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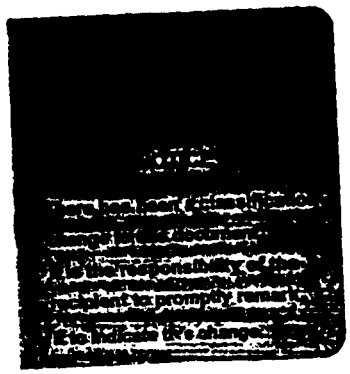

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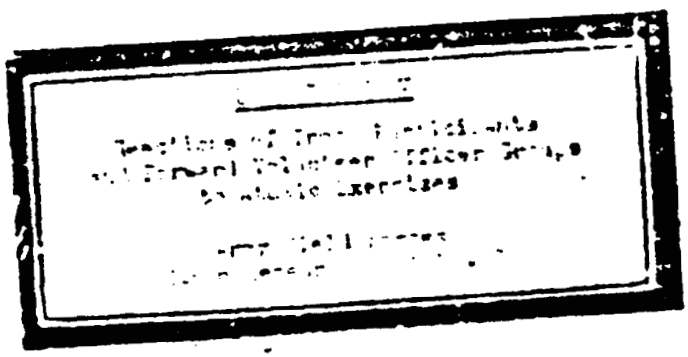

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(6) DESERT ROCK V

Reactions of Troop Participants and Forward Volunteer Officer Groups to Atomic Exercises,

(11) Benjamin W. White,

(11) 1 Aug 53,

(12) 53p.

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FOREWORD

The spring of 1953 marked the third occasion on which maneuvers were held by the Army in connection with the atomic tests at the Nevada proving grounds. AFF Human Research Unit No. 2 was given the mission of assisting the maneuver director in the preparation of that section of his report dealing with psychological reactions of participating troops. In partial fulfillment of this responsibility, a preliminary report which contained only summary statements of the immediate results was submitted to the maneuver director in May, 1953. It was then agreed that a final report containing more detailed results of the research done at Desert Rock-V would be published under separate cover. This document is the detailed report of the research carried on at DR-V by members of AFF Human Research Unit No. 2.

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Troop Reaction During an Atomic Explosion

Troop participants in the forward area [illegible] and after the detonation of the atomic device showed few signs of apprehension or anxiety.

Troop Knowledge of Atomic Weapons and Effects

There were widespread misconceptions about possible effects from atomic weapons among the troops upon arrival at Camp Desert Rock. Questionnaires administered to the troops after the exercise showed a significant gain in knowledge about atomic effects. On almost every information question there was an increase in the percentage of troops giving the correct answer.

Troop Attitudes and Opinions Concerning Atomic Weapons and Their Use

For the most part the exercise appeared to have little or no effect on troop attitudes and opinions concerning such matters as the advisability of using atomic weapons in Korea, international control of atomic development and [illegible] of war with Russia in the next ten years. There was a significant decrease in the stated danger of effects such as sterility and impotence from atomic weapons used in combat.

Troop Expectations About an Atomic Explosion

At the conclusion of the exercise, the majority of the troop participants felt that the actual experience of seeing an atomic explosion had surpassed their expectations, but that the evidence of destruction they had been able to see in the forward area, immediately after the explosion, had fallen short of their expectations.

Security Briefing Effects

From informal talks with troop participants, it appeared that many of them were uncertain which aspects of their experience at Desert Rock they could talk about. Some men stated that they would play safe by not saying anything. Consideration should be given to changing the security briefing so that troop participants are not inhibited in communicating to other members of the Army, information which it is desirable to disseminate.

Members of the Special Forward Volunteer Groups Expressed the Following Conclusions in Interviews

1. The technical manual which members of these groups used in making their computations of effects to be expected

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at various distances, proved to be satisfactory, and the officers stated they had gained confidence in it from this experience.

2. Knowledge that such groups had been stationed as close as 2,[illegible] yards from an atomic explosion without injury would give troops increased confidence on future atomic exercises.

3. Members of the groups felt that they were ready within a few moments after the shot to assume command functions.

4. There was little more to be gained by placing volunteer groups in forward positions on future shots, or from stationing large numbers of troops at this distance on future shots.

5. Some of the instruments the volunteer officers took with them proved difficult to read after the shot because of the reduced visibility. It would be wise to redesign these instruments to make them more readable under such adverse conditions.

6. The experience did not change the volunteer officers' views on the possibilities and limitations of atomic warfare.

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DESCRIPTION OF THE DESERT ROCK V EXERCISES

Troops participating in the DR-V exercises arrived at Camp Desert Rock four or five days before a shot was scheduled. Upon arrival they were assigned to a provisional battalion combat team. These combat teams were made up of men from many different posts throughout the zone of the interior. In contrast to previous exercises, very few TO&E units participated in the DR-V exercises.

In the days before the shot, the men in combat teams were given a four-hour indoctrination by officers of the special instructor group at Camp Desert Rock. Indoctrination consisted of security briefing, lectures on the effects of atomic weapons, and protective measures against such effects. The men were also told what they would do on shot day and what they might expect to see and hear during the atomic explosion they were about to witness.

After all men had received indoctrination, they were taken by truck to the forward area for a rehearsal of the maneuver for shot day. Here they were shown how to enter the trenches which had been prepared, given orientation regarding terrain, and acquainted with the commands which would be given on shot day from the public address system. Then they were moved from the trench area toward the target area where they could view some of the military equipment which had been placed there.

On shot day the procedure was substantially the same. After arriving at the trench area, the men were again briefed over the public address system and instructed to enter their trenches ten minutes before shot time.

(Most of the shots at DR-V were tower shots. For these, the troop trenches were at a distance of approximately 4,000 yards from ground zero. This is considerably closer than trenches had been placed on previous maneuvers. For the air drops and the atomic cannon shot the trenches were farther away from the target area).

For the tower shots the men remained kneeling in the trenches until the shock wave from the explosion had passed over the trenches. At this point they were allowed to rise from their trenches to watch the atomic cloud. After the forward area had been monitored, they were ordered to advance in simulated attack toward ground zero. Upon reaching this forward area, they inspected the damage done to animals and equipment in the area, and then returned to camp by truck. Within 24 to 48 hours after a shot, most of the participants were on their way back to their home stations.

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PSYCHOLOGICAL RESEARCH ACTIVITIES AT DR-V

A primary purpose of the Desert Rock maneuvers was to teach troops more about atomic weapons and useful field procedures for protection against injury. Consequently, one of the chief objectives of the psychological research was to ascertain what and how much the troops learned in these maneuvers and the degree to which the experience changed their attitudes toward atomic warfare. For this purpose questionnaires were administered to groups of participants upon their arrival at camp before indoctrination had begun. The same questionnaire form was administered to other groups of men after they had been indoctrinated and had seen the shot, but before they departed for their home stations. A comparison of the questionnaire responses obtained before and after indoctrination made it possible to estimate what the men had learned during their stay.

A second research activity at DR-V was the interviewing of the special volunteer officers who took forward positions on three tower shots. In an effort to record their reactions to the experience, members of these groups were interviewed before and after witnessing a shot at 2,000 yards.

A third study was concerned with the dissemination of information. Research at DR-I and IV indicated that participants, upon return to their home stations, communicated to their associates little of the information they picked up on the maneuver. This study was designed to determine whether certain techniques in selection and orientation of men participating in the maneuvers would increase the amount of information communicated to other members of their units. If such techniques could be found, one of the major missions of such maneuvers could be accomplished more effectively. Also, such techniques would have application to other military training and indoctrination programs. The results of this experimental study will be published in another report.

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CONCENTRATION OF TROOPS IN THE ATOMIC AREA

Psychological research personnel were on hand to observe troop behavior on shots 3, 7, 9, and 10. From watching the troop participants immediately before and after these atomic blasts, it was obvious that the American soldier went through the experience with impressive equanimity. At no time was there anything approaching panic among the troops. They entered their trenches in a fairly orderly fashion and were responsive to orders given them on the public address system. Immediately after the shot, when they first got out of their trenches, their reaction was one of wonder and amazement at the spectacle before them.

On two occasions an unexpected event might well have given rise to widespread panic, but did not. On one occasion, because troops were somewhat slow in filing into a trench, several men were standing exposed at the end of the trench with a shot only a few seconds away. Although the exposed men were plainly uneasy about their situation there was no violent shoving or leaping into the trench from the side in an effort to seek cover. On another occasion, immediately after a shot, there was a sudden shift in the wind which brought the dark dust cloud toward the troops who had just gotten out of their trenches. Despite the ominous appearance of this cloud and the distinct possibility that it was dangerously radioactive, there was no stampeding away from it on the part of the troop participants. They talked about it uneasily as it approached, but awaited word from the control point on the need to evacuate the area.

From these reactions alone, it would be hazardous to predict what troop reaction would be to the use of atomic weapons in combat. At the exercise they knew beforehand exactly when the bomb would go off and what distance it was from them. In combat such exact knowledge would, of course, be lacking, and anxiety about possible injury from radiation might be acute. When asked how much panic there would be among our troops if the Communists made a surprise atomic bomb attack in Korea, over half the men indicated that there would be serious panic in such an event (see item 24 in the appendix).

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THE QUESTIONNAIRE STUDY

Description of the Groups Studied

Questionnaires were administered to [illegible] enlisted men at Camp Desert Rock on three shots. Of these, [illegible] were administered to men who had just arrived at the camp, and [illegible] to men upon completion of the exercise. All men, in order to attend the exercises, had to have a security clearance of confidential and none of the participants were trainees. Seventy percent of the men had come into the Army by way of Selective Service. Approximately 60% of the men had over two years' active military duty and some combat experience at the time they came to participate in the exercises. About 40% of the participants were first three graders. All of the men had at least a fifth grade education; 45% of them had completed high school. Over 90% of the men were from combat branches.

Initial Misconceptions of the Troop Participants

The responses of these men to the questionnaire administered before the indoctrination and exercise give some indication of the information and opinions they held upon arrival. It is of interest to note than when asked what their main source of information on atomic weapons had been, more of them checked "Army orientation lectures" than any other source, such as movies, books, newspapers or talking with other people. Most of the men felt that these Army orientation lectures had been of real help in understanding protective measures during an atomic attack (see items 61, 8 in the appendix).

Presumably these soldiers, because of their previous exposure to Army orientation lectures on atomic warfare, knew more initially about this area than would a comparable civilian group. Even so, their questionnaire responses indicate than many of them had misconceptions about various aspects of atomic weapons. Most of these erroneous views were in the direction of overestimating various injurious effects of the bomb. For example, 44% of the men on the pre exercise questionnaire indicated there would be some danger of permanent sterility resulting from witnessing an atomic explosion at a distance of two to three miles. Approximately 60% of the troops thought that there was a possibility one could catch radiation from someone exposed to it. More than one-third (39%) thought that those who viewed an atomic explosion from a distance of three miles might become impotent. Over 70% thought that permanent blindness might also be a consequence (see items 40, 33, 39, 38 in the appendix).

These widespread misapprehensions, it will be noted, all refer to effects peculiar to an atomic explosion - radiation, intense light, and heat. Radiation especially, appears to be not too well understood. A majority of the troops on the pre exercise questionnaire stated that radiation was something one could sense directly. Nearly one man in five thought that radiation was responsible for most of the casualties at Hiroshima (see items 31, 19 in the appendix).

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Despite overestimation of radiological effects, the men had a [illegible] understanding of the relative danger of various atomic [illegible] effects. They were asked the following question: "If you were [illegible] combat and were attacked with atomic weapons, how much danger do [illegible] think there would be from each of the following?" (see items [illegible] in the appendix). In this question blast and burn injuries [illegible] rated more dangerous than immediate radiation injuries. [illegible] of impotence and sterility were rated even lower. It [illegible] about atomic effects and dangers [illegible] are not exaggerated to the degree that they [illegible] as more likely to produce injury in combat than are the less [illegible] effects of blast and heat.

Radiation effects of the atomic bomb are unfamiliar and have been [illegible] in secrecy, so it is hardly surprising to find the men [illegible] to admit the possibility of effects like impotence and [illegible]. In a combat situation, however, it seems probable that [illegible] would not be their primary concerns - a source of rumor perhaps - [illegible] probably not panic.

[illegible]formation Gained by the End of the Exercise

At the conclusion of the exercise the troops were significantly [illegible]tter informed about atomic weapons and their effects than they were [illegible] arrival.

In order to get a rough estimate of the amount of information [illegible]quired during the exercise by the troop participants, eleven in[illegible]rmation items were selected from the questionnaire. All troops [illegible] took the questionnaire were given an information score based on the number of information items to which they gave correct [illegible]swers (see items 18, 19, 27, 28, 29, 30, 31, 33, 38, 39, 40 in [illegible] appendix). The average number of correct responses to these [illegible]ms, made by the men who took the questionnaire prior to indoctrina[illegible]on, was five. For those who took the questionnaire at the con[illegible]usion of the exercise, the average number of correctly answered [illegible]ms was seven. In other words, by the end of the exercise the [illegible]oops knew, on the average, two more of these items of information [illegible]an they did when they came.

As on previous studies at Desert Rock, the greatest increases [illegible] percentage of correct responses were on questions dealing with [illegible]rsonal safety. There was additional evidence that the men were [illegible]are of the effectiveness of protective measures by the end of the [illegible]ercise. Two-thirds of the men were aware that ordinary clothing [illegible]forded considerable protection from heat at a distance of a mile [illegible]om an atomic explosion, but little or no protection against [illegible]diation. Over 80% of them knew that loose fitting, light colored [illegible]othing afforded the best protection (see items 35, 36, 37 in the [illegible]pendix).

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There was a significant decrease in the proportion of men who ed that sterility, impotence or blindness would result from hing an atomic explosion at a distance of three miles. The table e presents comparison figures on some of the opinion changes, pre post exercise.

[illegible]

	Pre exercise	Post exercise	% increase in the number of correct responses
r-effect, believed to result m watching an atomic explosion a distance of three miles:			
Percent believing sterility can result	44	21	23
Percent believing impotence can result	39	25	14
Percent believing blindness can result	72	30	42
ets regarding radiation:			
Percent believing can catch radiation from someone who has been exposed to it	39	55	04
Percent believing can feel, taste, or smell radiation	52	38	14

The question regarding the contraction of radiation (see item 33 he appendix) was virtually the only information item on which e was no significant increase in percentage of correct answers the pre to the post exercise questionnaire.

Not only were the men less likely to think that such dire con- ences as sterility and impotence would follow exposure to an ic blast in a trench at three miles, but they had a more accurate about the limits of an atomic bomb's effectiveness and the ection which a trench could afford against most atomic effects item 26 in the appendix).

The indoctrination expressed two themes which at first glance appear somewhat contradictory. There was considerable stress placed upon information which would allay the men's fears about injury from an atomic explosion. Instructors pointed out that most injuries from the bomb at Hiroshima had been due directly or indirectly to the blast effects, and that the danger of these could be materially reduced if personnel were well dug in. This emphasis was obviously designed to make troop participants less anxious about witnessing the coming shot. However, at the same time that the instructors stressed the effectiveness of protective measures against atomic attack in the field, they emphasized the destructive power of the atomic bomb as an offensive weapon.

Interestingly enough, before the indoctrination the men had tended to overestimate certain dangers such as impotence and sterility, but at the same time they underestimated the number of fatalities in Hiroshima from the bomb. After the indoctrination and seeing a shot, the men paradoxically tended to express less concern over the possibility of injury from the bomb, at the same time they raised their estimates of the number of people killed at Hiroshima (see item 18 in the appendix). It is unlikely, however, that this latter shift can be interpreted as a raising of the men's estimate of the bomb's destructive power, since there was no change in a similarly worded question asking for estimates of casualties should a bomb of the same yield be dropped on a large American city such as New York or Chicago (see item 21 in the appendix). In other words, learning through indoctrination that their estimates of the number of casualties at Hiroshima were low, the troop participants raised them on the post exercise questionnaire, but they evidently didn't consider this change relevant to their estimates of how many would be killed by a similar atomic attack on an American city.

The Experience of the Exercise in Relation to Troop Expectations

At the end of the exercise, after the troops had returned from witnessing a shot, they were asked two questions:

> Right when the bomb went off, did it seem more or less powerful than you expected?
>
> After you had an opportunity to look at the damage, how did you feel about the bomb's effectiveness? (see items 58 and 59 in appendix).

On both of these questions, the men were asked to check one of six alternatives ranging from "much more powerful (or effective) than I expected" to "much less powerful (or effective) than I expected." There was a striking difference in the distributions of responses to these two questions. On the first question, a majority of the men said that at the time of the explosion the bomb seemed more powerful than they had expected. But on the second question a majority of

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the men said that after looking at the damage it seemed less effective than they had expected. This difference was amply borne out in observing the men during and after a shot. Immediately after the detonation, when they were given the order to rise from their trenches, the men were obviously awed and interested at the spectacle. An hour before the shot they had seen a ton of TNT set off in the forward area. This seemed as a standard of comparison to the flash and sound of the atomic explosion. The contrast was, to say the least, obvious.

However, when they went to the forward area to view the damage, their disappointment was equally obvious. On the Nevada proving grounds there is virtually no natural object in the area which could show blast or heat effects in any striking manner. The earth in some places is bare so there is no vegetation to char, and the area is very flat so there is nothing to be bent, broken, or turned over. These, of course, are distinct advantages for a technical proving ground, but they do not make for a place in which to impress non-technically trained observers with the bomb's destructive power. Undoubtedly this is why most of the men felt that, in this respect, the bomb's destructiveness fell short of their expectations. On the tower shots they were not allowed far enough forward, because of residual radiation, so that they could see much striking damage to the military equipment which had been placed in the area.

Attitude and Opinion Changes

The primary purpose of the questionnaire study at DR-V was not to assess troop attitudes toward the employment and control of atomic warfare. An attempt was made, however, to determine whether or not the experience of seeing an atomic explosion and being given considerable information about atomic weapons would alter more general opinions about their military use. It is safe to say that most members of the American public have comparatively little accurate information and a great deal of misinformation about atomic weapons. Given such a situation, what is the effect on these opinions and attitudes when considerable authoritative information is presented? The comparison of troop participants' responses to such attitude and opinion items before and after the exercise offered one means of throwing light on this question.

One area of opinion change has already been mentioned. There was significant change in the rated amount of danger the men thought there would be if they should be under atomic attack. The direction of change was not the same for all effects. Blast and burn effects were rated somewhat more dangerous by the end of the exercise, while the dangers of blindness, immediate radiation injury, impotence, and sterility were rated somewhat less dangerous than they were at the beginning of the exercise. These changes are in accord with the information given to the men during the indoctrination.

On attitude and opinion items less immediately relevant to the exercise, there was little or no evidence of significant change.

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There was no real shift in the proportion of men who stated that we should use atomic weapons at the outset of a major war (see items 5a in the appendix). In both questionnaires slightly more than half the men felt that atomic weapons should be employed. Similarly, other items dealing with international control of atomic warfare showed no change. These attitude questions are to be found in the appendix should the reader be interested in seeing how the troop participants responded to them.

Attitudes of Well and Poorly Informed Men

In order to answer this question, all the men who filled out the questionnaire at the conclusion of the exercise were divided into two groups on the basis of the number of information items they had answered correctly. These two groups were then compared on the basis of their answers to a number of attitude and opinion items. Not unexpectedly, the high information group showed a higher educational level than the low information group. There was no difference between the two, however, on such things as rank, length of service, or amount of combat duty.

The high information group differed from the low group in the following ways:

1. They gave less credence to the possibility that the scientists might blow up the world if they continued to experiment with atomic weapons.

2. They had more confidence that the experts knew enough about atomic bombs to use them in military maneuvers without danger to troops.

3. They were less likely to think that the atomic tests had affected weather conditions all over the country.

4. When asked how far they thought Russia had gone in developing atomic weapons, they showed less tendency to take extreme views - either that Russia doesn't yet have atomic weapons, or that the Russians are far ahead of the United States in the development of atomic weapons.

On other items, dealing with such things as the likelihood of war with Russia, or "the chances that you yourself will ever take part in atomic warfare against an enemy," there was no significant difference between the high and low information groups. Most men thought there was some chance of their taking part in atomic warfare against an enemy, and few thought this was either entirely impossible or entirely certain (see items 4B, 5O in the appendix).

It thus appears that the main difference between high and low information groups is that the former are less likely to be superstitious

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about atomic weapons and to ascribe to them a magical power to influence the weather or to blow up the world. From their greater faith in the knowledge of the experts in charge of atomic developments, it appears that these well-informed men regard atomic research in much the same way they would regard other scientific endeavors.

Troop Feelings at the End of the Exercise

In response to the question, "Now that the exercise at Desert Rock is over, how do you feel about it?" (see item 4) in the appendix) the large majority of the men said they were glad they had had a chance to witness a shot. They complained about the living conditions at the camp, especially mess facilities and the length of time they had to stay at the camp before shot day, but felt that the indoctrination and the opportunity to see an atomic explosion made up for these inconveniences and discomforts. Very few of the men felt that being this close to an atomic bomb had left them with any ill effects (see item 62 in the appendix).

Security Briefing Effects

Many of the men were concerned about the security regulations governing what they could and could not talk about when they got back to their home stations. Some had the impression that they should not even mention that they had been to Desert Rock. This feeling is somewhat understandable in view of the security briefing they received. During this briefing, the men were told that they might talk about what they saw, felt and heard at the time of the explosion, but that they were not to discuss the extent of the damage they observed in the forward area. They were also instructed to take no notes or pictures in the forward area. They were warned repeatedly that any security violations were punishable not only under AR 380-5 but under the Atomic Energy Act and that the penalties for such violations were severe.

It seems certain that the emphasis on security which the troop participants received in their indoctrination materially reduced their willingness to talk about their experiences when they returned to their home stations. The uncertainty as to what was and was not classified material probably caused many of them to play safe by saying little about any aspect of their experience at Camp Desert Rock. Previous studies at Desert Rock exercises have indicated that comparatively little communication took place between participants returned from exercises and men in neighboring units. This lack of communication may be due in part to the participants' feeling that it would be a breach of security to talk about their experiences.

It was a constant source of amusement at the camp that the news-papers carried accounts of the atomic tests which included information, usually accurate, which the men had been expressly forbidden to reveal.

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From the information the men were given in their indoctrination and from what they were able to observe in the forward area, there seemed to be little reason for this emphasis on security. Such an attitude could materially reduce one of the potential benefits of such exercises, namely, the dissemination of information to American forces about atomic weapons and defensive measures against atomic attack.

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INTERVIEWS WITH SPECIAL FORWARD VOLUNTEER OFFICERS

Description of the Forward Volunteer Program

For the first time at [illegible], special groups of officer volunteers were given permission to take positions [illegible] near the ground zero than human beings had ever been on an atomic test. Three such groups participated in the [illegible] operations. Most of these officers had come to Camp Desert Rock on special orders for this mission. They had been specially chosen because of their knowledge of and training in the effects of atomic weapons. Upon arrival these men were given information about the expected yield of the atomic device to be detonated, meteorological data, and data about the terrain. With such information, and the data available in the technical manual prepared at the Command and General Staff School at Fort Leavenworth on atomic effects, each officer volunteer was directed to arrive at an estimate of how far forward he could take a dug-in position so that the various atomic effects such as blast, heat, radiation, etc. would not exceed the specified maxima. After each of the volunteers had completed his computations and arrived at an individual decision, he met with the other members of his volunteer group and a group decision was made as to how far away from the atomic device they would be willing to be. This decision was then presented to the commanding general of the camp for final approval. A trench at the approved distance was then prepared for the volunteer group.

On the day of the shot these officers, equipped with a variety of instruments for measuring radiation, moved into this trench. They were in touch with the control point by telephone. Immediately after the shot they phoned back to report all secure and to give initial instrument readings, after which they left their trench position to be met by trucks and taken back to the camp area.

Initial Interviews with the Volunteers

An effort was made to interview volunteers on shots 2 and 7. The pre shot interviews for shot 2 were satisfactory. Due to unanticipated difficulties in security enforcement, the post shot interviews were not adequately carried out. These difficulties were overcome on shot 7 and the discussion which follows is based on information obtained from volunteers who participated in this shot.

On shot 7, the third shot on which such a volunteer group participated, all members of the group were interviewed individually before and after the shot. These interviews were designed not to obtain technical information concerning atomic effects at this distance, but to get some notion of the human reactions to such a situation.

There were eight officers in this group of volunteers. Of the eight, seven possessed extensive formal training in atomic weapons and their effects. Five had seen an atomic blast on some prior

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occasion. One member had been in the two previous volunteer groups, an experience which gave him a key role in this group.

The most striking feature from the pre shot interviews with these volunteers was the equanimity with which they regarded the experience they were about to undergo. Little anxiety was expressed during this interview, about danger of injury. Individual estimates made by the members of this volunteer group had been in close agreement and all were quite satisfied with the data finally agreed upon. All officers acquainted with the technical manual seemed to place great confidence in it and to feel that it gave them adequate data upon which to base their computations. The group appeared to draw considerable assurance from the presence of a man who had been in the two previous volunteer groups. The fact that he had come through it all right before made the others less apprehensive about their participation as volunteers in this shot.

Post Shot Interviews with the Volunteers

The post shot interviews revealed that events immediately before and after the blast had gone smoothly and about as expected. Each member was asked what aspect of the experience had been most surprising or unexpected. In this respect several mentioned surprise at the heat; others mentioned the long duration of the initial light; and the heavy fallout was also mentioned. None reported injury or pain from any of the effects, though all were caused some discomfort by the large amount of dust in the area after the blast.

The major conclusions which they felt could be drawn from their experience as volunteers are listed and discussed below.

1. Increased confidence in the technical manual upon which they had based their calculations.

This manual had led them to predict the magnitude of various effects from the atomic explosion at this distance, and their instrument readings during the actual shot had substantially confirmed these predictions. The members of the group felt that their having employed the manual successfully in this manner would increase confidence in it throughout the service.

2. Other troops participating in atomic maneuvers would be less anxious, knowing that such volunteer groups had taken positions closer to the bomb than others had been asked to go.

As one officer in the group put it: "Nothing new will be learned about atomic effects as such by our being up there. That could be done better by putting instruments, rather than men, in the trench. Effects that can be read in a book now can be proved by actual experience. Reports of what we have experienced will have wide circulation and these reports will help indoctrinate troops who have not

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experienced the blast." Just as the members of this group drew assurance from the presence of a man who had previously participated as a forward volunteer, so they thought that the fact of their having been through it would give support to others in the future.

3. All officers in this group felt that they would have been able to assume command functions immediately after the blast.

Their opinion was that no one was seriously disturbed by the experience, and that the thick dust after the shot would have been much more of a problem than the psychological reactions of the commanders concerned.

4. There was no point in continuing the special volunteer groups on subsequent shots.

These officers felt that the mission of these groups was essentially accomplished, and that nothing new would be learned by having additional groups go through the same procedure. Most of them felt that personally they would be willing to go through it again, even at a shorter distance, if the maximum effects restrictions could be lifted.

5. None of these officers felt that the experience had materially changed their views on the possibilities and limitations of atomic warfare.

6. There was nothing to be gained from stationing large numbers of troops at this distance on subsequent exercises.

7. Some of the dosimeters and other instruments they had taken into the trench with them had proved difficult to read after the blast when visibility was lowered by the thick dust. They felt it would be important to design these instruments so that they would be more readable under adverse conditions.

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APPENDIX

This appendix contains the information and statistical items employed in the questionnaire administered to troop participants. Most of these items were of the multiple choice variety in which the men were instructed to check the alternative answer which seemed most correct, or closest to their opinion. Under each question these alternatives are listed together with the percentage of the men checking each on the initial and final questionnaire. In each column of figures the number in parentheses indicates the number of men upon which these percentage figures are based. The number of respondents is not the same for each question since some questions were used on only one shot, while others were used on two or three. Questions marked with an asterisk are those which showed a statistically significant change from a comparison of the initial and final questionnaires.

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	Pre shot %	Post shot %
1) How did you come into the Army this time?		
I was called in from the Reserve	2	2
National Guard was called up	2	3
I was drafted	69	67
I volunteered for the Regular Army	28	30
No answer	0	1
	(n = 226)	(n = 165)
2) What is your Army grade?		
Private (E-1 or E-2)	14	8
Private First Class (E-3)	17	31
Corporal (E-4)	24	27
Sergeant (E-5)	24	19
Sergeant First Class (E-6)	15	11
Master or First Sergeant (E-7)	5	3
No answer	1	1
	(n = 234)	(n = 268)
3) What branch of the Army are you in now?		
Engineers	0	1
Artillery	31	44
Medical	2	0
Infantry	50	50
Signal	1	0
Transportation	1	1
Armored	5	2
Ordnance	3	0
Quartermaster	2	2
Military Police	2	1
No answer	5	1
	(n = 129)	(n = 222)
4) How much ACTIVE military duty altogether have you had?		
Less than a year	14	21
Over a year up to two years	21	15
Over two years up to four years	29	28
Over four years up to six years	12	23
Over six years	24	13
	(n = 168)	(n = 47)

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	Pre shot %	Post shot %
5) How many months of combat duty have you had (duty within range of enemy artillery)?		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible] a year	[illegible]	[illegible]
[illegible] a year	[illegible]	[illegible]
No answer	[illegible]	2
	(n = 226)	(n = 165)
6) How far have you gone in school?		
Less than 8th grade	6	6
Finished 8th grade	16	17
Finished 9th grade	3	10
Finished 10th grade	16	16
Finished 11th grade	9	10
Finished 12th grade	30	26
Some college but didn't finish	13	11
Graduated from college	6	4
No answer	0	1
	(n = 226)	(n = 165)
7) In the last year how many separate training talks do you remember hearing on defense against atomic attacks?		
None at all	26	15
One or two	40	44
Three or four	16	24
More than four	19	14
No answer	0	3
	(n = 58)	(n = 118)
8) Have these talks helped you to understand how you can protect yourself in case of atomic attack?		
I have not heard any talks on the subject	22	9
The talks helped me a great deal	38	53
The talks helped me a little	34	35
The talks did not help me at all	5	1
No answer	0	2
	(n = 58)	(n = 118)

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	Pre shot %	Post shot %
9) How much do you think any kind of advance training or indoctrination would help in preparing men for combat in which atomic weapons were used?		
No help at all	1	2
Would help very little	4	3
Would help a fair amount	[illegible]	[illegible]
Would help a great deal	86	84
No answer	0	1
	(n = 168)	(n = 151)
10) Do you think men who have been on these maneuvers at Desert Rock would be more or less likely to panic if they were attacked with atomic weapons?		
Much more likely to panic	10	12
Somewhat more likely to panic	9	8
Neither more nor less likely to panic	7	5
Somewhat less likely to panic	34	22
Much less likely to panic	40	52
No answer	0	2
	(n = 58)	(n = 116)
11) If you found yourself in combat in which atomic weapons were used, how well do you honestly think you could do your job as a soldier?		
Could do my job very well	32	40
Could do my job pretty well	36	32
Could do just a fair job	25	22
Could not do a good job at all	8	4
No answer	0	1
	(n = 168)	(n = 151)
*12) If you were in combat and were attacked with atomic weapons, how much danger do you think there would be from blast injuries?		
Great danger	45	59
Some danger	43	28
Little danger	11	9
No danger	1	1
No answer	1	3
	(n = 226)	(n = 269)

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	Pre shot %	Post shot %
*13) If you were in combat and were attacked with atomic weapons, how much danger do you think there would be of burns from heat alone?		
Great danger	57	14
Some danger	37	43
Little danger	4	33
No danger	0	4
No answer	2	3
	(n = 226)	(n = 269)
*14) If you were in combat and were attacked with atomic weapons, how much danger do you think there would be of being blinded?		
Great danger	20	7
Some danger	39	17
Little danger	31	43
No danger	6	28
No answer	3	4
	(n = 226)	(n = 269)
*15) If you were in combat and were attacked with atomic weapons, how much danger do you think there would be of immediate injury from radiation?		
Great danger	24	14
Some danger	44	34
Little danger	28	35
No danger	6	12
No answer	2	3
	(n = 226)	(n = 269)
*16) If you were in combat and were attacked with atomic weapons, how much danger do you think there would be of being made unable to have sexual intercourse?		
Great danger	9	4
Some danger	22	10
Little danger	42	30
No danger	25	51
No answer	2	4
	(n = 226)	(n = 269)

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	Pre shot %	Post shot %
*17) If you were in a boat and were attacked with atomic weapons, how much danger do you think there would be of being unable to have children?		
Great danger	7	4
Some danger	24	11
Little danger	43	31
No danger	21	50
No answer	2	4
	(n = 226)	(n = 269)
*18) How many people in Hiroshima do you think were killed by the atomic bomb in 1945?		
Less than 5,000	5	4
5,000 to 10,000	13	5
10,000 to 25,000	16	10
25,000 to 50,000	17	13
50,000 to 75,000	20	24
75,000 to 100,000	16	38
More than 100,000	12	4
No answer	0	1
	(n = 226)	(n = 269)
*19) What do you think caused the greatest number of casualties from the atomic bomb attacks at Hiroshima and Nagasaki?		
Lack of oxygen after the explosion	5	4
Blast effects and falling objects	40	63
Burns from the flash or fires	35	22
Radiation	18	7
No answer	1	1
	(n = 226)	(n = 165)

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	Pre shot %	Post shot %
20) If the Communists made a surprise atomic bomb attack against our troops in Korea tomorrow, what percent of our troops within three miles of the burst do you think would be killed or seriously injured?		
1% - less	17	11
1-5%	12	12
6-10%	9	5
11-15%	12	11
16-20%	12	5
21-25%	6	7
26-30%	2	10
31-35%	6	8
36-40%	11	9
More than 40%	0	2
No answer	(n = 168)	(n = 151)
21) Suppose that an enemy made a surprise attack with a single atomic bomb against an American city like New York or Chicago - about how many people do you think would be killed or seriously injured?		
Less than 5,000	2	2
5,000 to 10,000	4	6
10,000 to 25,000	10	6
25,000 to 50,000	12	11
50,000 to 75,000	18	13
75,000 to 100,000	18	21
100,000 to 500,000	27	34
More than 500,000	10	7
No answer	0	1
	(n = 168)	(n = 151)
22) Suppose that an enemy made a surprise attack with a single atomic bomb against an American city like New York or Chicago - what percent of the buildings <u>within 2 miles</u> of the burst do you think would be completely destroyed or very heavily damaged?		
Less than 5%	5	7
5% to 10%	10	14
10% to 20%	7	15
20% to 40%	19	15
40% to 60%	34	25
60% to 80%	16	18
More than 80%	9	7
No answer	0	1
	(n = 99)	(n = 118)

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	Pre shot %	Post shot %
23) If this country were attacked by an enemy who used atomic weapons, what do you think the chances would be that some civilian member of your family would be killed or badly injured?		
Almost certain	10	6
About a fifty-fifty chance	45	47
About one chance in five	8	9
About one chance in ten	17	20
Hardly any chance at all	20	16
No answer	0	1
	(n = 168)	(n = 151)
24) If the Communists made a surprise atomic bomb attack in Korea, how much panic do you think there would be among our troops?		
Our troops would be completely disorganised	19	10
Serious panic, but it could be controlled	43	41
Some panic, but it would be over fairly quickly	22	34
No panic at all except in area very close to bomb	14	13
No answer	2	2
	(n = 58)	(n = 118)
25) If a man were directly below an atomic bomb air burst at 2000 feet, and if he were not killed by blast or radiation, do you think he would be killed by the heat alone?		
He would probably be killed by the heat alone	69	53
He would probably not be killed by the heat alone, but he would be very badly burned	19	37
He would probably be only slightly burned	9	5
He would probably not be burned at all	3	3
No answer	0	1
	(n = 58)	(n = 118)

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	Pre shot %	Post shot %
*26) If you were in a trench four miles from an atomic bomb burst how much heat do you think you would feel?		
A great deal of heat	7	4
A fair amount of heat	19	15
A little heat	32	47
No heat at all	23	34
	(n = 168)	(n = 47)
*27) Suppose troops moved to a spot 3/4 of a mile away (from ground zero) one hour after an atomic bomb burst at 300 feet, how much danger do you think they would be in?		
A great deal of danger	19	19
Quite a lot of danger	28	18
A little danger	33	40
No danger at all	20	22
No answer	0	1
	(n = 226)	(n = 269)
28) Is radiation sickness always fatal?		
Yes, always	12	12
No, not always	88	87
No answer	0	1
	(n = 226)	(n = 268)
*29) If a man attended a great many test explosions of the atomic bomb, would it make it more dangerous for him to go into an area which had been recently bombed with atomic weapons?		
No, would not make it more dangerous	59	36
Might make it just a little more dangerous	20	25
Might make it quite a bit more dangerous	7	9
Would definitely make it more dangerous	14	28
No answer	1	1
	(n = 168)	(n = 151)

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	Pre shot %	Post shot %
*30) If a man received a large dose of radiation from an atomic explosion, would he know it right away, or do you think it would be some time before he felt sick?		
Would know it right away	38	13
Would feel sick in one or two hours	26	30
Would feel sick in about 24 hours	30	21
Would feel sick in about a week	14	35
Would feel sick in two or three months	2	1
	(n = 165)	(n = 151)
*31) How easy do you think it would actually be to feel, taste, or smell radiation from an atomic bomb?		
Very easy	17	8
Fairly easy	13	8
Fairly difficult	21	21
Impossible	48	62
No answer	0	1
	(n = 226)	(n = 269)
*32) How often can instruments (such as Geiger counters) detect all dangerous radiations after an atomic explosion?		
Always	29	55
Almost always	43	25
Fairly often	9	11
Very seldom	17	8
No answer	2	1
	(n = 58)	(n = 118)
33) How easy is it for a person to catch radiation from someone who has been exposed to it?		
Very easy	13	14
Fairly easy	22	14
Fairly hard	25	26
Impossible	41	44
No answer	0	1
	(n = 229)	(n = 269)

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	Pre shot %	Post shot %
34) After radioactive particles get on the skin, how many of them can be removed by scrubbing with soap and water?		
Almost all of them can be removed	52	47
Most of them can be removed	14	25
Few of them can be removed	22	9
Almost none of them can be removed	12	8
No answer	0	1
	(n = 58)	(n = 118)
35) If you were about a mile away, how much do you think ordinary clothing would protect you against burns from an atomic bomb?		
Would protect a great deal		26
Would protect a fair amount		41
Would protect just a little		25
Would protect not at all		8
		(n = 104)
36) If you were about a mile away, how much do you think ordinary clothing would protect you against radiation from an atomic bomb?		
Would protect a great deal		20
Would protect a fair amount		15
Would protect just a little		33
Would protect not at all		32
		(n = 104)
37) If you were caught by an A-bomb burst, what kind of clothing would be safest?		
Loose fitting, dark in color		10
Tight fitting, dark in color		3
Loose fitting, light in color		83
Tight fitting, light in color		4
		(n = 104)

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	Pre shot %	Post shot %
*38) How often does watching an atomic bomb explode three miles away cause permanent blindness?		
Almost always causes permanent blindness	10	6
Fairly often causes permanent blindness	17	6
Very seldom causes permanent blindness	46	18
Never causes permanent blindness	28	70
No answer	0	1
	(n = 226)	(n = 269)
*39) How many men three miles from an atomic bomb explosion would be unable to have sexual intercourse because of radiation effects?		
Many of them would be unable to have sexual intercourse	7	4
Quite a few would be unable to have sexual intercourse	9	6
Hardly any would be unable to have sexual intercourse	22	14
None of them would be unable to have sexual intercourse	61	74
No answer	1	2
	(n = 226)	(n = 269)
*40) Would radiation from an atomic bomb explosion make men two or three miles away permanently sterile?		
Many men would be permanently sterile (unable to become fathers)	4	2
Quite a few men would be made permanently sterile	10	3
Hardly any men would be made permanently sterile	31	12
No men would be made permanently sterile	55	81
No answer	0	1
	(n = 226)	(n = 269)

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	Pre shot %	Post shot %
*41) Which one of the following types of burns is most like the flash burns on exposed skin caused by the heat wave of an atomic bomb?		
Burns from sunlight	7	5
Burns from a hot stove	9	15
Burns from gunpowder	3	6
Burns from radium	79	61
No answer	2	3
	(n = 58)	(n = 118)
42) Have you heard anything about another type of atomic weapon called the H-bomb (hydrogen bomb)?		
Yes	91	92
No	9	7
No answer	0	2
	(n = 58)	(n = 118)
43) How do you think this H-bomb would compare with the A-bomb?		
Very much more powerful than the A-bomb	60	65
Somewhat more powerful than the A-bomb	19	23
About the same power as the A-bomb	7	4
Somewhat less powerful than the A-bomb	9	1
Much less powerful than the A-bomb	0	2
Can't answer - never heard of it	3	4
No answer	2	1
	(n = 58)	(n = 118)
44) How much effect do you think the atomic tests at Desert Rock have had on weather conditions all over the country?		
A very large effect	5	3
Quite a bit of effect	14	10
A little effect	22	28
No effect at all	58	58
No answer	1	1
	(n = 168)	(n = 151)

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	Pre shot %	Post shot %
45) Some people are afraid that if scientists go on experimenting with atomic weapons, they may start a chain reaction that could blow up the whole world. What do you think about this?		
Those like this are just nonsense	34	37
This might be possible, but nothing to worry about	45	41
I think there is some danger of something like this	18	14
I think there is great danger of something like this	4	5
No answer	0	2
	(n = 226)	(n = 269)
*46) Do you think the experts know enough about atomic bombs to use them in military maneuvers without danger to our troops?		
Yes, enough to use them without any danger at all	45	52
No, there would be just a little danger to our troops	35	30
No, there would be a fair amount of danger to our troops	11	11
No, there would be a lot of danger to our troops	10	6
No answer	1	1
	(n = 168)	(n = 151)
*47) Since the first atomic bomb exercise in 1951, how many men would you guess have been hurt enough by the atomic bomb to need hospitalization?		
No men	10	25
Less than five men	16	32
Five to ten men	26	12
Ten to twenty men	17	16
More than twenty men	29	13
No answer	2	2
	(n = 58)	(n = 118)

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	Pre shot %	Post shot %
48) What do you think are the chances of you, yourself, ever taking part in actual atomic bomb warfare against the enemy?		
Almost certain	7	5
Very good chance	22	34
Fairly good chance	32	34
Some chance, but not much	32	28
Almost no chance	8	7
	(n = 148)	(n = 267)
49) What chance do you think there is that the Communists will use atomic weapons against us in Korea within the next year or two?		
Very good chance	3	5
Fairly good chance	14	3
Some chance, but not much	24	30
Hardly any chance	41	45
No chance at all	17	15
No answer	0	2
	(n = 58)	(n = 218)
50) Do you think that the United States will ever go to war against Russia?		
Yes, within the next year	2	2
Yes, within three years	20	17
Yes, within five years	20	24
Yes, within ten years	25	28
No, not in next ten years	27	28
No answer	6	1
	(n = 168)	(n = 151)
51) Compared with the United States, how far do you think the Russians have gone in developing atomic weapons?		
Don't believe Russians have atomic weapons yet	8	9
Russians know how to make A-bomb, but they are far behind us in developing it	36	40
Russians are just a little behind us in developing atomic weapons	30	29
Russians know as much as we do, but they can't make as many bombs	23	18
Russians are ahead of us in developing atomic weapons	3	2
No answer	0	3
	(n = 226)	(n = 269)

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	Pre shot %	Post shot %
52) Do you agree with the decision to use the atomic bomb against the Japanese cities in 1945?		
Yes, I agree	88	87
No, I don't agree	10	10
No answer	3	3
	(n = 168)	(n = 151)
53) How much do you think questions of right and wrong should enter into decisions to use atomic weapons?		
Not at all; it's just a question of military tactics	65	90
Right and wrong come into it a little bit	11	10
Right and wrong come into it a fair amount	7	12
Right and wrong come into it a great deal	15	6
It's entirely a matter of right and wrong	22	20
No answer	0	1
	(n = 166)	(n = 151)
54) If the United States got into a major war within the next year, when do you think we should use atomic weapons?		
Should use them immediately	98	99
Should use them only if war is going against us	13	14
Should use them if enemy is using them first	16	12
Should use them only to avoid certain defeat	13	9
Should not use them under any circumstances	0	5
No answer	0	1
	(n = 167)	(n = 151)

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	Pre shot %	Post shot %
*55) If we decided to use atomic weapons against the Communists in Korea, what do you think would be the most likely to happen?		
It would end the fighting almost immediately	24	20
It would be fairly effective, but wouldn't end the fighting right away	47	43
It wouldn't be very effective; the enemy would just dig in deeper and go on fighting	10	25
The Communists would use atomic weapons too, but we would do better at this kind of war	16	6
The Communists would use atomic weapons too, and we would have to pull out of Korea	2	2
No answer	2	4
	(n = 58)	(n = 118)

56) Who do you think should decide whether to use the atomic bomb in Korea?

The United Nations	41	35
The leaders of the allied nations	16	14
The people of the United States by special vote	17	11
The Congress of the United States	5	14
The President of the United States	7	9
The Commanding General in Korea	14	16
No answer	0	2
	(n = 58)	(n = 118)

57) Some people believe that all atomic developments, including atomic weapons, should be controlled by an international body rather than by each country separately. If it could be worked out, would you favor or oppose such a plan?

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Strongly favor	34	26
Somewhat favor	28	27
Would make no difference	9	14
Somewhat opposed	12	15
Strongly opposed	16	15
No answer	3	3
	(n = 58)	(n = 118)

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Post shot
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58) Right when the bomb went off at Desert Rock, did it seem more or less powerful than you expected?

Much more powerful than I expected	—
Somewhat more powerful than I expected	12
Just a little more powerful than I expected	7
Just a little less powerful than I expected	13
Somewhat less powerful than I expected	13
Much less powerful than I expected	7
No answer	2
	(n = 165)

59) After you had an opportunity to look at the damage, how did you feel about the bomb's effectiveness?

Much less effective than I expected	19
Somewhat less effective than I expected	21
Just a little less effective than I expected	20
Just a little more effective than I expected	8
Somewhat more effective than I expected	8
Much more effective than I expected	21
No answer	3
	(n = 165)

60) In your opinion, how good was the briefing and indoctrination you received at Desert Rock?

Very poor	7
Just fair	8
Fairly good	9
Good	35
Excellent	40
	(n = 150)

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	Pre shot %	Post shot %
61) Where do you think you have gotten most of your information about atomic weapons?		
From newspapers	5	4
From books or magazines	14	14
From talking to other people	13	10
From service (including newsreels)	20	15
From Army training talks and lectures	42	53
No answer	1	2
	(n = 226)	(n = 165)
62) Do you think the atomic explosion has made you sick or affected you physically in any way?		
Yes, it has		0
I don't feel so well, but it may not be due to the bomb		11
No, it has not		89
		(n = 47)
63) Now that the exercise at Desert Rock is over, how do you feel about it?		
Glad I got a chance to come		85
All right, but I wouldn't volunteer to come on this maneuver		15
Would rather have stayed at my home station		0
		(n = 47)

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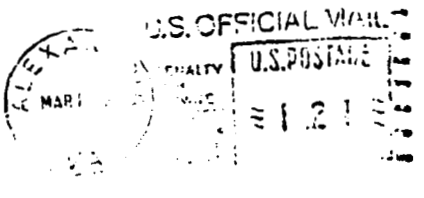

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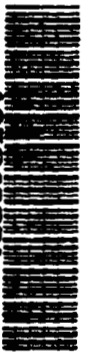
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