the Airborne Infantry. It would be unwise, to say the least, to assume that the findings of this study can be applied to less highly motivated and less well trained troops. Within this limitation, however, the following conclusions seem reasonable:

First: Such initial fears and anxieties as troops may have can apparently be overcome by indoctrination.

Second: Training in atomic effects can be accomplished with essentially the same techniques as are employed in connection with more conventional weapons.

Third: The effects of atomic weapons and protective measures should be presented in simple terms, omitting abstract theory and technical terminology.

Fourth: The informal word-of-mouth process of passing information from participant troops to non-participants accomplishes little in the way of improving knowledge or reassurance about the A-bomb, unless conditions after the maneuver actively assist the dissemination process to a greater degree than was true in the situation following Exercise DESERT ROCK.

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II. BACKGROUND OF THE RESEARCH

A. Objectives

Technical details of the study design are presented in the Findings in Detail. In brief, the research involved the application of self-administered questionnaires to enlisted men assembled in small groups. Experienced research personnel monitored the questionnaire sessions, administered under conditions of anonymity. Scientifically-selected samples were drawn from two basic groups:

> Enlisted men from the participant Battalion Combat Team, which was formed from the 1st Battalion, 188th AIR (augmented by addition of men from the 2nd Battalion), 11th Airborne Division, Ft. Campbell, Kentucky; and Battery "C" of the 546th Field Artillery Battalion, Ft. Lewis, Washington.
>
> Men from comparable groups of non-participants, interviewed to draw comparisons between participants and non-participants as well as to study the process of dissemination of information on atomic effects. These men were drawn also from the 11th Airborne Division and the 546th Field Artillery Battalion with the addition of one group from the 195th Field Artillery Battalion, also stationed at Ft. Lewis, Washington.

The research had three basic objectives:

1. To measure the effectiveness of indoctrination in atomic effects. This was accomplished through:

   a. Study A, administered prior to the atomic effects indoctrination, in early October, to the 11th Airborne man who were to participate in the maneuver. Study A was also given to control groups of non-participants.

   b. Study B, administered after the participants had received special training and indoctrination at Ft. Campbell and at Desert Rock. This study had two parts:

      (1) Study B(p), conducted at Desert Rock three days before the final maneuver date (D - 3) among the participants.

      (2) Study B(n), given to control groups of non-participants at approximately the same time as Study B(p). The special indoctrination was withheld from these non-participants.

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2. To determine the effects of the maneuver experience, Study C was administered at Desert Rock on D-day (the day of the final maneuver), immediately after the men had returned from the advanced maneuver site.

3. To study participants' delayed reactions and the dissemination of information from participants to non-participants. This involved two questionnaires:

   a. Study D(p), given to participants approximately three weeks after D-day (D+18) at Fort Campbell and Fort Lewis.

   b. Study D(n), administered to non-participants at Fort Campbell and Fort Lewis at the same time as Study D(p).

The main purpose of the several studies was to measure changes in the level of information and attitudes. Consequently, most of the questions were kept as similar as possible throughout the various questionnaire forms so that exact comparisons would be available.

B. Application of this Report

This report provides information to be considered in the preparation of any revised atomic warfare information for troops, indications of the effectiveness of word-of-mouth dissemination of information about atomic effects, and findings on the types of fears and tensions that might develop in future atomic maneuvers. However, certain limitations should be pointed out:

1. The results are not to be viewed as necessarily typical of the findings that might be obtained from an average infantry organization, even one in advanced stages of training. The Airborne troops studied were all volunteers for Airborne, had been in training for an extensive period, and were unusual in a number of other respects (for example, a greater-than-average number of these men had completed high school, and a good many had had at least some college education).

2. Certain troop reactions might have been just as much a product of the particular field conditions obtaining at the time of the maneuver as they were of the maneuver itself. For example, the participant Airborne troops were in the area for about two weeks before the final maneuver. Their reactions might have been different had they been there only a few days.

3. The report can not separate out the effects of the formal indoctrination lectures given at Ft. Campbell from the effects of further indoctrination at Desert Rock by Armed Forces Special Weapons Project representatives as well as by others. The time schedule did not permit measurement of the separate effects of the two indoctrination programs; such a study could be done in any future maneuver of this type.

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C. Calendar of Principal Events

	1951	
D - 30	2-3 Oct.	Baseline Study A administered at Ft Campbell to one participant and one non-participant Airborne group.
D - 28	4-5 Oct.	Special six-hour Phase 3 presentation at Ft Campbell to Airborne troops scheduled for participation in Exercise DESERT ROCK.
D - 22	9-15 Oct.	11th Airborne participants departed for Camp Desert Rock.
D - 9	23 Oct.	Study B(n) administered to several groups of non-participants at Ft Campbell.
D - 3	29 Oct.	Study B(p) administered to several groups from participant Battalion Combat Team.
D	1 Nov.	Final maneuver date. Maneuver A-bomb exploded; maneuver completed; Study C administered to several groups from participant BCT immediately after their return to Camp Desert Rock from the forward area.
D + 18	19 Nov.	Study D(p) administered to one group of participants and Study D (n) administered to two groups of non-participants at Ft Campbell.
D + 25	26 Nov.	Study D(p) administered to one small group of participants at Ft Lewis, Washington (Battery "C", 546th FA Bn); Study D(n) administered to two groups of non-participant FA enlisted men at Fort Lewis, Washington.

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III. FINDINGS IN DETAIL

A. Effects of the Indoctrination

Background on the indoctrination received by the participants:

1. At Fort Campbell: beginning the day after the completion of the base-line Study A, an 11th Airborne officer who had had special Army courses in atomic warfare and defense presented formal indoctrination (based on D/A Pamphlet 20-110 and the more condensed 20-111) to all men scheduled to go on the maneuver, as follows:

   4 October, two hours in the morning: lectures on the background of the development of the A-bomb, results of the bombings of Hiroshima and Nagasaki, general description of A-bomb effects.

   5 October, two hours in the morning: lectures on radiation effects, physiological effects, medical aspects of atomic energy.

   5 October, two hours in the afternoon: radiological detection and defense, and two films — "Self-Preservation in an Atomic Attack", and the color film, "Operation Crossroads".

2. At Desert Rock: in addition to several "dry runs" and briefings by their own officers, several days before the final maneuver the men were given a 75-minute presentation on the following:

   a. Mechanics of the maneuver, and a listing of the phenomena the men should observe during and after the explosion.

   b. Indoctrination by Armed Forces Special Weapons Project specialists, pointed toward the maneuver situation:

      (1) What the men would see, a description of non-medical effects (such as blast and heat), and a summary of defensive measures (shielding, clothing, etc.).

      (2) Radiation and instruments for detection.

      (3) Medical aspects of the A-bomb.

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3. Further "indoctrination" was provided in the form of two A-bomb shots visible to the men at Desert Rock on 28 and 30 October, prior to the final maneuver. There was no organized indoctrination for the troops on these occasions.

Measurement of indoctrination effects: because of lack of time, it was not possible to make separate measures of the effectiveness of the six-hour indoctrination and the effects of the special final indoctrination. Thus, the net effect of the total indoctrination was analyzed, through utilizing the results on the following four groups:

Group 1, consisting of 112 riflemen from the participant 1st Battalion, drawn by systematic sampling from the total rosters of all three rifle companies. These men were interviewed on Study A just before the indoctrination at Fort Campbell. These interviews although anonymous did involve the use of special techniques of matching up before-and-after questionnaires for the same individuals, thus providing the opportunity for analyzing individual shifts in information level or opinion between the two points of time.

Group 2, consisting of 122 riflemen, chosen on the same basis as Group 1, and from the same three companies. These men were interviewed for the first time on Study B(p).

Group 5, a "Control" group of 150 riflemen chosen from the non-participant 3rd Battalion, 503rd AIR in the same way as Groups 1 and 2. As was true of all control groups, Group 5 received no indoctrination during the experimental period of October and November. This group filled out the Study A questionnaire before the participant groups received any indoctrination, and also filled out a Study B(n) questionnaire at Fort Campbell in late October, a few days before Study B(p) was administered to participant Groups 1 and 2.

Group 6, another control group of 114 riflemen from the 3rd Battalion, comparable to Group 5 in all major respects except that they did not fill out a questionnaire for Study A prior to their participating in Study B(n). This group is utilized in the following analysis to correct for "test effects" in Group 5.

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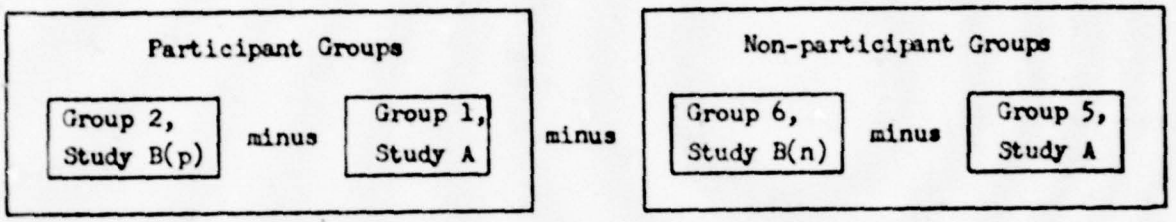
The analysis of changes in attitudes and information is based on results on all four groups in order to rule out changes caused by something other than the formal indoctrination (such as information from the newspapers or other informal sources, and "test effects" resulting from answering comparable questions twice). The basic analysis used in this combination was:



The findings are organized as follows, within each area of inquiry:

1. A condensation of the question that was asked, and (in parentheses) the questionnaire answer considered most "favorable" (in terms of having correct information on a question of fact, tolerance of maneuver conditions, willingness to volunteer for future maneuvers, and the like).

2. The percentage of the men in participant Group 1 who gave a "favorable" response before the indoctrination (Study A), as compared to the percentage of the men in participant Group 2 who gave a favorable response after the indoctrination [Study B(p)].

3. The percentage of the men in non-participant Group 5 who gave a favorable response in Study A, before the indoctrination period began. This is compared to the percentage of the men in non-participant Group 6 who gave a favorable response in Study B(n), which was administered after participants had been given special indoctrination at Fort Campbell. (The indoctrination was withheld from Groups 5 and 6, which served as control groups.)

4. The net difference between favorable percentages in participant and non-participant groups. Again, this represents the change in information (or attitude) on the part of the participant groups that is attributable to the indoctrination programs. Instances in which the change was in a negative direction are indicated by a minus sign.

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5. The symbol "S" indicates changes that are statistically significant.[1]

Here is a detailed illustration of complete findings,[2] using a question asked on all studies, the correct response being marked with an asterisk:

The Question: "Suppose an A-bomb like the one at Hiroshima were exploded at 2000 feet. In how much danger would you be if you were five miles away, lying flat on the ground?"

The Results:	Participants		Non-participants		
	After Indoctr.	Before Indoctr.	After	Before	Net Difference
Percentage saying:					
In no danger at all	(57% minus 16%)		minus (12% minus 10%)		= 39% S
All other responses (in great danger, in considerable danger, in a little danger, (Can't guess)	43/100%	84/100%	88/100%	90/100%	

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1. The formula used is:

$$\sigma_{p_1 \pm p_2 \pm \ldots \pm p_n} = \sqrt{\frac{p_1 q_1}{N_1} + \frac{p_2 q_2}{N_2} + \ldots + \frac{p_n q_n}{N_n}}$$

This formula was modified to include correlation terms whenever appropriate. "Statistical significance" as used in this report refers to differences of at least two standard errors. In other words, a difference is considered statistically significant if the odds against its occurrence by chance alone are greater than approximately 19 to 1.

2. A limited supply of complete copies of all questionnaires is available for reference upon request, through official channels, to the Attitude Assessment Branch, TI&E Division, OCI, Department of the Army.

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1. Knowledge and opinions about atomic effects:

NOTE: before the formal indoctrination was given, the 11th Airborne took extraordinary precautions to keep secret the fact that units of that Command were to participate in Exercise DESERT ROCK. These precautions were observed in order to make it possible to take a "base-line" measurement of knowledge of atomic effects, prior to any special indoctrination, that would not be unduly influenced by widespread knowledge among the future participants that they were to go on the A-bomb maneuver.

As a check upon whether the men knew of the maneuver, the question was inserted in Study A, "What is the most interesting rumor you have heard lately? Thirteen per cent of the future participants wrote that they had heard they were going to Nevada on an A-bomb maneuver, and an additional 27% had heard they were going to Nevada, but did not specify that it was to be an atomic experiment.

As to the practical effects of the rumors upon the soldiers' information about atomic phenomena: it was found that those who knew of the rumor were somewhat better informed than others about atomic effects, although not materially better. It is not possible to determine whether the rumor-hearers were also better informed about atomic effects <u>because</u> they had heard the rumor, or because they were the more intelligent and alert individuals who would be more likely than others to be attuned both to rumors and information on atomic effects to which they had been exposed in the past. Whatever the causal relationship might have been, indications are that <u>if</u> none of the men had heard the rumor, the "base-line" knowledge of atomic effects would have been <u>no higher</u> than the rather low level actually found.

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a. General reactions:

(1) Confidence in self:

Abbr. of q., and "correct" answer	Participants % Before Indoctr.	Participants % After Indoctr.	Non-participants Per cent Before	Non-participants Per cent After	Net Difference
If sent into actual fighting, how do you think you would do (All right)	41	46	43	43	5
If caught in open by A-bomb attack, what is first thing you should do (Take cover or fall flat)	83	98	87	87	15 S
After A-bomb burst, first thing you should do (Take care of self, help buddies, care for injured)	37	61	25	21	28 S
Would you volunteer for small outfit to train & then carry out secret dangerous mission (Yes)	56	57	49	53	- 3
Is your outfit ready to go into combat now if it had to (Yes; In a few weeks)	65	75	73	60	23 S

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Additional findings on confidence in self, asked only after the indoctrination, are available for Group 2 (participants) and Group 6 (non-participants).

After the indoctrination period, and just before the final maneuver, the following percentages gave "favorable" responses:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
If sent into actual A-bomb fighting, how do you think you would do (All right)	62	29
Choice between going on A-bomb maneuver and one without A-bombs (A-bomb man; makes no difference)	93	64
How worried do you honestly think (you are) (you would be) about taking part in A-bomb maneuver (Not worried at all)	83	14
Would you volunteer for (another) A-bomb maneuver if asked (Yes, probably)	80	70

Discussion:

Results on the two before-after issues (how they thought they would do in regular combat, and whether they would volunteer for a secret dangerous mission) show that there were no significant differences between participants and non-participants on these two points regarding personal confidence before the indoctrination. This is evidence of the likeness of participants and non-participants.

A significant net improvement in feeling about combat readiness of outfit was registered. However, this would not have been a statistically certain gain were it not that while the favorable answer increased ten percentage points among participants, the control non-participant group showed a decline of 13 percentage points. Thus, the change within the participant group is less pronounced than indicated by the net gain.

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Results on the after-indoctrination-only questions:

A large proportion of participants, while at Desert Rock just before the final maneuver date, were not worried about the maneuver, would be willing to go on another such maneuver, and felt they would do all right in actual atomic warfare. This is consistent with the general picture of confidence in their training and the weapon, reported in detail further on in this report.

Although participants and non-participants were seen to be about alike on the questions about general readiness for ordinary warfare or secret missions, the non-participants were markedly lower in confidence in their own performance in atomic warfare and lack of concern were they to be in an A-bomb maneuver. Even so, note that seven out of ten non-participants said they would volunteer to participate in an A-bomb maneuver if they were asked.

As to reasons for not wanting to volunteer for another A-bomb maneuver on the part of participants just before the final maneuver (only 16 per cent said they would not volunteer), the outstanding justification was dislike of Desert Rock living conditions, restrictions, and waste of time in preparing for the maneuver. None expressed fear of the bomb in offering objections to volunteering.

(2) Confidence in the weapon:

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
Supposing an A-bomb like Hiroshima exploded at 2000 ft. How much danger would you be in 5 mi. away, lying flat (No danger at all)	16	57	10	12	39 S
There is no protection within 5 mi. of center of A-bomb burst (False)	78	95	78	74	21 S

Additional finding, asked only after indoctrination period:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
Do you think the experts really know enough to use A-bombs in military maneuvers without harming our troops (Yes)	78	22

Discussion:

On the two before-and-after questions, significant gains in confidence occurred as a result of the indoctrination.

On the "experts-know-enough" issue, the vast majority of the participants had confidence just before the final maneuver.

b. Radiation

(1) Knowledge of radiation effects:

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
If an A-bomb exploded at 2000 ft, under what conditions safe to move into spot directly below, right after explosion (Safe if you wore regular field clothing)	5%	48%	6%	6%	43 S
Suppose A-bomb used against enemy troops by exploding it 2000 ft. from ground & all enemy troops killed. How dangerous our troops enter area directly below within a day (Not dangerous at all)	7	74	8	6	69 S

This table is continued on page 31

(Continued)

Abbr. of Q., and "correct" answer	Participants: % Before Indoctr.	Participants: % After Indoctr.	Non-participants: Per cent Before	Non-participants: Per cent After	Net Difference
Which type of atomic explosion has greatest residual (*long-lasting*) radiation (Surface; Underwater)	54	81	60	53	34 S
Suppose A-bomb like Hiroshima exploded at 2000 ft. Any harmful radioactive materials fall to earth (No harmful mat.)	4	22	7	8	17 S
Radiation 4 mi from A-bomb expl can make men permanently sterile (False)	37	87	36	32	54 S
R. sickness is nearly always fatal (False)	40	70	47	49	28 S
Mis-shapen children are being born in Japan because of 1945 A-bombings (False)	42	79	42	42	37 S
R. can be contagious (False)	39	78	33	39	33 S
Some of ships in Bikini tests had to be sunk because too r. to use again (False)	21	35	14	17	11
Instruments (Geiger, etc.) are dependable for detecting any dangerous r. (True)	69	89	69	65	24 S
Area that has been A-bombed can be de-contaminated (True)	76	83	76	72	11

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Abbr. of Q., and "correct" answer	Participants		Non-participants		
	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
R. caused a good many skin burns in Japan (False)	11	65	16	6	64 S
People can't feel, taste, or smell radiation (True)	57	97	61	47	54 S
R. 4 mi. from A-bomb can make men unable to have sexual intercourse (False)	58	92	49	41	42 S
Any r. can be detected on a Geiger counter is strong enough to be dangerous (False)	40	84	31	33	42 S
Drinking water in sealed steel cans 2 mi. from A-bomb expl is safe to drink right away (True)	19	83	21	20	65 S
Scrubbing with soap & water can remove most r. particles from skin (True)	60	96	67	61	42 S

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Discussion:

Statistically significant gains in information occurred in 15 of the 17 items. After the indoctrination, a majority of the participants had the correct answer in 14 out of the 17 questions; before the indoctrination, on only five items was the majority of the participants correct.

Comment on the two instances where there was not a statistically significant gain:

'Some of the ships in the Bikini tests had to be sunk because they were too radioactive to use again': this mistaken belief was so widespread that this item might well deserve special emphasis in the indoctrination of shipborne service personnel, and civilian populations in seacoast areas.

'An area that has been A-bombed can be de-contaminated': although the gain in the number giving this correct answer was not significant, the percentage correct after the indoctrination rose above the 80 per cent mark.

Discussion of certain of the items:

If an A-bomb exploded at 2000 ft, under what conditions safe to move into the spot directly below, right after the explosion: although a great gain was made in choosing the right answer (Safe if you wore regular field clothing), only half the participants chose the right answer after training. The widespread misgivings on a point so directly related to the maneuver (and to the probable conditions of actual atomic combat) would seem to call for considerable indoctrination emphasis on the degree of safety from radiation following an air burst.

...Would any harmful radioactive materials fall to earth: only 22 per cent of participants checked the right answer after the training. It is unlikely that anxiety about possible fallout of harmful radioactive materials was very prevalent, since overwhelming majorities just before the final maneuver reported themselves as being willing to volunteer for another such maneuver and as being not at all worried about the maneuver. It is possible that the indoctrination did not dwell at length on this point. It is also possible that the question was interpreted differently than intended: perhaps some of the many who did not choose the intended correct answer had in mind that traces of harmful materials would indeed fall to earth, but not in sufficient concentration to hurt anyone at any given point.

Note that very substantial gains were registered in the percentages knowing that radiation four miles from an A-bomb would not cause sterility or impotence.

(2) Opinion about radiation:

Three items were covered for the first time in the study after the indoctrination:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
How worried (are you) (think you would be) about each of the following effects of the A-bomb explosion?		
Radiation at time of the explosion:		
(Not at all)	59	21
Residual radiation after the explosion:		
(Not at all)	53	12
Will the field equipment your outfit left in advanced position become radioactive enough to be dangerous: (Will not happen)	69	(Not applicable)

Discussion:

Results are not indicative of any high extent of anxiety regarding radiation effects, on the part of participants a couple of days before the final maneuver.

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c. Flash effects:

Abbr. of Q., and "correct" answer	Participants % Before Indoctr.	Participants % After Indoctr.	Non-participants Per cent Before	Non-participants Per cent After	Net Difference
Flash burns on exposed skin from Hiroshima-type burst would be expected up to distance of (3 mi.)	31	60	25	19	35 S
Which kind of clothing gives better protection (Light-colored, loose-fitting)	46	54	53	53	8

Other findings obtained only after indoctrination:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
How worried (are you) (think you would be) about:		
The fire flash (fireball):		
(Not at all)	62	20
Will the field equipment your outfit left in advanced position be badly burned by heat: (Will not happen)	60	(Not applicable)

Discussion:

On the before-after questions, the one about flash burns on exposed skin showed substantial gain in learning. The question on kind of clothing did not register a significant gain; however, this in itself is not a serious reflection on the men's learning in a situation where the right answer ("light-colored, loose-fitting clothing") was rather academic since all men were wearing regular field clothing.

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On the after-only questions about worry concerning the fire flash, or whether their equipment would be badly burned, the answers do not indicate much grave concern. (Some of the equipment was located in positions where it would be damaged; but it was impossible to ascertain to which men this applied.)

d. Blast effects:

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
Blast effect of A-bomb air burst at 2000 ft would not kill anyone beyond: (three mi.)	14	47	19	16	36 S

Questions on blast effect asked only after indoctrination were:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
How worried (are you) (do you think you would be) about:		
The explosion (blast effect):		
(Not at all)	53	20
Will the field equipment your outfit left in advanced position be badly damaged by the blast: (Will not happen)	64	(Not applicable)

Discussion:

Again, little serious anxiety was manifested.

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e. Miscellaneous effects:

Abbr. of Q., and "correct" answer	Participants % Before Indoctr.	Participants % After Indoctr.	Non-participants Per cent Before	Non-participants Per cent After	Net Difference
All elements consist of atoms (True)	67	55	65	65	-12
Doubling size of A-bomb does not double the amount of damage (True)	44	28	41	45	-20 S
Watching an A-bomb explode 5 mi. away can cause permanent blindness (False)	37	79	33	27	48 S
Cause of greatest no. of casualties in Hiroshima, Nagasaki (Blast & falling objects)	23	93	9	6	73 S
Which of the three types atomic explosions would do the most damage right away (Air burst)	61	79	67	66	19 S

Discussion:

The two items which showed a loss in information by participants during the indoctrination period (all elements consist of atoms, doubling the size of the bomb doesn't double the damage) had been deliberately inserted to test whether men would learn information that was obviously immaterial in their field situation. At the same time, a very substantial gain was registered regarding the relevant question of blindness.

This again illustrates the familiar point that in military training, as in any training, motivation is a key factor in learning.

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f. Aggregate information score:

An "information score" can be derived by pooling the results on the 30 measures of information about atomic effects. Under such a scoring system, a score of zero indicates that the individual gave no correct answers on these 30 questions of fact, while a score of 30 would mean that the soldier answered all questions correctly.

The information score must not be considered an absolute measure of the individual's information level on all relevant issues concerning atomic effects, because it was not possible to ask a number of questions regarding each area of inquiry. For example, about 60 per cent of the items were on radiation, whereas there was only one question on blast effects. However, the range of items is fairly representative of the source of materials for the indoctrination, D/A Pamphlet No. 20-110, "Atomic Energy Indoctrination", in which there is a heavy emphasis on radiation effects. At any rate, despite its limitations the information score does provide one crude over-all measure of information change that summarizes the results on the 30 specific questions asked throughout the series of studies.

The average (mean) information scores for the groups discussed in this section:

	Before indoctrination period (Study A)	After indoctrination period (Study B)
Airborne participants (Group 1 before indoctrination, Group 2 after indoctrination)	12.05 points	21.57 points
Airborne non-participants (Group 5 before indoctrination period, Group 6 after indoctrination period)	11.80 points	11.15 points

Discussion:

Before the indoctrination, the average participant Airborne soldier was correct on slightly more than one-third of the information questions. After the indoctrination, he was correct on slightly more than two-thirds of these questions. The average gain is statistically significant.

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The non-participant Airborne control groups showed no gain during the indoctrination period; they had received no special indoctrination. Since the control groups were comparable to the participant groups, the lack of gain in control groups demonstrates that the participants' gain in information was attributable to the indoctrination rather than to information obtained through other channels.

Relationship between information scores and attitudes: a consistent positive relationship was found between higher information scores and attitudes of confidence in self and in the use of the weapon. Those who had scores at or above the median were appreciably more confident than less-informed men regarding such issues as how they thought they would do in atomic combat, preference for an A-bomb maneuver, and whether they felt the experts really knew enough to use A-bombs in military maneuvers without harming our troops.

This finding does not in itself mean that raising men's information level automatically will increase confidence, since it may be that those who are motivated to learn the correct answers are also motivated by basic factors to have a confident attitude in self and the use of the weapon. The findings do demonstrate that the more confident men are better informed, rather than expressing confidence merely because of a dare-devil spirit or a desire to conform to expectations.

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2. Changes in tensions:

NOTE: As part of the process of measuring the state of tensions before and after the A-bomb maneuver, the following nine questions were asked. The last seven of these questions make up a "psychosomatic complaints scale" found useful in measuring anxiety reactions of soldiers being screened for psychoneurotic tendencies [1], and the first two questions were included because they were relevant to measuring anxieties in this maneuver situation.

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
In general, what sort of physical condition would you say you are in (Very good; good)	79	76	80	82	- 5
Ever worry about whether you will be injured in combat (Think but don't worry; Never think about it)	85	83	83	89	- 8
Hands ever tremble enough to bother you (Never)	62	64	65	61	6
Ever bothered by nervousness (Sometimes; Never)	93	93	94	89	5
Ever bothered by your heart beating hard (A few times; Never)	95	97	94	94	2
Ever bothered by shortness of breath when not exercising or working hard (Sometimes; Never)	95	98	96	96	3

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1. See Chapter 13 of Measurement and Prediction, Stouffer and others, Vol. 4 of Studies in Social Psychology in World War II, Princeton University Press, 1950.

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Abbr. of Q., and "correct" answer	Participants % Before Indoctr.	Participants % After Indoctr.	Non-participants Per cent Before	Non-participants Per cent After	Net Difference
Ever troubled by your hands sweating so that they feel damp and clammy (Sometimes; Never)	88	94	84	89	1
How often bothered by an upset stomach (Not often; Never)	94	93	93	86	6
Ever been troubled by "cold sweats" (Never)	58	59	59	50	10

Discussion:

There was really no change in tension levels, as measured in these questions, among the participants before and after the indoctrination in atomic warfare. This is consistent with the generally calm attitude of these participants as expressed the day of the final maneuver.

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3. Changes in opinions about the armed forces:

a. Opinions about effectiveness of weapons, modes of warfare:

NOTE: the following questions provide a means of measuring whether through the indoctrination the troops were unintentionally "over-sold" on the power and effectiveness of the atomic bomb or of their own branch of service. Such overconfidence might prove to be detrimental to combat efficiency in actual atomic warfare. While the results do provide a general picture of attitudes on effectiveness of various weapons, it is recognized that some of the items are not very explicit and that they are not mutually exclusive.

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
How effective would each of the following be in winning another war (Very effective):					
Atomic bombs	87	92	84	81	8
Regular artillery	40	29	37	34	- 8
Regular (long-range) bombing	51	42	63	64	-10
Tactical (short-range) bombing	51	45	52	47	- 1
Bacterial (germ) warfare	50	56	38	43	1
Airborne infantry	78	77	71	67	3
Ground infantry	44	56	49	39	22 S
Armored vehicles (tanks)	46	37	33	38	-14
Naval surface warships	57	43	45	46	-15
Submarines	62	57	55	50	0
Feel development of A-bomb has changed importance of:					
Ground infantry (More important)	20	38	11	18	11
Airborne infantry (More important)	37	52	27	32	10

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Discussion:

It should be borne in mind that the designation of "favorable" responses here is arbitrary, and chosen merely for purposes of analysis.

There was no significant shift in the number thinking the A-bomb would be "very effective" in winning another war, and no evidence that the indoctrination per se "over-sold" the participant troops on the effectiveness of the A-bomb in relation to other weapons or modes of warfare.

The only significant change was that the ground infantry was more highly regarded after the indoctrination.

b. Attitudes toward military life:

NOTE: some maintain that in even the best of maneuvers the participant troops inevitably become somewhat disgruntled and dissatisfied, and that perhaps a certain amount of griping and tension is a good thing for maneuver efficiency.

Even so, if a maneuver situation results in sharp increases in general dissatisfaction toward the Army, being in service, and being in one's own branch of service, this might indicate remedial measures should be taken in future maneuvers. The following questions were asked for this reason, and because dissatisfactions might affect retention of points in the indoctrination.

	Participants		Non-participants		
Abbr. of Q., and "correct" answer	% Before Indoctr.	% After Indoctr.	Per cent Before	Per cent After	Net Difference
If you were offered an honorable discharge today and not to be drafted later, would you take it (No)	12	15	12	14	1
How could you be of greatest service to your country--by being a soldier, in school, working in civilian job (By being a soldier)	66	60	57	53	- 2

This table is continued on page 44

Abbr. of Q., and "correct" answer	Participants: % Before Indoctr.	Participants: % After Indoctr.	Non-participants: Per cent Before	Non-participants: Per cent After	Net Difference
Are you the type that makes: (Very good soldier; Good soldier)	81	77	83	78	1
How much does it bother you when ordered to do things for which you don't see a good reason (Not much; Not at all)	49	49	55	50	5
If you had your own free choice, which service would you be in (Army)	47	28	28	25	-16
Which branch of Army would you most like to be in (Airborne)	48	48	49	46	3

Discussion:

None of the individual changes in attitude on these points is statistically significant. The largest change was on choice of service, in which there was a tendency on the part of participant troops after the indoctrination (and while in the Desert Rock situation) to prefer some service other than the Army.

Findings: while morale on these points did not improve in the shift from the Fort Campbell to the Desert Rock locale, the negative shifts on these questions were not so great in themselves as to indicate a situation of lessened maneuver efficiency.

4. Sources and adequacy of atomic information:

Abbr. of Q., and "correct" answer	Participants % Before Indoctr.	Participants % After Indoctr.	Non-participants Per cent Before	Non-participants Per cent After	Net Difference
Have the talks helped you understand protection in case of an atomic attack (Great deal)	28	84	25	27	54 S
Do you need more information regarding atomic weapons & protection from attack (A little more; or None)	22	50	37	21	44 S

Discussion:

The participant troops demonstrated a fairly high level of confidence in the information they received, but without much evidence of cocksureness. Among the two participant groups, only three per cent in one group and seven per cent in another checked that they thought they needed "No more" information.

It must be made clear that the majority of the men had had at least some training talks in the Army before this indoctrination. Only 23 per cent of the participant group (No. 1), and 21 per cent of the non-participant group (No. 5) interviewed before this indoctrination reported that they had had no training talks at all prior to that time, and one-third of each group remembered having three or more such talks. This is consistent with the 11th Airborne's report that the great majority of men already had had Phase 3 indoctrination at some time. Of course, some of the training talks remembered by the men may have been discussions during Command Conference periods, drawn from Armed Forces Talks rather than the regular Phase 3 training on atomic effects and defense.

Clear indications are that the regular Phase 3 training prior to the indoctrination for this maneuver was not effectively retained by these troops. One indication is that the base-line study prior to the special indoctrination found such a low general level of information, even though a majority had had Phase 3. This is further borne out if one separates the airborne men who were interviewed into two groups (those who said they had heard three or more talks earlier, as against those who recalled having heard fewer than three) to compare the average scores of the two groups on the 30 information items.

> Those who remembered hearing three or more talks (and who thus would include a high concentration of men exposed to Phase 3) had a median score before the indoctrination of only one point higher than those who had heard fewer than three talks. This finding applied to non-participants and future participants alike. The difference of one point out of 30 is not enough to be of any real consequence in reflecting a higher level of information among those who had heard three or more talks prior to the special indoctrination.

The results per se do not mean that the content of Phase 3 was presented in an ineffectual way, although this is possible. Much of the lack of retention of Phase 3 information may be traced to lack of sufficient motivation, since prior to this maneuver there was less pressing need for the men to retain the information.

Conclusive evidence on the effect of motivation would be best measured by research in which certain groups would get atomic information after they knew they were likely to go on an atomic maneuver or into atomic warfare, while certain other groups would get the training with no indication that they might be exposed to atomic maneuvers or warfare.

On the write-in-question, "On what things regarding atomic weapons would you like to learn more?" the troops before the indoctrination stressed general answers, such as "Everything", with a secondary emphasis upon protective measures.

After the indoctrination, their primary expressed interest was still in "Everything", more information about the bomb itself, and atomic artillery. Interest in more information on protective measures dropped off sharply.

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Before the indoctrination, only one per cent said they felt they had been given any misleading or inaccurate information about atomic weapons by official sources. After the indoctrination, this had risen, but only to five per cent.

Other findings, on questions asked only after the indoctrination:

	Per cent Group 2 Participants	Per cent Group 6 Non-participants
If soldier were well-trained for ordinary combat, how much added training absolutely needed for A-warfare (Movies & lectures enough, A-bomb maneuver not needed)	41	25
Did training you have had on A-bombs make you more/less worried about effects (Less worry)	82	(Not applicable)
Any particular points in talks, movies that were hard to understand (Nothing)	60	(Not applicable)

Discussion on questions after indoctrination:

Are movies and lectures enough: it is of interest that as many as four out of ten of the participants, even before the final maneuver, felt an A-bomb maneuver would not be absolutely needed prior to atomic warfare.

Points that were hard to understand: 32 per cent of this group of participants said there were "a few things" and six per cent said "many things" were hard to understand. (Evidently these difficulties were no great cause for worry, since only two per cent said the training had made them even "a little more worried".) As to the

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points that created difficulty, those most frequently mentioned were radiation details (mentioned by eight per cent of the total) and technical terminology (seven per cent), points which appear to be interrelated. Two comments on technical terminology were: "I am of simple mind and do not understand the meaning of some of the words", and "The big words they used was a little hard--just the scientific names of the contents of same".

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B. Effects of the Final Maneuver

Conditions of the measurement: the basic comparisons in this section are drawn between findings based on one sample of 122 men apportioned equally among the three Airborne infantry rifle companies, interviewed on Study B(p) on D - 3, and a like sample of 91 men from the same rifle companies, interviewed on Study C on D-day immediately after returning from the field. The only possible effects on the men between the two measurements, in view of the isolation of Desert Rock and the short space of time, are seen to be as follows:

Further final briefing of the men in their maneuver tasks by their own officers.

Public address briefing and description of effects at the observation site before and during the explosion, and in the forward area following the explosion.

The men's own observations of the explosion and the effects.

Discussion among the men during D-day. This was limited by the fact that they were interviewed within an hour after their return to Desert Rock from the maneuver site.

The analysis used in measurement of the effects of the maneuver was:

Group 3, Study C (after) minus Group 2, Study B(p) (before)

These results are free from "test effects" from repeated interviewing, since these were the first times those particular men had filled out any questionnaire on atomic effects.

It was not possible to set up a control group of non-participants who would have had the full indoctrination but then be kept from participating in the final maneuver and to be interviewed elsewhere on the day of the maneuver. However, such a control group was viewed as not as necessary as in the analysis of indoctrination effects, since the time between post-indoctrination Study B(p) and post-maneuver Study C was only three days, during which the participants were kept in fairly complete isolation.

The general plan of organization of this section is identical to the arrangement of the preceding section on indoctrination effects.

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1. Knowledge and opinions about atomic effects:

a. General reactions:

(1) Confidence in self:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
If sent into actual fighting, how think you would do (All right)	43	57	14 S
If sent into actual A-bomb fighting, how think you would do (All right)	63	73	10
Would you volunteer for small outfit to train & then carry out secret dangerous mission (Yes)	57	43	-14 S
Is your outfit ready to go into combat now if it had to (Yes; In a few weeks)	75	71	- 4
Choice between going on A-bomb maneuver and one without A-bombs (A-bomb maneuver; makes no difference)	95	98	3
How worried do you honestly think you are about this A-bomb maneuver (Not worried at all)	84	81	- 3
Will you volunteer for another A-bomb maneuver if asked (Yes, probably)	84	81	- 3
If caught in open by A-bomb attack, what is first thing you shoud do (Take cover or fall flat)	98	100	2
After A-bomb burst, first thing should do (Take care of self, help buddies, care for injured)	61	74	13 S

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Additional findings, on questions not asked until after the maneuver:

	Per cent Group 3
Just how frightened were you when the last test A-bomb went off (Hardly frightened at all)	84
Was there any time during maneuver you wondered whether you could do your job (No, always sure)	87
Anything about the explosion you did not fully expect (No)	80

Discussion:

In general, little change was evident in self-confidence as measured by these particular questions. In interpreting these results, however, it should be kept in mind that on these questions, with one exception, majorities already had a self-confident point of view before the maneuver.

One change that was statistically significant (although perhaps not of much importance) was the decline in the number willing to volunteer for a secret dangerous mission.

The reasons given by the minority of the men (19 per cent) who said they would not volunteer for another atomic maneuver centered primarily around dislike of Desert Rock living conditions and restrictions and complaints about the maneuver ("too many dry runs"). Practically none of those who would not volunteer mentioned fear of the bomb, family reasons, or physical hardship.

(2) Confidence in the weapon:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
Supposing an A-bomb like Hiroshima exploded at 2000 ft. How much danger would you be in 5 mi away, lying flat (No danger at all)	57	64	7
There is no protection within 5 mi of center of A-bomb burst (False)	95	92	- 3
Do you think the experts really know enough to use A-bombs in military maneuvers without harming our troops (Yes)	80	86	6

An Additional question, asked only after the maneuver (Study C):

	Per cent Group 3
How safe do you think humans would have been if located at same spot as animals (Humans safer, just as safe)	83

Discussion:

There were no significant gains.

Even after the maneuver, which the men observed from seven miles away, only two-thirds thought there would be "no danger at all" five miles from the burst. (Six per cent checked that they thought the danger would be "great" or "considerable"; 28 per cent "a little danger".) The findings do not mean that the men who thought there were dangers at five miles believed that they themselves had been put in jeopardy at seven miles; heavy majorities showed confidence in themselves and the use of the weapon on most other questions.

b. Radiation:

(1) Knowledge of radiation effects:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
If an A-bomb exploded at 2000 ft, under what conditions safe to move into spot directly below, right after explosion (Safe with regular field clothing)	48	62	14 S
Suppose A-bomb used against enemy troops by exploding it 2000 ft from ground & all enemy troops killed. How dangerous our troops enter area directly below within a day (Not dangerous at all)	74	82	8
Which type of atomic explosion has greatest residual (long-lasting) radiation (Surface; Underwater)	81	77	- 4
Suppose A-bomb like Hiroshima exploded at 2000 ft. Any harmful radioactive materials fall to earth (No harmful materials)	22	19	- 3

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(Continued)

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
Radiation 4 mi from A-bomb explosion can make men permanently sterile (False)	87	93	6
R. sickness is nearly always fatal (False)	70	85	15 S
Mis-shapen children are being born in Japan because of 1945 A-bombings (False)	79	73	- 6
Radiation can be contagious (False)	78	75	- 3
Some of ships in Bikini tests had to be sunk because too r. to use again (False)	35	42	7
Instruments (Geiger, etc) are dependable for detecting any dangerous r. (True)	89	91	2
Area that has been A-bombed can be decontaminated (True)	83	90	7
Radiation caused a good many skin burns in Japan (False)	65	65	0
People can't feel, taste, or smell radiation (True)	97	92	- 5
Radiation 4 mi from A-bomb can make men unable to have sexual intercourse (False)	92	95	3
Any r. can be detected on a Geiger counter is strong enough to be dangerous (False)	84	86	2
Drinking water in sealed steel cans 2 mi. from A-bomb explosion is safe to drink right away (True)	83	89	6
Scrubbing with soap & water can remove most r. particles from skin (True)	96	96	0

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Discussion:

Significant gains occurred on two items, those on safety of moving into bombed area right after explosion, and whether radiation sickness is nearly always fatal. There was little possibility of many sharp gains in information on radiation, because before the final maneuver majorities (most of them large) knew the correct answers in 14 out of 17 instances.

That not more than 62 per cent after the maneuver felt it would be safe to enter bombed area right after an explosion if one were wearing only regular field clothing is not necessarily indicative of much misgiving about radiation effects within the particular conditions of the maneuver. For one thing, only 19 per cent checked that they did not think it would be safe "no matter what you wore". However, considerable emphasis in future indoctrination on the degree of safety from radiation would seem to be in order.

Points about the two items on which less than a majority had the right answer after the maneuver:

Would any harmful radioactive materials fall to earth. As mentioned in the previous section, on indoctrination, it is possible "some of the many who did not choose the intended correct answer had in mind that traces of harmful materials would fall to earth, but not in sufficient concentration to hurt anyone at any given point". In line with this, only 19 per cent checked that they felt "very harmful materials" would fall to the earth. Consequently, it does not appear that many men were seriously concerned about fallout of radioactive materials with an air burst of the Hiroshima type.

Some of the ships in the Bikini tests had to be sunk. Perhaps the men did not learn the right answers on this because it was not related to the immediate maneuver situation, or perhaps this item did not get much stress in the special indoctrination.

(2) Opinion about radiation:

As mentioned in the last section, just before the maneuver, 59 per cent reported themselves as "not at all" worried about immediate radiation, and 53 per cent "not at all" worried about residual radiation.

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Results on five questions not asked until after the maneuver:

	Per cent Group 3
How dangerous to the troops (likely to kill or seriously hurt a man) were:	
Radiation at time of explosion (Not dangerous)	41
Residual radiation (Not dangerous)	61
How frightening did you find:	
Radiation at time of explosion (Not at all)	80
Residual radiation (Not at all)	74
What did you think about handling the field equipment your outfit left in advanced position (No danger at all)	62

Discussion:

The answers on danger to the troops are inconsistent with the general attitude of lack of grave concern about radiation: 26 per cent responded that they thought immediate radiation was "Very dangerous", and 11 per cent checked "Very dangerous" for residual radiation.

Note that few reported having been frightened about radiation. As to the danger of handling the equipment left in an advanced position, only two per cent said they had thought it would be "very dangerous".

c. Flash effects:

	Participants in maneuver		
Abbr. of Q., and "correct" answer	Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
Flash burns on exposed skin from Hiroshima-type burst would be expected up to distance of (3 mi.)	60	49	-11
Which kind of clothing gives better protection (light-colored, loose-fitting)	54	55	1

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Questions asked only after the maneuver:

	Per cent Group 3
How dangerous to the troops (likely to kill or seriously hurt a man) was the fire flash (fireball) (Not dangerous)	41
How frightening did you find the fire flash (fireball) (Not at all)	40
Did you feel any heat from the blast at the time of the explosion (A little; No; Don't remember)	97

Discussion:

Danger to the troops: again, this result is inconsistent, especially since 97 per cent reported not feeling more than "a little" heat.

Fright: the fire flash was one phenomenon that appeared to frighten a good many men. 20 per cent said they were frightened "A lot", and an additional 38 per cent "A little". Note also that there was a decrease of 11 points (not statistically significant) in the number thinking flash burns on exposed skin would be limited to a distance of three miles.

The flash was the first phenomenon the men observed, after a dramatic period of waiting after "Bomb away"; and it appears certain that much of the fright was startle effect or awe rather than genuine fear of a lasting variety. Even so, further emphasis on describing fire flash effects in the indoctrination would seem to be in order.

d. Blast effects:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
Blast effect of A-bomb air burst at 2000 ft would not kill anyone beyond (3 mi.)	47	45	- 2

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Items asked only after the maneuver:

	Per cent Group 3
How dangerous to the troops (likely to kill or seriously hurt a man) was the explosion (blast effect) (Not dangerous)	42
How frightening did you find the explosion (blast effect) (Not at all)	38

Discussion:

Results on blast effects were much the same as on flash. More fright was also expressed about the blast than about radiation (16 per cent said they were frightened "A lot", and 44 per cent "A little" by blast.) Again much of the fright may have been startle effect or awe rather than lasting fear. (This is borne out by the fact that among the minority saying that there were things about the A-bomb they had not fully expected, one of the phenomena most frequently mentioned was the blast or shock waves.) It is possible that increased indoctrination emphasis on flash and blast effects might not decrease the startle effect, but some added emphasis on flash and blast seems warranted.

e. Miscellaneous effects:

	Participants in maneuver		
Abbr. of Q., and "correct" answer	Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
All elements consist of atoms (True)	55	59	4
Doubling size of A-bomb does not double the amount of damage (True)	28	29	1
Watching an A-bomb explode 5 mi away can cause permanent blindness (False)	79	79	0
Cause of greatest no. of casualties in Hiroshima, Nagasaki (Blast & falling objects)	93	74	-19 S
Which of the three types atomic explosions would do the most damage right away (air burst)	79	76	- 3

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Discussion:

As noted in the previous section, the first two items were deliberately inserted as immaterial items for test purposes, and changes were not expected in the findings on them.

A marked decline occurred on the question of the cause of the greatest number of casualties. While three-fourths still were correct in saying it was blast and falling objects, there was a tendency toward choosing "burns from the flash or fires" (5 per cent in Group 2 before D-day, and 22 per cent in Group 3 on D-day).

f. Aggregate information score:

A rough measure of change in information as a result of the maneuver experience is indicated by the following comparison of average (mean) scores just before, and just after, the maneuver:

	Airborne Participants
Just before final maneuver (Group 2, Study B(p))	21.57 points
Just after final maneuver (Group 3, Study C)	21.92 points

Discussion:

The net improvement, considering the 30 information questions as a whole, was not statistically significant. On these particular questions, taken as a whole, the gains on some items of fact were almost offset by losses on others. However, as shown earlier, there was marked improvement in information on some of the items as a result of the final maneuver experience.

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2. Changes in tensions:

NOTE: as discussed in the last section, the following nine questions were asked as part of the process of measuring the state of tensions before and after the A-bomb maneuver.

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
In general, what sort of physical condition would you say you are in (Very good; good)	76	84	8
Ever worry about whether you will be injured in combat (Think but don't worry; never think about it)	83	83	0
Hands ever tremble enough to bother you (Never)	64	76	12
Ever bothered by nervousness (Sometimes; Never)	93	93	0
Ever been bothered by your heart beating hard (A few times; Never)	97	96	- 1
Ever bothered by shortness of breath when not exercising or working hard (Sometimes; Never)	98	98	0
Ever troubled by your hands sweating so that they feel damp and clammy (Sometimes; Never)	94	98	4
How often bothered by an upset stomach (Not often; Never)	93	89	- 4
Ever been troubled by "cold sweats" (Never)	59	57	- 2

A question asked only after the maneuver was:

Soldiers who have been present during explosions report different physical reactions. Did you yourself have any of the following reactions on the same day that the last test bomb went off?

Percentages reporting they had had that reaction at some time during that day:

	Per cent Group 3
Trouble with your eyes for a few minutes	18
Sinking feeling in the stomach	8
Muscles stiff and sore	7
Feeling sick at the stomach	5
Violent pounding of the heart	4
Feeling of weakness or feeling faint	3
Cold sweat	2
Vomiting	2
Ears ringing or hurting for hours	1
Trouble with your eyes for hours	1
Urinating in pants	1
Shaking or trembling all over	0
Losing control of bowels	0

Discussion:

On the before-after questions, there were no statistically significant changes.

On the after-only questions, only a handful of men reported having experienced any of the physical reactions, with the exception of having "trouble with eyes for a few minutes". This reaction was very transitory; only one per cent reported eye trouble "for hours" after the explosion.

These questions measured recollection of reactions, and as such might not yield the same results as might have been obtained by physiological or other measurements during and immediately after the blast. Even so, the results on these questions are in line with the almost complete absence of answers indicating grave anxiety or fear on the part of the participant troops on the day of the maneuver.

3. Changes in opinions about the armed forces:

a. Opinions about effectiveness of weapons, modes of warfare:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
How effective would each of the following be in winning another war (Very effective):			
Atomic bombs	92	85	- 7
Regular artillery	29	28	- 1
Regular (long-range) bombing	42	55	13
Tactical (short-range) bombing	45	40	- 5
Bacterial (germ) warfare	56	55	- 1
Airborne infantry	77	78	1
Ground infantry	56	51	- 5
Armored vehicles (tank)	37	34	- 3
Naval surface warships	43	44	1
Submarines	57	45	-12
Feel development of A-bomb has changed importance of:			
Ground infantry (More important)	38	51	13
Airborne infantry (More important	52	63	11
Air Force (More important)	69	76	7

Discussion:

As pointed out in the last section, the designation of "favorable" responses on these items is arbitrary, and merely for purpose of statistical analysis.

None of the changes is statistically significant.

While the rating of the effectiveness of the A-bomb remained high after the maneuver, there is here no sign of the maneuver's over-selling the troops on the effectiveness of the weapon.

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b. Attitudes toward military life:

NOTE: as discussed in the Indoctrination section, these questions are being analyzed because they may have some value in future maneuvers.

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
If you were offered an honorable discharge today and not to be drafted later, would you take it (No)	15	16	1
How could you be of greatest service to your country--by being a soldier, in school, working in a civilian job (By being a soldier)	60	58	- 2
Are you the type that makes: (Very good soldier; Good soldier)	77	77	0
How much does it bother you when ordered to do things for which you don't see a good reason (Not much; Not at all)	49	55	6
If you had your own free choice, which service would you be in (Army)	28	35	7
Which branch of Army would you most like to be in (Airborne)	48	59	11

Discussion:

There was no statistically significant change as a result of the maneuver experience. The experience in itself was not found to affect adversely attitudes toward military life as measured by these questions.

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4. Sources and adequacy of atomic information:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 2 (Before)	Per cent Gp 3 (After)	Difference
Have the talks helped you understand protection in case of an atomic attack (Great deal)	84	76	- 8
Do you need more information regarding atomic weapons & protection from attack (A little more; or None)	50	59	9
If soldiers were well-trained for ordinary combat, how much added training absolutely needed for A-warfare (Movies & lectures enough)	42	39	- 3

Asked only after the maneuver:

	Per cent Group 3
Anything unnecessary in the talks or movies (No, all necessary)	84

Discussion:

None of the before-after differences was significant. As was found in studying the effect of indoctrination, the experience did not make many of these men think they knew all the necessary answers, since after the maneuver only 10 per cent said they needed "no more" information on atomic effects.

It is of interest that the percentage saying that movies and lectures would be enough did not decrease significantly as a result of the maneuver experience, since it might have been expected that the troops would tend to feel that any new troops should share most of their own experiences.

The men's interest in atomic information is further borne out by the fact that only 14 per cent indicated they thought there were unnecessary elements in the talks and movies. No specific elements were singled out as "unnecessary" by this small minority.

On the write-in question after the maneuver, "Exactly what further information would you like to have about atomic weapons?", only half the men wrote down an answer. The leading interests expressed were more about atomic weapons in general (12 per cent), more on the workings of the bomb and its size (11 per cent), and information on atomic artillery (ten per cent). Only four per cent here asked for more information on protective measures.

On the post-maneuver question on whether the men felt they had been given any misleading or inaccurate information on atomic effects by official sources, only nine per cent felt they had been given such information. Before the final maneuver date, an even smaller proportion (five per cent) mentioned that they felt they had been given such information.

5. Ideas about the maneuver:

NOTE: while these Airborne infantrymen would not be expected to know about the over-all objectives of the maneuver in detail because their part was limited, their ideas may be of some use in planning the details of any future atomic maneuvers. The following questions were asked only after the A-bomb maneuver:

	Per cent Group 3
In the part of the maneuver that you saw following the explosion, did anything get fouled up? (No, nothing got fouled up)	92
When the last A-bomb exploded, how far would you say you were from ground zero (About 7 miles)	93
After the explosion, how close would you guess you went to ground zero (Within half a mile)	87
How close would you say the nearest edge of the ball of fire came to you when the last test A-bomb exploded (Within 6 miles)	41

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Discussion:

The seven per cent that said "some things" got fouled up gave answers centering primarily around the difficulties of keeping the marching lines of men evenly spaced. Here there was no mention of any problems having to do with the maneuver as a whole.

Most of the men had a pretty fair idea of the various distances:

Only five per cent checked that they thought they had been closer than seven miles at the time of the shot.

Only 12 per cent guessed the ball of fire came within four miles of them or closer.

Over-all suggestions: all participants were asked a final free-answer question calling for their ideas on improving any future maneuvers of this sort. The main suggestions were as follows:

	Group 3
Too much time wasted	9%
Place men closer to Ground Zero	7
Improve the training	7
Improve living conditions	5
Have fewer dry runs	4
Have simulated attack after the burst	4
Make it more realistic (general)	2
Fewer regulations, restrictions	2
No suggestions	70
(Some offered more than one suggestion)	110%

The general distribution of suggestions on the same question by the Group 3 men in Study D(p), three weeks after the maneuver was much the same, except that "Too much time wasted" fell from nine per cent to four per cent, and "Have fewer dry runs" fell from four per cent to one per cent.

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C. Participants' Reactions Three Weeks After Maneuver

Conditions of measurement: the purpose of a post-maneuver study of knowledge and attitudes among participants was to ascertain whether the effects of the D-day experience remained constant over a period of time, and to find out to what degree the participants were passing on to non-participant troops their information and attitudes about the maneuver experiences.

The main comparisons in this section are based upon the answers of one sample of 91 riflemen who were drawn systematically from the three Airborne rifle companies. The answers of this group (Group 3) on Study C on D-day at Desert Rock are subtracted from the answers of the same men interviewed on Study D(p) at Fort Campbell three weeks later, to provide measures of change.

Ideally, there should have been "control" groups of non-participants, so as to make it possible to determine how much of any change in the participant group's knowledge and attitudes could have been laid to the process of re-structuring their experiences in their own minds or through discussion with others, and how much change might have been brought about through outside media of information. However, it was found impossible to set up any comparable "control" group of non-participants who would have been kept free from contact with any of the many observers and participants in the maneuver.

Further, ideally there should have been another group of participants who would have been tested upon post-maneuver Study D(p) for the first time, since this would have made possible the complete elimination of any "test effects" of exposure to two interviews on the same subject-matter. However, from the outset such a post-maneuver-only group was impossible simply because there were not enough Airborne riflemen in the three participant companies to form such a group without cutting the numbers of the other survey groups (1, 2, and 3) below statistically reliable levels.

There is evidence that "test effects" are not of much real importance in the post-maneuver results. The evidence comes from analysis of the differences between the D-day study results with Group 2 (which had been interviewed three days before on Study B(p)) as compared with Group 3 (which had not been interviewed previously). The D-day Study C with these two comparable groups found that on the total of 117 different items examined, there was a statistically significant difference in only six instances. Since there was only a three-day gap between those two studies, it is assumed that the test effects

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on the post-maneuver Study D(p) would be of no greater consequence, since the men had had three weeks in which to forget their first answers on the questions.

This participant group was interviewed three weeks after the maneuver at Fort Campbell. Originally it had been planned to delay a couple of weeks longer to have a better test of the effects of passage of time; but longer delay would have resulted in many of the men being unavailable because of transfers, leaves, or further maneuvers.

The general outline of this section is the same as for the preceding section, on the effects of the final maneuver.

1. Knowledge and opinions about atomic effects:

a. General reactions:

(1) Confidence in self:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
If sent into actual fighting, how think you would do (All right)	57	62	5
If sent into actual A-bomb fighting, how think you would do (All right)	73	74	1
Would you volunteer for small outfit to train & then carry out secret dangerous mission (Yes)	43	47	4
Is your outfit ready to go into combat now if it had to (Yes; In a few weeks)	71	58	-13 S
Choice between going on A-bomb maneuver and one without A-bombs (A-bomb maneuver; Makes no difference)	98	93	- 5
If caught in open by A-bomb attack, what is first think you should do (Take cover or fall flat)	100	99	- 1

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Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
After A-bomb burst, first thing you should do (Take care of self, help buddies, care for injured)	74	67	- 7
How worried do you honestly think you (are) (were) about the A-bomb maneuver (Not worried at all)	81	56	-25 S
Will you volunteer for another A-bomb maneuver if asked (Yes, probably)	81	81	0
Just how frightened were you when the last test A-bomb went off (Hardly frightened at all)	85	76	- 9
Anything about the explosion you did not fully expect (No)	81	73	- 8

An additional question, not asked until the final study:

	Per cent Gp 3 D + 18
If you were in on another A-bomb maneuver exactly like the last one, would you volunteer to stay in a foxhole two miles from "ground zero" during the burst (I would volunteer)	66

Discussion:

With two exceptions, there were no significant shifts on these questions in the three weeks following the maneuver.

The decrease in proportion reporting themselves as being "not worried at all" was not accompanied by any real decrease in willingness to participate in A-bomb maneuvers. Note also that, even under the anonymous conditions of the interview, two-thirds of these men said they would volunteer to stay in a fox-hole two miles from "ground zero" during a burst.

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The reasons for the decline in estimate of combat readiness are not readily seen. Although the decline is consistent with the tendency to revert to earlier attitudes, the final reaction is less favorable than the reaction of comparable participants on the very first study before the maneuver. Further, studies of two non-participant groups before the maneuver [Study B(n)] and after [Study D(n)] showed a moderate gain on this item in one non-participant group and almost unchanged results in the other non-participant group.

Since this participant group did not show many adverse reactions to the maneuver experience three weeks later, the findings may reflect a possible post-maneuver "letdown" that might apply on any type of maneuver. The presence of such a "letdown" and its relation to combat efficiency would seem in itself a worthy subject for future research.

The minority reporting they would not volunteer for a future A-bomb maneuver (19 per cent on the final study) gave almost exactly the same type of reasons three weeks after the maneuver as they did the day of the maneuver. Principally mentioned were dislike of living conditions and restrictions and complaints about the maneuver, rather than fears, family reasons, or personal hardships.

(2) Confidence in the weapon:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
Supposing an A-bomb like Hiroshima exploded at 2000 ft. How much danger would you be in 5 mi away, lying flat (No danger at all)	64	66	2
There is no protection within 5 mi of center of A-bomb burst (False)	92	92	0
Do you think the experts really know enough to use A-bombs in military maneuvers without harming our troops (Yes)	86	79	- 7
How safe think humans would have been if located at same spot as animals (Humans safer, just as safe)	83	77	- 6

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An additional question, asked on the final study:

	Per cent Gp 3 D + 18
Do you think the A-bomb could be used against enemy troops without great danger to our own front-line troops? (Sure it could)	88

Discussion:

None of the changes was significant, even though it might have been expected that the rather high level of confidence would fall off sharply on some items after the men were away from the drill and the indoctrination for three weeks.

b. Radiation:

(1) Knowledge of radiation effects:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
If an A-bomb exploded at 2000 ft, under what conditions safe to move into spot directly below, right after explosion (Safe if you wore regular field clothing)	62	68	6
Suppose A-bomb used against enemy troops by exploding it 2000 ft from ground & all enemy troops killed. How dangerous our troops enter area directly below within a day (Not dangerous at all)	82	85	3
Which type of atomic explosion has greatest residual (long-lasting) radiation (Surface; Underwater)	77	80	3
Suppose A-bomb like Hiroshima exploded at 2000 ft. Any harmful radioactive materials fall to earth (No harmful materials)	19	19	0

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(Continued)

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
Radiation 4 mi from A-bomb explosion can make men permanently sterile (False)	93	87	- 6
R. sickness is nearly always fatal (False)	85	81	- 4
Mis-shapen children are being born in Japan because of 1945 A-bombings (False)	73	71	- 2
Radioactivity can be contagious (False)	75	80	5
Some of ships in Bikini tests had to be sunk because too r. to use again (False)	42	42	00
Instruments (Geiger, etc) are dependable for detecting any dangerous r. (True)	91	92	1
Area that has been A-bombed can be de-contaminated (True)	90	90	0
R. caused a good many skin burns in Japan (False)	65	55	-10
People can't feel, taste, or smell radiation (True)	92	96	4
R. 4 mi from A-bomb can make men unable to have sexual intercourse (False)	95	96	1
Any r. can be detected on a Geiger counter is strong enough to be dangerous (False)	86	85	- 1
Drinking water in sealed steel cans 2 mi. from A-bomb explosion is safe to drink right away (True)	89	96	7
Scrubbing with soap & water can remove most r. particles from skin (True)	96	93	3

Discussion:

Knowledge about radiation effects remained remarkably constant over the three-week period following the maneuver. None of the changes on the 17 items was significant. It is surprising that there was not a greater tendency to forget the facts, especially on some of the more academic questions on radiation.

(2) Opinion about radiation:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
How dangerous to the troops (likely to kill or seriously hurt a man) were:			
Radiation at time of explosion (Not dangerous)	42	31	-11 S
Residual radiation (Not dangerous)	62	51	-11
How frightening did you find:			
Radiation at time of explosion (Not at all)	81	76	- 5
Residual radiation (Not at all)	75	74	- 1
What did you think about handling the field equipment your outfit left in advanced position (No danger at all)	62	66	4

One question, asked only in the final study, was:

	Per cent Gp 3 D + 18
After the burst when you moved up toward "ground zero", did you feel you were getting too much radiation at any time (No)	58

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Discussion:

As reported in the last section, the findings on danger to the troops are inconsistent with the general attitude of lack of grave concern about radiation. Whatever the reasoning of the men was, the fact remains that three weeks after the maneuver, only one-third said that immediate radiation was not dangerous and only half expressed no concern over residual radiation. Thirty per cent rated immediate radiation as "Very dangerous" and 11 per cent rated residual radiation "Very dangerous".

> Until further research is done on this point, the findings indicate the wisdom of repeated indoctrination, after an atomic bomb maneuver, to allay misgivings.

None of these men remembered having felt that they were getting too much radiation as they were moving toward ground zero following the burst.

c. Flash effects:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
Flash burns on exposed skin from Hiroshima-type burst would be expected up to distance of (3 mi)	49	47	2
Which kind of clothing gives better protection (Light-colored, loose-fitting)	55	47	- 8
How dangerous to the troops (likely to kill or seriously hurt a man) was the fire flash (fireball) (Not dangerous)	42	25	-17 S
How frightening did you find the fire flash (fireball) (Not at all)	40	44	4
Did you feel any heat from the blast at the time of the explosion (A little; No; Don't remember)	98	94	- 4 S

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Discussion:

Presumed danger to the troops showed a statistically significant shift, with 41 per cent three weeks afterward saying it was "Very dangerous". As discussed in the last section, the results are inconsistent, since so few reported feeling more than "a little" heat.

d. Blast effects

	Participants in maneuver		
	Per cent Gp 3 D-day	Per cent Gp 3 D+18	Difference
Abbr. of Q., and "correct" answer			
Blast effect of A-bomb air burst at 2000 ft would not kill anyone beyond (3 mi)	45	47	2
How dangerous to the troops (likely to kill or seriously hurt a man) was the explosion (Blast effect) (Not dangerous)	42	25	-17 S
How frightening did you find the explosion (Blast effect) (Not at all)	39	43	4

Discussion:

Again the item on danger to the troops showed a significant negative change in opinion, with half (51 per cent) three weeks afterward rating the blast effects as "Very dangerous". It may well be that blast effects (like flash effects) need greater emphasis in post-maneuver indoctrination, in order to allay unwarranted fears.

e. Miscellaneous effects:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
All elements consist of atoms (True)	59	68	9
Doubling size of A-bomb does not double the amount of damage (True)	29	35	6
Watching an A-bomb explode 5 mi away can cause permanent blindness (False)	79	82	3
Cause of greatest no. of casualties in Hiroshima, Nagasaki (Blast and falling objects)	74	78	4
Which of the three types atomic explosions would do the most damage right away (Air burst)	76	71	- 5

Discussion:

Again, most of these items are immaterial or academic as regards a practical A-bomb maneuver situation. On the one item on which there might have been legitimate personal concern (blindness), note that eight out of ten of the men knew the right answer.

f. Aggregate information score:

Net change in over-all information, as reflected by changes in the scores on the 30 information items between the maneuver date and 18 days afterward, was found to be practically zero.

2. Changes in tensions:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D+18	Difference
In general, what sort of physical condition would you say you are in (Very good; good)	84	81	3
Ever worry about whether you will be injured in combat (Think but don't worry; never think about it)	83	76	- 7
Hands ever tremble enough to bother you (Never)	76	68	- 8
Ever bothered by nervousness (Sometimes; Never)	93	92	- 1
Ever been bothered by your heart beating hard (A few times; Never)	96	93	- 3
Ever bothered by shortness of breath when not exercising or working hard (Sometimes; Never)	98	92	- 6 S
Ever troubled by your hands sweating so that they feel damp and clammy (Sometimes; Never)	98	92	- 6 S
How often bothered by an upset stomach (Not often; Never)	89	88	- 1
Ever been troubled by "cold sweats" (Never)	57	66	9

Discussion:

Two of the changes are statistically significant, but not of consequence in themselves. The slight general trend toward reporting more psycho-somatic complaints three weeks after the maneuver than on D-day is of theoretical interest. However, it is clear that no substantial number of these Airborne participants reported psycho-somatic complaints three weeks after the maneuver.

3. Changes in opinions about the armed forces:

a. Opinions about effectiveness of weapons, modes of warfare:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
How effective would each of the following be in winning another war (Very effective);			
Atomic bombs	85	84	- 1
Regular artillery	28	44	16 S
Regular (long-range) bombing	55	60	5
Tactical (short-range) bombing	40	57	17 S
Bacterial (germ) warfare	55	54	- 1
Airborne infantry	78	77	- 1
Ground infantry	51	56	5
Armored vehicles (tanks)	34	36	2
Naval surface warships	44	54	10
Submarines	45	64	19 S
Feel development of A-bomb has changed importance of:			
Ground infantry (More important)	51	42	- 9
Airborne infantry (More important)	63	60	- 3
Air Force (More important)	76	76	0

Discussion:

Three of the shifts were statistically significant, all in a positive direction, and all representing shifts back nearer the ratings these modes of warfare had had before these riflemen had witnessed the maneuver A-bomb explosion.

The important finding here is that the A-bomb did not change in the men's estimation of effectiveness after they had had three weeks to think it over.

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b. Attitudes toward military life:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
If you were offered an honorable discharge today and not to be drafted later, would you take it (No)	16	11	- 5
How could you be of greatest service to your country--by being a soldier, in school, working in a divilian job (By being a soldier)	58	51	- 7
Are you the type that makes: (Very good soldier; Good soldier)	77	77	0
How much does it bother you when ordered to do things for which you don't see a good reason (Not much; Not at all)	55	64	9
If you had your own free choice, which service would you be in (Army)	35	30	- 5
Which branch of the Army would you most like to be in (Airborne)	59	45	-14 S

Discussion:

The one significant change was in the decline in preference for the Airborne, back to a position roughly equal to the sentiments of a comparable partipant group of riflemen prior to the maneuver experience. This may be merely a reversion toward earlier sentiments after a temporary maneuver-heightened desire to remain in the Airborne, rather than as the result of specific adverse experiences after the maneuver. This possibility is supported by the fact that two very similar non-participant groups (Groups six and seven) of Airborne infantrymen, whose duties after the maneuver were about the same as the participants', had almost the same views about the Airborne in the final study as they had before the maneuver period.

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Regardless of the reasons for the shift in the views of the participant group, these two findings do remain:

Participants were not measurably induced by the maneuver experience to express a higher preference for the Airborne three weeks after the maneuver was over.

The Airborne still remained by far the most-preferred branch of service, and only 19 per cent finally rated Airborne as the branch they would like least to be in now.

4. Sources and adequacy of atomic information:

Abbr. of Q., and "correct" answer	Participants in maneuver: Per cent Gp 3 D-day	Per cent Gp 3 D + 18	Difference
Have the talks helped you understand protection in case of an atomic attack (Great deal)	76	73	- 3
Do you need more information regarding atomic weapons & protection from attack (A little more; or None)	59	61	2
If soldiers were well-trained for ordinary combat, how much added training absolutely needed for A-warfare (Movies & lectures enough)	39	48	9
Anything unnecessary in the talks or movies (No, all necessary)	83	85	2

Discussion:

There were no significant changes. It is of interest that there were no really negative trends, since one would assume that with three weeks to think it over, these men might have thought of more criticisms of the indoctrination program than would have occurred to them on D-day.

On the question, "Exactly what further information would you like to have about atomic weapons?", only 38 per cent wrote down an answer. Their main interests were much the same as expressed

on the maneuver day three weeks earlier (more information on atomic weapons in general, atomic artillery, and the workings of the bomb), but with slightly increased interest in use of atomic weapons in support of infantry (seven per cent) and protective measures (11 per cent). Differences in answers on D-day as compared to D + 18 were not statistically significant.

On D + 18, only six per cent felt they had been given any "misleading or inaccurate information" on atomic effects by official sources.

5. Ideas about the maneuver:

On D-day, relatively few of the men (only seven per cent) could think of anything that got "fouled up" in the part of the maneuver they witnessed following the explosion.

Three weeks after the maneuver, three-fourths (74 per cent) indicated they felt the A-bomb maneuver was realistic enough. However, this is not an indication that many were scared; two-thirds on another question said they would volunteer to stay in a fox-hole two miles from ground zero.

Few suggestions were offered on how the maneuver might have been made more realistic, with the largest number (seven per cent) writing in that they felt troops should have been in fox-holes closer to Ground Zero, and six per cent suggesting that in similar future maneuvers regular combat formations should be utilized.

Free-answer suggestions on the maneuver, after three weeks to think it over, were:

Improve the training	7 %
Place men closer to Ground Zero	7
Have simulated attack after the burst	5
Improve the living conditions	5
Waste less time	4
Make it more realistic (general)	3
Have fewer dry runs	1
Fewer regulations, restrictions	1
No suggestions	76
(Some offered more than one suggestion)	109%

These suggestions differed very little from the ideas of the same men as expressed immediately after the maneuver.

D. Dissemination of Information and Attitudes

How the dissemination process was studied: the research afforded an opportunity to see whether non-participant enlisted men picked up much information on the A-bomb maneuver from the participants, and whether this informal process of disseminating information was effective in educating non-participants on the facts of atomic effects and in building attitudes of non-anxiety about participating in future atomic maneuvers or atomic warfare. The following groups were studied.

Participant Groups:

Group 3, a sample of 91 airborne riflemen drawn in a scientifically randomized fashion from the three participant rifle companies. These men were interviewed on Study C at Desert Rock on D-day and again at Fort Campbell three weeks later. Their information and attitudes at those two points of time already have been reported in the two preceding sections. Their part in disseminating information is described in this section.

These men had limited opportunity to mix with non-participants at Fort Campbell during the three weeks intervening between the maneuver and the final questionnaire. Many of the men went on pass or leave immediately after their return from the maneuver; One of the non-participant groups was on bivouac; the other non-participant group was in the field most of the time engaging in unit tests. While three-fourths of the participants said they had described the A-bomb explosion and the maneuver to at least some non-participant military personnel, this does not necessarily mean three-fourths had talked to men from the two non-participant groups that were studied.

Group 10 Battery "C" 546 artillery personnel. A very small group (only 23 men) were interviewed on Study C at Desert Rock and again on Study D(p) at Ft. Lewis three weeks later. This group is too small for formal analysis. However, this representative group provides some indication of the degree to which the participant Battery "C" men discussed the maneuver with non-participants.

About two-thirds of these men said they had discussed the explosion and the maneuver with some non-participant military personnel, which is about the same proportion as was the case with the airborne participants from Fort Campbell. Consistent with this finding was the fact that the "C" Battery men had been in the field much of the three weeks after the maneuver.

Non-participant groups:

Group 7, consisting of 76 men from the 2nd Battalion, 188th AIR, chosen by controlled random methods from the three rifle companies in the Battalion. These men's views and knowledge were measured in Study B(n) just before the maneuver, and again in Study D(n) three weeks later. This is termed the "nearest" group in this analysis of dissemination, because the men came from a Battalion that was companion to the participant battalion. Their connection with the participant battalion was further strengthened by the fact that participants were drawn from this 2nd Battalion before the maneuver, to bring the participant 1st Battalion up to full strength.

Group 6, 114 men from the 3rd Battalion, 503rd AIR. These men also answered questionnaires in Study B(n) and study D(n). They are termed the "farthest" group in the following analysis, because they came from a different Regiment than the participants.

Group 6 non-participants ("farthest") were on bivouac most of the time after the participants returned from Desert Rock, and remained in the field much of the three-week period between the end of the maneuver and the final study. Group 7 non-participants ("nearest") were in the field most of the time engaging in unit tests, but did return to Battalion area each night. Hence the opportunity for dissemination of information to these men was very limited, not only through word-of-mouth but also through newspapers, magazines, and radio. Even so, 72 per cent of the "nearest" non-participant Group 7 and 11 per cent of the "farthest" non-participant Group 6 said they had talked with someone who was in the recent A-bomb maneuver.

Group 11, 95 men from all Batteries, except participant Battery "C", of the 546 FA Battalion, Ft. Lewis, Washington. This group is called the "nearest" of the Field Artillery non-participants, since they were from the same Battalion as the participant Battery "C" men. These men answered questionnaires for Study D(n) only, three weeks after the maneuver.

Group 12, 116 men from all batteries of the 195 FA Battalion, Ft. Lewis. This group is called the "farthest" of the Field Artillery non-participants, since they were from another Battalion than the participants. However, they were also stationed in the same area as the participant Battery.

All Fort Lewis participant and non-participant groups that were interviewed had been in the field on training efficiency tests much of the time between the end of the maneuver and the application of the questionnaire, thereby reducing the opportunities for dissemination of information about the maneuver through discussions between participants and non-participants.

Again, none of these non-participant groups received any special indoctrination in atomic effects from the time the maneuver was planned until the research program was completed. Nor was there any attempt on the part of the commands concerned during the three weeks after the maneuver to organize open discussions of the maneuver to "pass the word" to non-participants in general. Thus, conditions were good for measuring informal dissemination of information, except that contact between the men was limited by the training conditions.

1. Participants' role in the dissemination process:

Amount of discussion: the Group 1 Airborne rifle participants from Fort Campbell said that they had described the A-bomb explosion and maneuver to non-participants as follows:

Only to non-participant military personnel	44 %
To both non-participant military personnel and family or civilian friends	27
Only to family or civilian friends	4
To neither non-participant military personnel nor family nor civilian friends	25
	100%

As mentioned earlier, about two-thirds of the 23 Field Artillery participants interviewed three weeks after the maneuver said they had talked to military non-participants about the maneuver. This is about the same proportion as was true of the Airborne participants, but again the Field Artillery sample was too small for reliable comparisons.

Of the participant Airborne men, 28 per cent said they had talked to their families about it, and 20 per cent said they had talked about the maneuver to friends not in service. (As will be clear from the preceding table, almost all of those who had talked to non-military personnel about it had also talked to non-participant military personnel.)

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25 per cent said they had not talked at all about the maneuver to non-participants. Some of these men may have forgotten about discussions with non-participants, although every effort was made to make it clear to these men at the time of the survey that a security check was not being conducted, that they were anonymous, and that it was important for them to search their memories to provide accurate answers.

Only 22 per cent of these men reported having talked to more than six people about their experiences in the maneuver. This is another indication that the informal communication process was not working very efficiently as of three weeks after the maneuver.

Interest: 48 per cent of the Airborne participants reported that the people they had talked to were "very interested" in what they had to say about the maneuver. One-third said people were "Mildly interested", and two per cent said their listeners were "Not interested". The rest said they had not talked to non-participants.

While the men might not have had an accurate impression of others' interest, their guesses agree fairly well with the non-participants own reports of their own interest or lack of interest, presented later. While the results do not indicate general apathy, neither do they indicate widespread curiosity on the part of non-participants.

2. Reactions of non-participant enlisted men

NOTE: the non-participant groups are labeled as follows in the succeeding tables, in terms of their relation to participant groups:

"Airborne, nearest": Group 7, 76 men from 2nd Battalion, 188th AIR.
"Airborne, farthest": Group 6, 114 men from the 3rd Battalion, 503rd AIR.
"Artillery, nearest": Group 11, 95 men from the 546 FA Battalion.
"Artillery, farthest": Group 12, 116 men from the 195 FA Battalion.

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a. Sources of information:

The Question: "Have you heard anything about the recent maneuvers where men from this Division saw an A-bomb explosion?"

	Airborne non-partic. Per cent Nearest	Airborne non-partic. Per cent Farthest	Artillery non-partic. Per cent Nearest	Artillery non-partic. Per cent Farthest
Heard about it from enlisted men who were there	68	17	45	21
From officers who were there	24	9	7	5
From men who were not there	22	26	26	28
From news reports (radio, newspapers, magazines, newsreels)	78	70	71	78

The Question: "Have you yourself talked with anyone who was in the recent A-bomb maneuver?"

	Airborne non-partic. Nearest	Airborne non-partic. Farthest	Artillery non-partic. Nearest	Artillery non-partic. Farthest
Percentage saying "Yes"	72%	11%	43%	23%

Discussion:

The figures demonstrate that direct communication from participants to non-participants during the three weeks after the maneuver was limited, with a sharp variation according to the closeness to the participant unit. Again, even the "farthest" units were close to participant units geographically. Even so, discussions with participants were widespread only in the "nearest" Airborne group, from which a good many men had been borrowed in order to bring the participant Battalion up to strength for the maneuver.

The figures for indirect communication (from men who were not there, and from news reports) were fairly constant from one group to another, indicating that the differences on direct communication are not chargeable to differences in interest among the groups.

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b. Interest in information:

The Question: "How interested were you in learning what took place during the A-bomb maneuver?"

	Airborne non-partic. Per cent Nearest	Airborne non-partic. Per cent Farthest	Artillery non-partic. Per cent Nearest	Artillery non-partic. Per cent Farthest
Very interested	62	56	53	61
Mildly interest	21	30	37	27
Not very interested	14	9	7	9
No response	3	5	3	3
	100%	100%	100%	100%

Discussion:

The groups did not vary significantly in their reports of interest. In no group did as many as two-thirds report themselves as "very interested".

c. Dissemination of information by non-participants:

The Question: "After hearing or reading about it, have you yourself talked about the A-bomb maneuver with any of the following people?"

	Airborne non-partic. Nearest	Airborne non-partic. Farthest	Artillery non-partic. Nearest	Artillery non-partic. Farthest
Percentage who had talked to:				
Other soldiers in your division	55%	55%	49%	58%
Other soldiers not in your division	17	9	10	13
Your family	33	20	25	26
Your friends not in the service	24	20	19	16

Discussion:

The percentage reporting having talked about it to other soldiers in their own divisions was about the same throughout all groups. Results point to the possibility that hearsay discussions by these non-participants may have touched a large proportion of the military personnel in their installations. As to the effect of this further

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dissemination, these non-participants could not have educated other non-participants very well concerning the detailed facts of atomic phenomena and affects, because (as we shall see) their own possession of facts was limited. It is possible these middlemen in the dissemination process may have passed on a certain measure of confidence in the use of the weapon tactically, since non-participants who were surveyed both before and after the maneuver had become not especially fearful of atomic maneuvers, had confidence in the experts knowing enough to use the weapon with relative safety, etc. However, it is just as possible that the gain in confidence among non-participants might have stemmed from information obtained from media such as the newspapers or the radio, rather than from talking to military personnel.

d. Knowledge and opinions about atomic effects:

NOTE: an analysis of change in information and attitudes as a result of all informal communication is possible with the Airborne Groups 6 and 7, both of which were covered in Study B(n) just before the A-bomb maneuver and in Study D(n) three weeks after the maneuver, with neither of these groups being exposed to any formal indoctrination in the interim. The following series of tables present results on information and attitude questions for these two groups, and also results on Study D(n) only for the Artillery non-participant groups 11 and 12.

These cautions should be followed in examining these results:

Groups 6 and 7 were interviewed twice, and hence "test effects" may have influenced responses on the second questioning. Although on other studies it has been found that "test effects" of repeated interviewing may reduce the proportion of correct answers because of increased caution or confusion, in the earlier phases of this series of studies (effects of indoctrination and participation in the maneuver) the "test effects" operated slightly in the direction of sensitizing the men to giving more "right answers" the second time. Hence it appears that if there were any "test effects" on these non-participants, they would tend to result in a slightly higher gain in information than would have resulted had the men been interviewed only once.

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The results are presented in the same order as in the first three sections of this report.

To save space, the "before" results on the "nearest" and "farthest" airborne groups are omitted; but the "before" and "after" differences are presented, and also whether any change was positive or negative (latter being indicated by a minus sign). Statistically significant shifts within Group 6 or 7 are indicated by an "S".

For the "nearest" and "farthest" Artillery groups, interviewed only after the maneuver, "correct" percentages are given, with significant differences between those two groups being indicated by an "S".

Instances in which certain questions were not asked are indicated by "NA".

(1) General reactions:

(a) Confidence in self:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Farthest: Per cent Aft.	Diff from Bef.		Artillery Non-partic. Nearest: Per cent After	Farthest: Per cent After	Sig Diff (S)
If sent into actual fighting, how think you would do (All right)	53	8	54	11	S	43	30	S
If sent into actual A-bomb fighting, how think you would do (All right)	44	23	34	4		24	26	
Would you volunteer for small outfit to train & then carry out secret dangerous mission (Yes)	53	- 5	53	0		25	24	

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Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
Choice between going on A-bomb maneuver and one maneuver and one without A-bombs (A-bomb maneuver; No difference)	77	- 2	81	16 S	71	73	
If caught in open by A-bomb attack, what is first thing you should do (Take cover or fall flat)	79	0	84	- 3	93	84	S
After A-bomb burst, first thing you should do (Take care of self, help buddies, care for injured)	32	4	23	2	38	38	
How worried honestly think you would be if on A-bomb maneuver (Not worried at all)	22	6	21	6	15	25	
Would you volunteer for another A-bomb maneuver if asked (Yes, probably)	76	- 5	81	9 S	69	72	
If you were on A-bomb maneuver, would you volunteer stay in fox-hole 2 mi from Ground Zero (Yes)	32	NA	31	NA	21	14	

Discussion:

Changes in confidence in self within the "nearest" airborne participants as against changes in the "farthest" group are not clear-cut. While the "nearest" group did register a significant gain in the proportion feeling they would do all right in atomic warfare, the "farthest" group showed positive gains on preference for A-bomb maneuvers and willingness to volunteer for such a maneuver.

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Among the Artillery non-participants, there were no significant differences between the two groups.

> Closer contact with participant troops does not result in clear-cut evidence of gain in confidence in self relation to atomic maneuvers or warfare. Neither do the results indicate that contact with participant troops deepens the anxieties of non-participant troops. The main implication of this is that the process of informal dissemination of information by participant troops was found to be not effective in building confidence in this situation.

About nine out of ten among all four non-participant groups could not think of anything they had heard about the A-bomb maneuver that made the A-bomb seem even a little more dangerous than they had thought previously.

Among the few who did hear something that made the bomb seem more dangerous, no particular type of answer stood out. It should be remembered that the question did not limit the fear-evoking statements or stories about the bomb to those obtained from participants; the sources for adverse reactions for this minority may have been the press, the radio, or media other than participant troops.

(b) Confidence in the weapon:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Farthest: Per cent Aft.	Diff from Bef.	Sig Diff (S)	Artillery Non-partic. Nearest: Per cent After	Farthest: Per cent After
Supposing A-bomb like Hiroshima exploded at 2000 ft. How much danger at 5 mi, lying flat (No danger at all)	16	11	16	4	S	21	12
No protection within 5 mi. of center of A-bomb burst (False)	64	5	64	-10		76	72
Think experts really know enough to use A-bombs in military maneuvers without harming our troops (Yes)	51	12	50	27	S	44	36

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(Continued)

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
Think A-bomb could be used against troops without great danger our own front-line troops (Sure)	58	NA	48	NA	44	41	

Discussion:

A significant gain was made within the "farthest" airborne group on the question of whether "the experts really know enough", whereas the gain among the "nearest" airborne non-participants was not significant. However, the final percentage with favorable answers was practically identical for the two groups.

(2) Radiation:

(a) Knowledge of radiation effects:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
If A-bomb exploded 2000 ft, what conditions safe to move into spot directly below, right after explosion (Safe with regular field clothing)	17	10	S	10	4	18	8	S
Suppose A-bomb used against enemy troops by exploding it at 2000 ft & all enemy troops killed. How dangerous our troops enter area directly below within a day (Not at all)	26	13	S	12	6	15	13	

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Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Airborne Non-partic. Nearest: Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Airborne Non-partic. Farthest: Diff from Bef.	Artillery Non-partic. Nearest: Per cent after	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
Which type atomic explosion has greatest residual r. (Surface; Underwater)	59	- 2	46	- 7	52	64	
Suppose A-bomb like Hiroshima exploded at 2000 ft. any harmful r. materials fall to earth (No)	9	5	4	- 4	3	6	
R. 4 mi from A-bomb explosion can make men permanently sterile (False)	38	12 S	39	7	48	41	
R. sickness nearly always fatal (False)	45	8	52	3	55	39	S
Mis-shapen children being born in Japan because of 1945 A-bombings (False)	41	3	36	- 6	52	47	
R. can be contagious (False)	41	2	48	9	52	47	
Some of ships in Bikini tests had to be sunk because too r. to use again (False)	22	4	17	0	34	25	
Instruments are dependable for detecting any dangerous r. (True)	68	- 2	61	- 4	75	72	
Area that has been A-bombed can be de-contaminated (True)	62	- 1	72	0	79	76	
R. caused good many skin burns in Japan (False)	9	0	14	8 S	20	15	

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(Continued)

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Farthest: Per cent After	Sig Diff (S)
People can't feel, taste, or smell radiation (True)	39	-11	46	- 1	47	59	
R. 4 mi from A-bomb can make men unable to have sexual intercourse (False)	45	- 5	59	18	64	56	S
Any r. can be detected on a Geiger counter is strong enough to be dangerous (False)	34	2	39	6	40	40	
Drinking water in sealed steel cans 2 mi from A-bomb explosion is safe to drink right away (True)	38	16	25	5	27	19	S
Scrubbing with soap & water can remove most r. particles from skin (True)	54	- 3	62	1	60	62	

Discussion:

Among the Airborne non-participants, significant gains were registered on four questions by the "nearest" group, as against a significant rise on two questions among the "farthest" group.

Comparison of the two Artillery groups reveals only two significant differences, with the correct answer in both instances having been given more often by the "nearest" group.

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(b) Opinion about radiation:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest Per cent After	Artillery Non-partic. Farthest Per cent After	Sig Diff (S)
How dangerous to troops (likely to kill or seriously hurt) were:							
R. at time of explosion (Not dangerous)	16	NA	14	NA	22	14	
Residual R. (Not dangerous)	16	NA	16	NA	12	8	
How worried do you think you would be about:							
R. at time of explosion (Not at all)	28	14	S	22	0	27	17
Residual r. (Not at all)	27	12	S	16	3	17	18

Discussion:

Again the Airborne "nearest" non-participant sample registered greater changes toward favorable attitudes, on the two questions concerning worry about radiation.

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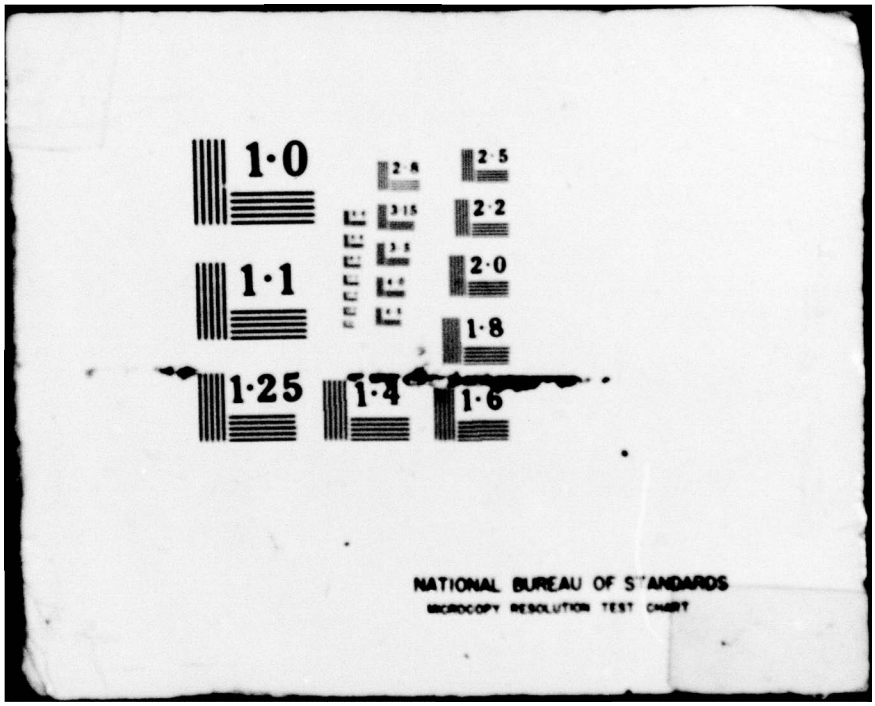
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(3) Flash effects:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
Flash burns on exposed skin from Hiroshima-type burst would be expected up to distance of (3 mi)	28	15	S 23	4	34	26	
Which kind of clothing gives better protection (Light-colored, loose-fitting)	49	6	57	4	54	50	
How dangerous to troops (likely to kill or hurt) was the fire flash (fireball) (Not dangerous)	13	NA	13	NA	19	16	
How worried think you would be about the fire flash (fireball) (Not at all)	14	- 1	26	5	28	22	

Discussion:

Differences were not marked. It is evident that the informal process of passing information from participants to non-participants did not contribute materially in dispelling worry about flash effects.

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(4) Blast effects:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest Per cent Aft.	Diff from Bef.	Farthest Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest Per cent After	Farthest Per cent After	Sig Diff (S)
Blast effect of A-bomb air burst at 2000 ft would not kill anyone beyond (3 mi)	18	- 3	19	3	19	23	
How dangerous to troops (likely to kill or seriously hurt) was the explosion (blast effect) (Not dangerous)	11	NA	17	NA	19	16	
How worried do you think you would be about the explosion (blast effect) (Not at all)	17	6	23	2	27	25	

Discussion:

As was true of answers on flash effects, differences were not marked between "nearest" and "farthest" groups, and relatively few of these non-participants had built up absence of worry about blast effects in an A-bomb maneuver.

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(5) Miscellaneous effects:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest: Per cent Aft.	Diff from Bef.	Airborne Non-partic. Farthest: Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest: Per cent After	Artillery Non-partic. Farthest: Per cent After	Sig Diff (S)
All elements consist of atoms (True)	64	1	67	2	68	55	
Doubling size of A-bomb does not double amount of damage (True)	42	6	43	- 2	55	40	S
Watching A-bomb explode 5 mi away can cause permanent blindness (False)	47	19 S	46	19 S	45	34	
Cause of greatest no. of casualties in Hiroshima & Nagasaki (Blast & falling objects)	14	- 2	10	4	17	18	
Which of the three types of atomic explosions would do most damage right away (Air burst)	47	-19 S	57	- 9	58	63	

Discussion:

On questions relevant to the maneuver, significant change occurred on the question about permanent blindness, with the "nearest" Airborne group changing the most. However, both Airborne groups wound up at the same level of correct answers to this question.

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(6) Aggregate information score:

The average (mean) scores for the non-participant groups are shown below, as an indication of overall changes that might have been caused by the informal process of dissemination of information by participants and by other media.

	Before Maneuver (Study B)	After Maneuver (Study D)
Airborne non-participants:		
Group 7 ("nearest")	10.83 points	11.82 points
Group 6 ("farthest")	11.15 points	11.81 points
Artillery non-participants:		
Group 11 ("nearest")	(Not interviewed)	13.45 points
Group 12 ("farthest")		12.34 points

Discussion:

Among the Airborne groups, the gains within both the "nearest" and "farthest" groups were of no great consequence, again demonstrating that the informal dissemination of correct atomic information was not particularly effective.

Among the Artillery non-participants, the "nearest" group's aggregate score was not significantly higher than the average score for the "farthest" group.

(7) Opinions about effectiveness of weapons, modes of warfare:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest Per cent Aft.	Diff from Bef.	Sig	Farthest Per cent Aft.	Diff from Bef.	Sig	Artillery Non-partic. Nearest Per cent After	Farthest Per cent After	Sig Diff (S)
How effective would each of the following be in winning another war (Very effective):									
Atomic bombs	73	-11	S	75	- 6		80	77	
Regular artillery	44	3		36	2		53	41	
Regular (long-range) bombing	63	4		59	- 5		56	47	
Tactical (short-range) bombing	55	6		45	- 2		49	54	
Bacterial (germ) warfare	51	8		37	- 6		44	53	
Airborne infantry	73	9		64	- 3		38	50	
Ground infantry	61	15	S	46	7		67	61	
Armored vehicles (tanks)	49	3		36	- 2		48	41	
Naval surface warships	45	0		47	1		45	46	
Submarines	53	- 6		50	0		47	53	
Feel development of A-bomb has changed importance of:									
Ground infantry (More important)	25	5		28	10	S	24	22	
Airborne infantry (More important)	36	- 1		39	7		24	29	
Air Force (More important)	70	-13	S	74	- 5		81	75	

Discussion:

Although there were a few changes that were statistically significant, none of the changes was important. It is clear that the dissemination of information by participants did not serve to magnify the non-participants' rating of the A-bomb as very effective in winning another war.

(8) Sources and adequacy of atomic information:

Abbr. of Q., and "correct" answer	Airborne Non-partic. Nearest Per cent Aft.	Diff from Bef.	Farthest Per cent Aft.	Diff from Bef.	Artillery Non-partic. Nearest Per cent After	Farthest Per cent After	Sig Diff (S)
Do you need more information regarding atomic weapons & protection from attack (A little more; or None)	18	10	S 23	2	24	14	
If soldiers were well-trained for ordinary combat, how much added training absolutely needed for A-warfare (Movies & lectures would be enough)	22	5	14	-11	S 17	21	

Discussion:

Whatever dissemination occurred, it did not operate to make many of these non-participants feel they "knew all the answers" on atomic effects.

In the final study, the following small percentages of men felt they had been given any "misleading or inaccurate information" on atomic effects from official sources:

Among Airborne non-participants, "nearest" group: 1 per cent
"farthest" group: 2 per cent
Among Artillery non-participants, "nearest" group: 5 per cent
"farthest" group: 6 per cent

Among the few who thought they had been given misleading or inaccurate information, there was no concentration on any one particular type of misinformation.