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TECHNICAL REPORT

67-57-PR

ATTITUDES OF TROOPS IN THE TROPICS

An abridgement of research reports

Submitted by

Rowland and Company

Haddonfield, New Jersey

Captain Robert J. Lee, MSC (Editor)

Pioneering Research Division

U. S. Army Natick Laboratories

Contract Nos. DA19-129-QM-2076(OL 6146)

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February 1967

UNITED STATES ARMY
NATICK LABORATORIES
Natick, Massachusetts 01760

Pioneering Research Division

EPT-6

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FOREWORD

This publication is an abridgement of research reports submitted by Rowland and Company, Inc., to the U.S. Army Natick Laboratories, Natick, Massachusetts. The original reports are referenced as:

Lucier, R.O., Hart, G.L., and Rowland, G.E., Attitudes of troops in the tropics. R&C Report No. 63-29 (Contract No. DA19-129-QM-2076 (ol 6146)). QMR&E Command, Natick, Mass., and Rowland and Company, 12 July 1963.

Hart, G.L., Faust, R.A., Jr., Rowland, G.E., and Lucier, R.O., Attitudes of troops in the tropics. R&C Report No. 64-19. (Contract No. DA19-129-QM-2076(N). U.S. Army Natick Laboratories, Natick, Mass., and Rowland and Company, 12 October 1964.

These reports are components of Project No. 7X95-01-001, Unclassified.

The objective of the research was to determine the effects of tropical operations upon the opinions and attitudes of U.S. Army troops with respect to items of food, clothing and equipment. Ways and means were to be developed to obtain, summarize and suggest uses for normative information on such attitudes in order to bring about more effective military operations in the tropics.

The Project Officer for the U.S. Army Natick Laboratories was Captain Robert J. Lee, MSC, of the Pioneering Research Division, who also served as the editor of this report.

S. DAVID BAILEY
Director
Pioneering Research Division

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ABSTRACT

Data were compiled to determine the effects of tropical operations on opinions and attitudes of the soldier regarding food, clothing, and equipment. Three groups, both combatant and non-combatant, from Panama, Okinawa and Hawaii, participated. The objective was to obtain, summarize and suggest uses for this information for more effective military operations in the tropics.

Items of clothing and equipment developed for a tropic environment were regarded as generally acceptable. Overall, foods were acceptable with quality preferred over quantity.

Cooperation or uncooperation in responses was linked to factors of age, education, rank, time in the Army, and combat experience. The Panama group rated the highest in most of these categories. Other variables included water, climate, insects, entertainment and family associations. Specific conclusions are listed regarding methodology and equipment.

ATTITUDES OF TROOPS IN THE TROPICS

I. GENERAL CONSIDERATIONS

A. Introduction

Perhaps the most important single concept in social psychology today is the concept of "attitude". Unfortunately, while reviewing the literature for the present study, it has been found that there is much to be desired in the field of attitude conceptualization and attitude theory. While some researchers use the term "attitude" to mean one thing, other researchers use the term differently. Other investigators assume that everyone agrees as to the nature and development of attitudes and therefore fail to define their terms and explicitly state their assumptions. Some writers use the term "attitudes", "beliefs", and "opinions" as syncnyms, while others make sharp distinctions between these constructs. An example of this is Abelson (1959, p. 102):

> "Unlike some others who have used these terms, we are using them interchangeably in the report. There is no concensus among social scientists about what these words mean."

Consider also the following conflicting positions: some researchers hold that an attitude is a response, while other maintain that it is a readiness to respond. Some employ the term both as a response and as a readiness to respond. Some state that an attitude is composed of pure affect, others hold that both affect and cognition enter into attitudes, and still others do not state their positions. Thus, attitudes have been construed as both event and process, static and dynamic, affect and cognition or affect alone, future tendencies and past performances, and various combinations of these and other dimensions. A brief review of the literature should convince the reader of the chaotic state in the conceptualization of attitude. It should be noted at this point that this research team has not attempted to produce a comprehensive review. The reader is referred to the article by McNemar (1946) and Moscovici (1963) for more comprehensive study.

B. Attitude: Tendency or Response?

Klineberg (1962) provides two definitions for attitude preferring the latter; the first is related to values, the second is a disposition to react. Allport (1954, p. 43) says that: "Attitude cnnnotes a neuropsychic state of readiness for mental and physical activity.". Morgan (1956, p. 626) similarly defines attitude as: A tendency to respond either positively (favorably) or negatively (unfavorably) toward certain persons, objects or situations.". Osgood, Suci, and Tannanbaum (1957, p. 189) seem to follow the general pattern with their view that attitudes are: "..predispositions to respond, but are distinguished from other such states of readiness in that they predispose toward an evaluative response.". Therefore, it can be seen that these authors hold that attitude falls into the category of a "tendency" or readiness or predisposition to respond to a psychological object.

Since a tendency or predisposition or readiness indicates a potential for some reaction in the future, it would appear that in most instances the "tendency" relates to classes of objects rather than to specific objects. A response, on the other hand, implies a reaction to a specific object in the present, past, and hence must be differentiated from a "tendency" to respond. Green (1954, p. 336) has summed up in a review of definitions of attitude:

> "It is apparent that the concept of attitude implies a consistency or predictability of responses. An attitude governs, or mediates, or predicts, or is evidenced by a variety of responses to some specified set of social objects or situations."

According to this view, when an attitude (tendency) has been actuated into some specific behavior towards a psychological object, the behavior is labelled a "response". One no longer has a tendency to respond (something which has a probability loading of happening in a certain way in the future) and instead one has something called a response or reaction which is happening in the immediate present or has happened in the past.

Logically, a "tendency to respond" and a "response" cannot be one and the same thing, thus, they should not be classified under an identical label. No small portion of the confusion in the research on attitudes may arise from the fact that some authors use the term attitude to mean a "tendency to respond", while others use this term to mean the "response" or "action". For example, Helen Peak (1959) states that: "This term (attitude) is used to refer to an affective or evaluative reaction which is organized around some situation or some object.". Axelrod (1959) states that M. Rosenberg, E. Carlson, and Helen Peak express a common theory of attitude structure "....an individual's attitude, defined as an evaluative response to an attitude object....". Das and Nanda (1963) state that: "Attitudes are evaluative verbal responses....".

On the other hand, Thistlethwaite, Moltz, Kamenetzky, and de Haan (1955) hold that the distinction between "disposition to respond" and "response" is inconsequential. They sum up their stand in a single paragraph:

> "'Attitude' may be conceived as a dispositional concept reducible to specified observations of behavior. The behavior in terms of which attitudes are specified in this report is the preferential behavior of the respondent in making choices as to which alternatives in a series of multiple-choice questionnaire items he prefers, or agrees with most nearly. This preferential behavior may be taken as an indicant of some unobservable attitude or sentiment, or it may be treated as if it constitutes the full meaning of the term 'attitude'. Pragmatically, it makes little difference which of these positions is adopted."

Other authors explicitly distinguish between attitude as a tendency to respond, and a response which is associated with an attitude. Cameron and Margaret (1951, p. 64) point up this difference clearly:

> "The attitude is the widespread, diffuse, behavioral background which prepares for, supports, and prolongs certain responses and not others. A response, on the other hand, is the more specific, localized aspect of a reaction which emerges from and is supported by the attitude.... Responses and their supporting attitudes are constituents of the unitary, temporal organizations we call reactions."

At this point, the writers wish to bring attention to a strategic failure in attitude research. From the account in the pages above, it can be seen that there is no concensus regarding whether attitudes are responses or tendencies to respond. This theoretical controversy would be acceptable as such for such is the stuff of science. It has been observed, however, that many writers accept the view that responses to survey items are direct measures of attitudes! Some authors draw their support for this action from Osgood, et al (1957), Kjeldergaard (1961), Fishbein and Raven (1959), and Manis (1961).

There have been alarms sounded from mental measurement oriented specialists that this cannot be done. Jahoda, Deutsch, and Cook (1951, p. 112-113), stress the difference from their frame of reference:

> "Many of the methods of social psychology are directed toward obtaining measures of behavior in specific situations under conditions which permit inferences about attitudes. Measurement of the characteristics of an attitude is always indirect. Unfortunately, in practice the inferential nature of the measurement of attitudes is frequently glossed over."

Newcomb (1950, p. 154) speaks as follows:

> "Attitudes....are not themselves responses but states of readiness to respond. Hence, they can be measured only indirectly. More precisely, they are inferred from responses, various dimensions of which are measured. We shall thus use the term 'attitude response' to refer to behavior (mainly of the verbal nature) from which attitudes are inferred."

Green (1954, p. 335), also viewing the field from a measurement orientation, says: "The concept of attitude does not refer to any one specific act or response, but an abstraction from a large number of related acts or responses." He defines an attitude as a disposition to react favorably or unfavorably to a class of objects, and then adds:

"This disposition may, of course, be inferred from a variety of observable responses made by the individual when he is confronted by a member of the class of objects toward which he has an attitude."

In spite of these warnings, it is apparent that much attitude research regards item responses as direct measures of attitude and reifies these responses as facts. This viewpoint is seemingly adopted as an article of blind faith.

As will be seen later, data from the present study clearly reveal that what one gets as answers to survey items can be at variance with the facts. What people "say" and what people "do" are two entirely different things at times. What people "think" and what people "say" are often different. Moreover, in this day and time, even a lay person will appreciate the fact that unconscious levels of mental behavior may produce responses whose sources are unrecognizable to the individual. Soldiers hold an "official" attitude toward their officers as well as a private one - and the two may be 180° apart. Psychologists should not be surprised at this, and they should be prepared to get past this kind of behavior.

C. Attitude: Cognition - Affect or Pure Affect?

As was mentioned earlier, some behavioral scientists consider attitudes to be purely affective, while others postulate that various mixtures or compounds of cognition and affect are part and parcel of an attitude.

Rosenberg (1960) points up the issue of the two approaches, affect only and cognition-affect, thusly:

> "Most, though by no means all, definitions of the attitude concept have been restricted to the emotional 'Einstellung': when some object regularly and dependably elicits an affective evaluative set that can be characterized as either 'pro' or 'con', 'positive'or 'negative', the individual is said to hold an attitude.... a concern with both the affective and cognitive components of attitudes leads to a useful clarification of their structured properties and to a useful formulation of the attitude-change process."

1. Cognition-Affect

The "cognition and affect" theorists were divided into two general classes: those who employ a "mixture" concept and those who employ a "compound" concept. The "mixture" theorists generally segment cognition and affect of an attitude into separate components, in which the cognitive component is a belief, and the affective component of an attitude is all that remains after belief has been removed. The "compound" theorists generally hold that attitudes have aspects of both cognition and affect in varying proportions.

The distinction between the "mixture" theorists and the "compound" theorists is generally clear. Adherents of each approach usually employ vocabularies which indicate their respective theories. The "mixture" theorists , postulate attitudes as consisting of two virtually independent but interacting components -- cognition and affect. These components are separable into pure elements: belief is the cognitive element, affect is the emotional (feeling) element. Belief is "operationally defined" by some authors as a probability function (e.g., true, false, correct, incorrect), while Osgood, et al (1957, p. 190) define belief as a judgemental function (scalable in polar terms, e.g., fast -- slow, stable-changeable, heavy-light, etc.). Affect is the emotional dimension (e.g., good-bad, right-wrong) or, in Osgood, et al (1957, p. 193), it is such scales as pleasant-unpleasant or good-bad. The point to be emphasized here is that cognition and affect are assumed to be two discrete components separable into pure elemental forms, each without trace of the other.

One of the adherents of the mixture theory is Katz (1960). He concludes that "attitudes include both the affective, or feeling core of liking or disliking, and the cognitive, or belief elements which describe the object of the attitude, its characteristics, and its relations to other objects.". Rosenberg (1960) delineates a similar view when he conceives of an attitude as "....consisting of a cognitive as well as an affective component.". Krech, Crutchfield and Ballachey (1962, p. 140) while concurring with Katz and Rosenberg on the components of an attitude, add "action tendency" as they proclaim: "The cognitive component of an attitude consists of the beliefs of the individual about the object....The feeling component of an attitude refers to the emotions connected with the object.". P.T. Young (1961, p. 521), is one of the few who uses the terms "aspects" and "components" interchangeably.

The "compound theorists", while postulating cognition and affect, as contributing vectors in their definition of attitude as measured or as a theoretical construct, specifically state or imply that cognition and affect are integrated in the totality of the individual in such a manner that are not separable. According to their theory there are aspects of cognition and affect which indicate that these two concepts are inseparable. There are proportions of cognition and affect involved in attitude: that is, there are instances where an evaluation may be predominantly cognitive (with concomitant smaller proportion of affect). To state it another way, all evaluations have significant proportions of affect and cognition.

The "compound theorists" seem as definite in their stand as do the "mixture theorists" although some with one orientation may have shifted to another orientation through time. Thurstone in at least one instance (1959, p. 216), held that: "The concept 'attitude' will be used here to denote the total sum of a man's inclinations and feelings, prejudice or bias, preconceived notions, ideas, fears, threats, and convictions about any specified topic. Thus a man's attitudes about pacifism means here all that he feels and thinks about peace and war.". This appears to be in opposition to the quotation credited to Thurstone by Edwards, mentioned later. Hartley and Hartley, (1958, pp. 655-656) write that:

"....since percepts with which attitudes are connected grow out of contact with the perceived object, attitudes have a cognitive base. However, because the individual does not easily separate that which he cognizes, experiences, or perceives from the affect such experiences have on him, the cognitive aspects of attitudes are integrated with the individual's emotional responses to the objects of his attitude."

Crockett (1957) succintly relates his views:

"The term attitude is used here to denote a more or less enduring cognitive-affective tendency to respond to some object....Although the affective and cognitive components of attitudes are discussed separately, it should be emphasized that the two sets of processes operate jointly and interdependently for any particular person."

2. Pure Affect

Helen Peak (1958), representing the "pure affect" theorists, says that, "The feeling about an object or the evaluation of it are, then, the affective responses or the properties of a concept which constitute an attitude.". Jahoda, Deutsch, and Cook (1951, p. 112) define attitudes as a "disposition to respond affectively toward a specified entity.". Edwards (1957, p.2) takes a similar stand as follows: "We shall, following Thurstone (1946), define an attitude as the degree of positive or negative affect associated with some psychological object."

3. Comparison of Positions

One method to further examine the practical consequences of the "affect only" and "cognition-affect" theoretical positions is to review their relative positions with respect to the concept of "evaluation".

The terms "evaluation" and "evaluate" are so frequently employed in connection with attitude that they must be carefully considered. While "evaluate" and "evaluation" are key words, they appear to represent totally different concepts to different authorities. These differences in use are largely centered around the user's viewpoint on the "Affect -- Cognition-Affect" controversy. To Helen Peak, the process of "evaluating" apparently is purely affective. For example, she asserts that: "The term (attitude) is used to refer to an affective or evaluative reaction.." (1959), or again, "The feeling about an object or the evaluation of it are, then, the affective responses to or the properties of a concept which constitute an attitude.", (1958) It is difficult to determine whether Osgood intends to "evaluate" to indicate pure affect, or a mixture of affect and cognition, or a compound of affect and cognition. It seems that it

means one approach to him at one time, and another at a different time. In Measurement of Meaning, Osgood et al, (1957) appear to be using "evaluate" primarily to refer to pure affect, yet one could hardly construe use of "evaluation" to mean pure affect in the fourth chapter of the same book entitled, "The Evaluation of the Semantic Differential.". Yet, some of his followers seem to believe that Osgood does intend "evaluate" to imply pure affect and are guided accordingly. For example, Fishbein and Raven (1959) report that:

> "Stemming from Osgood's analysis of attitude through his semantic differential, a scale was developed which permits an operational distinction between belief and attitude. Attitude is defined as the evaluative dimension of a concept, belief as the probability dimension. ....generally, cognitive aspects have been attributed to 'beliefs' and affective or motivational aspects to 'attitudes'. It seemed likely that pressures could be exerted upon the subject's belief in ESP - 'What is the probability that such a phenomenon does exist? Is it existant or non-existant?' or upon his evaluation of ESP - 'Is ESP "good" or "bad"?' The latter, consistent with Osgood (1952, 1958), Doob (1947) and Rhine (1958) can be seen as the evaluative dimensions of a concept, or more specifically as an attitude.... The first step then was to find a means for separately measuring the components."

While there are authorities who hold that "evaluation" is purely affective, there are also those who maintain that both "cognition" and "affect" are aspects of an evaluation. Parsons and Shils (1951, p. 11) appear to have concurred regarding the concept of "evaluation" as follows: "The process of deciding alternatives, of assessing them in the light of their ramified consequences, is called evaluation." Florence Kluckholm (1961, p. 7) presents her notion this way: "Value orientations are complex, but definitely patterned (rank-ordered) principles, resulting in the transactional interplay of three analytically distinguishable elements of the evaluative process -- the cognitive, the affective, and directive elements."

Frequently one is able to comprehend the meaning a writer intends for a term by the way he uses it rather than by the way he defines it. This seems to apply to the use of the term "evaluate" by "compound theorists." Rokeach (1960, p. 63) says that:

> "To evaluate information on its own merits is necessarily to be oriented with both feet in here and now. At the same time, this evaluative process implies a disciplined concern with the immediate, foreseeable future. For we continually make predictions and plans

> on the basis of information, and the way these predictions and plans turn out helps along the evaluative process. Similarly, with postdiction, which implies a realistic evaluation or re-evaluation of our past in terms of present."

One observation could be made in summary at this point. If attitudes are pure affect, how is it that so little has been done to measure attitude by resorting to projective techniques or non-verbal techniques? If affect is the basis, then attitudes may be simply unavailable to cognitive (and thereby verbal) levels of response. Relatively little has been achieved in this area. The present writers will provide further discussion elsewhere herein. Suffice it to say that at this point the "Affect versus Cognition-affect" argument does not seem to us to be undergoing particularly rigorous experimental study these days. Furthermore, the writers doubt that it would come under genuine test so long as investigators persist in sticking to objective, written surveys.

D. Attitudes, Opinions, Beliefs

The practice of using the above three terms interchangeably, thus losing distinctive characteristics of each, has become so widespread that careful documentation would be exceptionally time consuming and therefore appears to be unwarranted for the present report. There are some authorities, such as Thurstone (1959) and Morgan (1956) who have explicitly defined each term as a separate concept so that three distinct concepts are differentiated instead of having three terms for one diffuse concept. In constructing their own attitude model, the present investigators found it necessary to utilize three separate concepts for the terms "attitude", "opinion", and "belief" to aid in satisfactorily communicating with each other and to their readers. They also found that they were required to index terms to indicate differentiated meanings for individual terms. These terms are defined in the section discussing the model.

E. Summary

That there are major differences between theoretical foundations of attitudes held by different research social scientists seem beyond question. Writers in the field of attitudes seem to have neglected theory. Moscovici (1963) has this to say:

> "No outstanding technical progress marked the last decade. The surveys have merely taken, in their over-all conception, both a more anthropological.. and a more experimental direction....This methodological stability results from the predominant role of experimentation, and the lack of a major theoretical drive toward a new approach to the understanding of reality.... a common, or basic, theoretical concern is not seen to emerge from the obtained results."

von Bertalanffy (1962) sees a tendency to neglect theory in our scientific endeavors in general:

> "Science of the past (and partly still the present) was dominated by one-sided empiricism. Only collection of data and experiments were considered as being 'scientific' in biology (and psychology); 'theory' was equated with 'speculation' or 'philosophy', forgetting that a mere collection of data, although steadily piling up, does not make a 'science'. Lack of necessary theoretical framework and unfavorable influences on experimental research itself on experimental research itself (which largely becomes an at-random, hit-or-miss endeavor) was the consequence."

Another major factor contributing toward some of the chaotic results in attitude study has been the tendency of many researchers to reify the concept of attitude. The reification process in many cases has been carried to its logical conclusion. From concretizing the basic concept of attitude, many theorists have followed through by concretizing "elements" within the "attitude". The literature indicates that many of the attitude theorists and researchers are unaware that differences exist between theories, that some are aware of differences but consider such matters inconsequential, while still others who are aware of the differences, appear disturbed by those differences, but do nothing substantial in a research program which would allay their apparent disturbances.

Three basic theoretical models implicit in the literature seem to account for the various approaches used by the researchers in the attitude area today. They are: 1) attitude as purely affective; 2) attitude as a mixture of two components, affect and cognition; and 3) attitude as a compound with two aspects, cognitive and affective. The present authors have found theories and research approaches relating to attitudes to be in such a state of confusion that they felt forced to state their theoretical foundations and to build their own Attitude Model, which follows in the next section. They follow the route of the compound theorists.

II. ATTITUDE MODEL

A. Introduction

Unlike present day "hardware" technology, the behavioral sciences deal with subject matter and language which have been applicable through the ages. Man has long been cognizant of particular phenomena within himself. As one man has dealt with another, he has generally found it beneficial to become aware of the things the other person likes or dislikes, accepts or rejects, is for or against. He has expected these dispositions to be relatively stable and has operated on the assumptions, conscious or unconscious, that they would be. From a pragmatic standpoint, the assumption of stability with some phenomena has received support.

The writers, after examination of much of the work of others, have found no adequate model for the attitude area. Accordingly, the model described herein was devised. The model was constructed with two major aims in mind: first, to incorporate into the present research program the latest relevant information; and, second, to describe and relate this information in operational terms and definitions. Since this present model is conceived of as being in an early stage of development, it is reasonable to expect changes with added data, experience, etc. It is believed to be an improvement upon the existing models.

B. Definitions

In the construction of a model, definitions are required in order that reasonably unambiguous communications are made possible. This is particularly true in a field such as attitude theory and research where basic terms appear to have variant meanings for different authorities. Therefore, some basic definitions are provided at this point. Terms used in the model are briefly defined at the outset, and these terms are amplified in the context of the explanation of the model.

1. Attitude

The term "attitude" has a primary meaning for purposes of the present model. Other, more specific, secondary, and limited meanings of the term "attitude" are used and defined in context. An attitude in its primary meaning is herein considered to be a second order hypothetical construct which implies an individual's predisposition, tendency, or readiness to respond to a psychological object. It is a second order construct in that it represents other constructs such as predisposition, tendency, or readiness to respond, etc.; which in turn represent the "real" world. Hence, the construct attitude is two levels or orders from the actual phenomena.

2. Belief and Belief-Value Matrix

The present authors define a belief as an hypothesis about the world, self-included, and a value as an internal standard. It should be stressed here that it is our understanding that beliefs and values are not separate entitles. Following Tolman (1951) beliefs and values are interrelated in matrix form, such that we have Belief-Value Matrices (B-VM's).

Although "value" has been given a brief definition, the concept of value does not truly lend itself to a brief description. However a paragraph from a chapter on "Values and Value-Orientations" by Clyde Kluckholm (1951, p. 432) should provide sufficient orientation for immediate purpose.

> "Values and beliefs. Values differ from ideas and beliefs by the feeling which attaches to values and

by the commitment to action in situations involving possible alternatives. If you are committed to act on a belief, than there is a value element involved. The following crude schematization is suggestive. (1) This is real or possible (belief); (2) This concerns me or us (interest); (3) This is good for me or us, this is better than something else that is possible (value). Belief refers primarily to the categories 'true' and 'false'; 'correct' and 'incorrect'. Values refer to 'good' and 'bad'; 'right' and 'wrong'."

3. Belief System

It is postulated that every individual has a Belief System which, in Rokeach's words (1960, p. 32) is "an organization of verbal and nonverbal, implicit and explicit beliefs, sets, or expectancies.". System and Organization are employed in the present context in the conceptual framework of von Bertalanffy (1956, 1962) where the "parts" and B-VM's, the system is the Belief System, and the Organization consists of the interrelations of the B-VM's.

4. Opinion

Opinions are defined as subjects' verbalizations. For purposes of this model, they are assumed to reflect segments of an individual's attitudes. "Verbalization" in the present context is broadly interpreted; for example, checking a multiple-choice questionnaire, a direct written answer to an open question or a spoken response to an interviewer can all be considered as "verbalizing".

5. Evaluations

Evaluations are defined as an individual's directed consideration of any psychological object to which he responds. It is a weighing process in which an individual assigns an overall judgment in terms of value according to some standard or set of standards which he carries internally. In evaluating, an organism employs a compound of cognitive and affective energies rather than the use of one aspects to the exclusion of the other. These compounds vary in proportion of cognitive to affective energies with significant amounts of both in every evaluation.

6. Cathexis

A cathexis is considered to be any energy in the human organism originating from physiological sources which produces, independent of learning, vectors towards behavior. These forces can be inborn, or develop as a natural concomitant of organismic maturation. They will thus include drives, urges, needs, fears, etc. The recent research of Walk and Gibson (1961) has demonstrated experimentally that at least one kind of fear, the

fear of depth, occurs without necessity of previous experience (learning). Although most fears appear to be learned, if fear of depth can develop without experience, there is no assurance how many other fears and similar action-propelling energy potentials can evolve likewise. Such possible sources of energy potential must be considered in conjunction with attitudes. It would seem that the cavalier position held by some authorities, attitudes are learned, and only learned, is untenable. As for our own position, Maslow (1948) has said it well when he says that: "The current fashion is to treat attitudes, tastes, interests, and indeed values of any kind as if they had no determinant other than associative learning, i.e., as if they were determined wholly by arbitrary extra-organismic forces. It is also necessary to invoke intrinsic requiredness.".

C. Discussion of Model

Regarding human behavior, there seem to be numerous phenomena which are relatively stable, thus making prediction possible. One of these phenomena is the characteristic tendency of a specific individual to respond in a relatively consistent manner to a particular class of stimuli. This tendency toward response consistency has been referred to by many names, but has recently been called "attitude" and has been the topic of consideration by both laymen and scientists. One of the descriptions of this phenomenon of response consistency popular with many social psychologists was made by Allport (1935) nearly thirty years ago: "An attitude is a mental and neural state of readiness, organized through experience, exerting a directive or dynamic influence upon the individual's responses to all objects and situations with which it is related.".

Attitudes as predispositions to respond to psychological objects, are seen as hypothetical constructs, artifacts abstracted out of personality systems in order to simplify conceptualization of some complex segments of human behavior and enhance communication about those segments. Thus, "attitude" becomes a handy label permitting communications about a concept without the necessity of a descriptive discourse each time one wishes to refer to that concept. Yet, an attitude is not an attempt to represent "something real" in the sense of tangibility.

Belief systems and B-VM's are also seen as hypothetical constructs, but they are believed to represent some behavioral dynamics in the "real world", to describe macroscopically certain processes in individual organisms. Attitudes as hypothetical constructs, being based upon some aspects of the hypothetical constructs of Belief Systems and B-VM's, are thus constructs of constructs, or second order constructs. The equating of these two levels, Belief Systems and Attitudes, constitutes a mixing of dimensions, and thus leads to confusion. Communication about attitudes is possible so long as the communicants agree as to what is meant by "attitude" in the discussion immediately at hand.

Attitudes, as hypothetical constructs of predispositions to respond, are potentials, with potential direction and potential intensity. But as

second order hypothetical constructs, attitudes are neither static nor dynamic. Yet, if most recent organismic theories are accepted, man is a dynamic organism functioning in a dynamic environment, which is the approach accepted for this model. To place the artifact "attitude" back into its real-life setting, and thus relate dynamic processes to a processless concept, the Belief System of an individual, with its B-VM's is conceived as constituting the "real-life" dynamic forces which underlie an attitude and give force, direction, and change to an "attitude". The Belief System of an individual provides the potential, with dimensions of direction and intensity, for possible reaction at some future time. The dynamics visualized are described later.

The Belief System is thought of as being an organization of interrelated B-VM's which change through time, although changes are usually slow. While there is change in B-VM's and in the Belief System, there is generally a relative consistency of both through short time periods. Each B-VM is a multivectorial resultant of many forces, hence change is not a fortuitous matter, but rather comes about as the resultant of changes in the many vectors which make up a B-VM. The vectors which produce a resultant B-VM have varied origins: Some vectors may be predominantly effective, others may be predominantly cognitive; some vectors may be the result of learning, others may be more biologically determined. Significant change in any one of the vectors may cause a significant change in a B-VM.

For purposes of this discussion the biologically determined vectors involved in attitude are being called "cathexes". Cathexes may in many cases be altered by learning, but at least some traces of cathexes remain in B-VM's, and therefore contribute toward the Belief System. Thus, a Belief System is hypothesized as being the "real-life" counterpart of a major portion of the hypothetical construct referred to as an "attitude". The present authors maintain that biologically determined vectors, whether defined as needs, drives, or instincts are part of the attitude complex. This view is contrary to the strong stand taken by numerous social psychologists that "attitudes are learned" (Hartley and Hartley, 1958; Kimball Young, 1956; P.T. Young, 1961).

As an overview, this research team visualizes the development of a Belief System as follows: An organism has certain constitutional endowments and potentials for growth. As the organism develops in interaction with its environment, it has many experiences, and learning takes place. The growth, development, experiences, learning and the like constitute the individual's history, As Stevens (1935) has so succinctly and aptly put it: "....the simplest phenomenological observation is really a complex response of an organism with a long history, and is therefore itself a construct.". An individual's history also includes his drives, needs, urges, etc. Beliefs and values are generated within the historical framework. Beliefs, values, memories, etc. are stored, and the accumulated storage is called the "apperceptive mass". Beliefs and values form into separate B-VM's, but only as the result of many vectors (cognitive forces, affective forces, biological forces and others).

As the organism lives, information comes to him in various ways. In interpreting this information, an individual's B-VM's form constellations which provide directional and intensity dimansions of certain reactions and not others. The interpretations and the reaction themselves alter the B-VM's by a feed-back process. This process will be reinterpreted later in terms of set and hypothesis theories. B-VM's have degrees of consistency through time which frequently approach stability, at least for short periods. When an individual's B-VM's have been sufficiently stabilized that his responses to specific types of information (e.g., "psychological object A") become predictable to a high degree, it can be inferred that the individual "has an attitude toward object A." It is believed that this is what Tolman (1951, p. 358) meant when he wrote that:

> "A chapter on attitudes would, from my point of view, be nothing more or less than a descriptive study of beliefs and resultant positive and/or negative values in belief-value matrices in specified populations of individuals."

Even the paradigm presented so far is too sketchy to enable one to visualize an individual and "his attitude". Therefore, it behooves us even in the face of demands for brevity, to put some more substance into the account. First, consider the use of "information" in place of the more usual term "stimulus".* A stimulus implies that some source of energy sets an inert organism into activity, something similar to the pushing of a predetermined series of buttons which start an electronic computer. Even "stimulus energy" does not appear to be appropriately descriptive. Information on the other hand, implies that an active organism carrying within him an appropriate mass, interprets configurations in his environment. Woodworth (1947) expressed a significant fact when he said that: "It is impossible to look without trying to see or to listen without trying to hear.".

With respect to the difference between "information" and "stimulus" consider the following example: To the average American driving an automobile, a small red light, or a large red light, a red colored octagonal sign, or a policeman facing you with outstretched arms, if properly placed, all provide the same information -- STOP. To a Hottentot recently arrived in the United States sitting alongside the driver, this same "stimulus" (small red light, large red light, policeman with outstretched arms, or red octagonal sign) may well not provide the same information, (or even ANY information) -- if he had not accumulated the appropriate interrelationships in his apperceptive mass. Obviously, "information" is a

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* The desirability of using this terminology was first called to our attention by Dr. Crawford Clark.

more appropriate term than either "stimulus" or "stimulus energy" in the present context. In the next paragraphs which follow, the relationship between B-VM's and Belief Systems to information will be more thoroughly examined.

The Belief System, with its B-VM's, while serving as a base upon which to build the attitude hypothetical construct, still does not provide the necessary concepts to account, even superficially, for translation of B-VM's into dynamic processes of behavior relating to the present topic. In order to effect this translation, Floyd Allport's (1955) integration of the Bruner and Postman hypothesis theory with set theory has been adopted. The individual theories and Allport's integrations are too complex to report in any detail in the present report, therefore an abstracted version is attempted.

According to hypothesis theory, individuals do not perceive objects from a void, but rather develop expectancies based upon past experiences about what they will perceive in the future. The expectancies evolve into hypotheses about the world, self included, which each individual carries around in his organism, usually on an unconscious level. Individuals also have sets "that are long established through perceiving activity and may be already almost at the point of full operations when (they) enter a situation. ....such sets....serve to select, organize, and transform 'information' that comes to them (the organism) via the sensory input from the environment.", (Allport, 1955, p. 381). In other words, hypotheses tend to structure sensory input (information) into composites of organized, meaningful wholes. Hypothesis theory takes into consideration the cognitive and affective aspects relating to perceiving, and set theory adds physiological preparatory and sustaining mechanisms of perceiving. Allport (1955, p. 412) emphasizes that "....we have 'hypotheses' not merely to see or hear, but to do; sets for some kind of action not merely for drawing conclusions."

Appropriate hypotheses are evoked by information (stimulus energy input), and these hypotheses and sets combine to structure the outside information field. The activated hypotheses and sets become an internal ("inside") information field which interacts with the "outside" information field in a feedback cycle. The structuring of the outside information field leads to restructuring of the inside information field and a checking of hypotheses and sets followed by confirmation or rejections of hypotheses, calling up a new, more appropriate hypotheses where indicated, modification of hypotheses, and eventual action. The degree to which a perception is veridical to the information as stimulus energies depends upon a number of factors which have been spelled out as laws by Bruner and Postman, and have been amplified by Floyd Allport and reinterpreted in concepts of his structural theory. Our interest here is primarily in the contributions of the concepts of hypotheses and sets to the inner information field and how they relate to the Belief System and the B-VM's.

Both sets and hypotheses as used in the Allport version of the modified integrated set and hypothesis theories seem to the present authors to be the products of belief vectors and value vectors as well as previous

experiences. Each hypothesis which an organism maintains would seem to have vectors of beliefs, of values, of experiences, and of cathexes, as well as other vectors. The same would appear to hold for sets. The Belief Systems and B-VM's become active parts of the inside information field during behaviors labeled as perceiving, thinking or acting.

The problem of defining the stimulus in Social Psychology sometimes seems insurmountable. Certainly, it has bothered this team a great deal. Yet, practicing scientists must stop somewhere in their efforts to define the stimulus, or they will never do any practicing; no research could ever be started if someone did not eventually make the break and commence with whatever definitions he may have at the moment, no matter how crude. It does appear from close observation of the literature, however, that many researchers define the stimulus poorly, if at all. Many of them settle for an artificially oversimplified and unrealistic stimulus, select one of the "outside" or "inside" aspects, and neglect all the others. Such an approach frequently results in deficiencies in design of techniques administrative procedures, or analytic procedures, or deficiencies in all three. The present attempt is aimed at considering both the inside and the outside aspects in the model.

III. INSTRUMENT DEVELOPMENT

A. Phase I

1. Pilot Study No. 1

The first step in the instrument development process actually involved the solution of two problems. First, sites or locations where U.S. Troops served under tropical conditions and where troops would be available for testing had to be identified. Also, since it is obvious that all items of Quartermaster equipment could not be probed by the study, a means of identifying the topics which are most important (salient) to the troops had to be devised. Therefore, the first measruing instrument was designed with the objective of obtaining saliency data and getting a practical "feel" for the way U.S. Troops would react to various psychometric devices when used on an exploratory basis.

In coping with the first problem area, it was determined that American troops stationed in Panama experienced all the many characteristics of the jungle within a closely circumscribed geographical area and that samples of these troops could be made available. Other areas did not meet those requirements at that time. Having tentatively found a suitable location, the research team focused its attention on the development of an instrument which would elicit information from the troops as to which items of Quartermaster issue were of greatest concern to troops serving in the tropics. A tentative instrument relying largely on open-ended questions was devised for this purpose.

While this instrument was being developed, arrangements were made to obtain access to the troops in Panama. This administration was

considered as Pilot Study No. 1. It served as a good opportunity, not only to obtain the necessary data, but to get the lay of the land insofar as the suitability of Panama as a testing location went. Both objectives of Pilot Study No. 1 were fulfilled; Panama was deemed suitable as a site for subsequent extensive tropical troop attitude testing and specific items of Quartermaster issue were identifiable as being attitudinal objects of concern to these troops.

As a result of Pilot Study No. 1, sufficient data was available to begin the construction of questionnaires designed to elicit information on the attitudes of tropical troops towards salient items of Quartermaster issue. Pilot Study No. 1 served to identify these salient topics. The influence of the theoretical model was felt in a requirement to also elicit information identifying the subjects' perceptions of the military environment and, to a certain extent, the subjects' world view. Therefore, the development objective sought was the creation of assessment techniques which would probe specific attitudinal areas and those which would probe areas of fundamental outlook and world views. To these ends a variety of objective, written projective, and picture projective techniques were developed.

2. Pilot Study No. 2

The new attitude assessment battery was tried out on a small sample at Fort Lee, Virginia. This administration, Pilot Study No. 2, had a dual purpose. First, to provide the investigators with information and prior experience concerning the administration of the battery of assessment techniques; and, secondly, to provide an opportunity to detect and correct any major problems which might have been caused by the instrument or procedures as they then existed.

Analysis of the data obtained in Pilot Study No. 2 yielded the following conclusions.

a. The objective type questionnaires were generally effective in that most of the items were understood and appeared to be discriminative. Some simplification in language was required for some of the items;

b. Trends were noted which justified further consideration of the techniques used to identify certain kinds of invalid data;

c. The written projective technique elicited a good range of responses, but there were too many items and some of the items required simplification;

d. The projective pictures seemed practical, but there were too many.

Based on this and other information inferred from Pilot Study No. 2, refinements, additions, deletions and corrections were made to the

assessment battery. Arrangements were made during this period for access to 200 U.S. troops stationed in Panama for the Phase I major data collection effort.

The major data collection was carried out over a two-week period. The primary data were gathered in the first week by a two-man team. Supplemantal interview information was obtained during the second week by one of these men.

Due to the developmental nature of this phase of the study, the comparison and evaluation of techniques was the primary concern. In order to provide comparisons which would account for possible differential transfer, four counterbalanced conditions were established. Included among the comparisons made were:

a. Objective scaling concept - Osgood booklet vs. Likert booklet;

b. Projective scaling format - Written Projective Form A vs. Written Projective Form B;

c. Opportunity to volunteer comments - Object booklets with "Your Comments" cards vs. Osgood and Likert booklets without cards;

d. Order of administration - Written projective administered before Objective booklets vs. Written Projective administered after Objective booklets.

The interviews conducted during the second week had two principal foci of concern. First, the researchers wanted to know the troops' reactions to the instrument. Ambiguities, unclear wording, irrelevancies, etc., all were to be identified by the subjects. It was also desired to identify the salient topics pertinent to U.S. troops stationed in the tropics. Both of the objectives were met and permitted the following primary conclusions to be reached at the conclusion of Phase I.

3. Conclusions

a. Methodological Conclusions

As has been previously indicated, the major emphasis in Phase 1 was on the development and comparison of alternative attitude assessment techniques. A complementary methodological concern was the development of a technique for the detection of valid and invalid data samples. A concomitant of the methodological goals of Phase I was the acquisition of further information on the troops' reactions to the saliency of various topics and data as to their attitudes towards the specific items probed in Phase I.

1. The Osgood technique is superior to the Likert technique of attitude assessment;

2. Written projectives were found to be valuable in eliciting attitudinal saliency information as guides to item preparation, and generally aiding the interpretation of the objective responses;

3. There was not found to be a significant difference between Written Projective Forms A and B, however, individual items on both forms were identified which consistently elicited useful data;

4. Use of the "Your Comments" cards was found to be valuable. Among other advantages, subjects who received "Your Comments" cards had fewer inconsistent responses.

5. It was found advantageous to administer Written Projectives prior to the Objective booklets;

6. Whenever possible in attitudinal studies, steps should be taken to assess the data for response consistency and to categorize and treat the data in accordance with its consistency;

7. The dimensionalization of questions probing attitudinal objects of concern is more fruitful than merely asking global assessment questions under most circumstances;

8. A workable means of identifying inconsistent responses in objective attitude measuring techniques was developed;

9. Soldier respondents are willing to give at least overt cooperation when asked to participate in fairly bizarre assessment techniques;

10. Picture projectives seemed to have promise in the assessment of attitudes since they appeared to directly tap emotional responses.

b. Topical Conclusions

In addition to these methodological findings, the following topical conclusions were reached:

1. Snakes did not appear to be a major problem to seasoned troops in the Panama area;

2. Jungle boots had not been issued to troops in the sample population. They had but little definitive information upon which to formulate an opinion regarding this item;

3. The shelter-half, tents, raincoats, ponchos, and packs were rarely used by the sample population in the Panama area. This may have been attributable to the mission of the particular sample (Airborne Infantry) and may not be applicable to other types of troops;

4. The sample population was not generally issued water purification tablets and would not drink untreated water. A majority considered water in the jungle as particularly dangerous and did not seem interested in trying water purification tablets to be carried individually. A small, but sizeable, minority seemed to desire to have them issued to be carried as part of their standard stock;

5. The combat boot was considered unacceptable as a jungle item by the sample population;

6. Health was a topic of considerable concern to the sample population;

7. Most of the discomfort experienced by the men when they were on field exercises was attributed to heat and to insects, in that order;

8. Two interdependent factors, "too many alerts" and "no time off" accounted for the majority of the complaints made concerning duty in Panama.

These conclusions, both methodological and topical, were used to sharpen and tighten the measuring instruments for Phase II. Problem areas were identified in a more definitive manner such that items could be written to ensure adequate coverage of critical topics and their dimensions. The measuring instruments and their inter-relationships were improved so as to provide a more valid approach to the collection of attitudinal data.

B. Phase II Objectives

The present study was originally conceived and eventually supported by sponsors with different but compatible points of view. One view was hardware oriented and required an end product which could be used in equipment evaluation. The other view was more theoretical in nature and encouraged a rather heavy investment of time and effort in establishing methodological inroads which would improve the state of the art in general. Whereas Phase I (Report No. AD 417796) of this two-phased research stressed the development of attitudinal assessment techniques, Phase II has consisted largely of the collection, analysis, and interpretation of attitudinal data, as regards equipment evaluation. In addition, hypotheses formulated as a result of Phase I data were tested and additional information gathered relative to the methodological aspects of the study. Consequently, both phases have contained a methodological and attitudinal mix as far as objectives have been concerned. The treatise herein relates to the primary objective of Phase II which has been to collect, analyze and interpret attitudinal data.

1. Attitudinal Objectives

Not unlike any other scientific inquiry, only a finite number of objects could be considered in this study. The "objects" of the study

are referred to as "topics" and were systematically selected as a result of the data gathered and analysed during Phase I. There are two classes of "topics", equipment and situational. The equipment related topics investigated were: "Fatigues", "Poncho", "Poncho Liner", "Combat Boots", "Jungle Boots", "Canteen", "Meals", "Pack", "Rucksack", "Tiger Suit", and "Hammock". The situational topics included for study were: "Weather", "Water", "Insects", "Entertainment", "Family", and "Officer".

The primary objective of Phase II was to obtain an accurate assessment of the troops' attitudes toward the eleven equipment related topics. Inclusion of the six situational topics into the study was primarily to collect data which would expedite the analysis and interpretation of the equipment related data. It was also hoped that the study would provide attitudinal information as to why the respondents felt the way they appeared to feel about their equipment, and provide identification of any independent variables which are concomitants of attitudes.

The desired final product then, is one which the attitudes of troops toward some Quartermaster issue items have been accurately assessed. Not only was determination to be made as regards the troops' feelings twoards their equipment, but in addition, the reasons for their attitutdes were to be identified.

2. Methodological Objectives

Several concepts were developed in Phase I which were employed for data collection and analysis in Phase II. There are five of these major concepts and they are dealt with herein in the following order: Respondent Cooperation, Topic Dimensionality, Projective Techniques, Osgood-type Objective Scale, and Data Collection-Processing Techniques.

a. Respondent Cooperation

Attitudinal research has led to the development of a wide variety of techniques in an attempt to accurately assess attitudes. Although the psychometric instruments differ radically in some instances, the desired end product seems to be shared by all investigators; that is, that responses will be obtained which represent the subject's "actual" position on some specified psychological continuum. The present authors propose that a response which fulfills this requirement should be thought of as valid response, and that the construct of "response validity" be utilized to represent this desired end product.

There is a subtle but significant distinction which should be made between the more commonly used constructs of item or test validity, and the present authors' proposed construct, response validity. Although repeated reference is made to item validity, as if it were the ultimate objective of the investigator, in the present authors' opinions, item or test validity is merely a partial contributor to valid or invalid responses. On the other hand, response validity is here suggested to be the ultimate objective in any psychometric instrument and is a function of not only item validity but of Respondent Cooperation as well.

For the purpose of clarification, the constructs critical to the present discussion are defined below:

Response Validity

A valid response is one which represents the subjects' "actual" position on a psychological continuum where the continuum is one which is shared by respondent and investigator alike and means the same to each.

Item Validity

A valid item is one which, assuming cooperation from respondent, elicits evaluations of the referent prescribed by the investigator.

Respondent Cooperation

A cooperative respondent is one who, assuming item validity, attends to the referent prescribed by the investigator in the manner prescribed by the investigator.

In order to assess Respondent Cooperation, a measuring technique amenable to use with Objective instruments such as the Osgood or Likert scaling techniques has been developed and has been included in this study. This technique is referred to as the Respondent Consistency Check.

Although a great deal of attention has been paid to item validity and a number of techniques developed to measure and insure it, the notion of Respondent Cooperation appears to have been relatively unexplored. Some personality and interest inventories have included "lie scales" which have been inferential inferential in nature, but for the respondent cooperation has been an assumption. A major objective of this research has been to demonstrate that a significant number of respondents yield inconsistent responses, which signifies a lack of cooperation, and that their data is sufficiently different from the data of the rest of the sample as to make the inclusion of their data suspect for certain applications.

b. Topic Dimensionality

Although a crude measure of soldier acceptance is obtained with the use of global items such as "do you or do you not like your fatigues", it has been recognized for some time that information derived in this manner is insufficient if remedial action is to be taken to correct equipment deficiencies. In an attempt to acquire information which answers questions about why the troops feel the way they do concerning their equipment the dimensional approach came into being. Salient features

of equipment have been identified such as "Comfort", "Durability", and "Protection", and incorporated into the instruments thereby providing a dimensional approach to the measurement of attitudes.

The influence of the theoretical model developed by the authors during Phase 1 of this project prompted the recognition of levels of dimensions. When the various attitudinal parameters of a given topic are examined, it becomes apparent that there are levels of dimensions which are arranged in hierarchal order on a generality-specificity continuum. For example, attitudes relating to the topic of "Fatigues" may be evaluated in the following manner: level one, which is the most general in nature, deals with the soldiers' over-all acceptance or rejection of "Fatigues", level two consists of dimensions such as "Comfort", "Protection" and "Durability"; and level three relates to dimensions subsumed by the dimensions within level two such as "Rotting", "Tearing" and "Stitching" relate to "Durability", or underbrush protection, insect protection and protection from the sun relates to the "Protection" dimension.

It has been the authors' intent to explore the relationship among the different levels of dimensions thereby providing more accurate and definitive attitudinal assessments.

c. Projective Techniques

Highly structured techniques (Objective) lend themselves to easier, bias-free scoring procedures. However, they restrict the respondents to an artificial limit of responses which have been prescribed by the surveyor. On the other hand, "unstructured" (Projective) techniques are far more difficult to score but allow the subjects more freedom of response. The "unstructured" techniques are often the only methods which will work. For example:

1. Situations in which one wishes to discover something regarding attitudes from the respondent without providing cues to the respondent as to what the examiner is really interested in.

2. Situations in which explicitly naming the alternatives from which the respondent is to select his answer would "give away" the answer.

3. Situations in which the surveyor is desirous of obtaining information concerning saliency and doesn't wish to establish sets in the respondents.

4. Situations which are unavailable to verbal transmission.

5. Situations in which the surveyor knows the topic of interest to himself but either cannot (or does not choose to) set up a suitable scale of responses, (usually because he does not know what or how to use his alternatives).

Several unstructured techniques were developed during Phase I and it was planned that at the conclusion of Phase II the utility of these approaches would be determined and identification made of the approaches most likely to succeed in the assessment of attitudes. Section IV C. describes the instruments that were used in the final study.

d. Objective Scales

Techniques defined as Objective Techniques usually have highly-structured administrative procedures and highly structured manners of responding. Structural differences between objective questionnaires for gathering opinion data are due primarily to the different types of scaling procedures employed. A particular version of the method of summated ratings, herein referred to as the Likert scale, was considered at the outset of this study because it had undergone a number of years of both research and applied use and seemed to offer an optimal solution to scale construction problems. However, after this research group had accomplished considerable work with the Likert scale, a few questionable characteristics were identified which raised some doubt as to its validity, which in turn led to the adoption and further development of a form of the Semantic Differential technique, referred to in subsequent discussion as the Osgood Scale. A description of these scales can be found in Section IV C.

At the conclusion of Phase I, the data were interpreted to indicate the probability that the Osgood scale seemed to be a more valid approach to attitude assessment than the Likert technique. One of the objectives of Phase II was to provide the necessary data to substantiate or repudiate this notion.

e. Data Collection Processing Techniques

Not unlike most research jobs, the cost-accuracy tradeoff has been a practical and a necessary consideration, and consequently, has received special attention in the present study. Data collection techniques design: 1) a pre-test, the 129 subjects who were tested prior to the flag incident, 2) a major intervening force which could alter attitudes considerably, e.g., the troops were placed on alert and were cognizant of the impending danger of being shot at in combat, and 3) a post-test, the subjects tested prior to the flag incident were re-tested using the same instruments administered in the pre-test.

3. Experimental Objective

The importance of this experimental design is better understood through a careful examination of the basic assumptions underlying this research project or, for that matter, any other equipment-related attitudinal studies in the Armed Services. The first major assumption is that soldier performance in combat has a casual relationship to soldier attitude. Secondly, it is assumed that attitudes of non-combatant troops compare favorably with attitudes of troops in combat.

The objective of invoking the experimental design discussed in this section into the present research is to test the assumption that equipment related attitudes are not a function of the combat - non-combat situation. The results of this "experiment" are in Chapter V, Section C.

IV. DATA COLLECTION PROCEDURES

A. Description of Sample

The primary objective of this project has been to study the attitudes of troops in the tropics toward issue clothing and personal equipment. Panama, Hawaii and Okinawa are the principal tropical regions in which U.S. Army troops train. Viet Nam provided an area in which Army personnel were actually engaged in combat under tropical conditions at the time this report was in preparation. Policy considerations precluded the collection of data in Viet Nam so Okinawa was chosen instead. The non-combatant-combatant contrast was still possible since Okinawa is a major staging area for Viet Nam. Therefore, it was possible to obtain data at Okinawa from large numbers of troops who had been to Viet Nam.

Having thus assured a wide enough data base from a geographical standpoint to permit generalizations concerning troops in the tropics, arrangements were made for obtaining sufficient numbers of subjects in each location. These arrangements resulted in the administration of a total of 2160 attitude assessment batteries, with the following breakdown: 1130 in Panama, 560 in Hawaii and 470 in Okinawa. Also, prior to data collection, efforts were made to stratify the sample in accordance with the branch representation in each area.

In order to be able to characterize the sample adequately, each respondent was questioned concerning 13 demographic variables. These variables were: age, formal education, marital status, dependents, rank, time in service, branch, time in combat, battle scars, time in jungle training area, reason for entering active duty, season most time spent in tropics and region most time spent in tropics (answered only by those having been to Vietnam). The percentage distributions of each major subpopulation as well as the total cooperative and uncooperative populations for each response category to each of these questions are compared in Table 1. The data derived from each of these demographic items is treated briefly in the following text.

1. Demographical Analysis

Age

Over one-half the total sample is in the 20 - 24 year age bracket. The Okinawa sample is more heavily weighted with personnel in the 30 and over (20.3 percent) age category as contrasted with the population from Hawaii (11.9 percent) and Panama (16.1 percent).

Formal Education

Apparently there is a hierarchy among the three populations with respect to amount of education. The Okinawa group ranks first in this respect, Panama second and Hawaii third. This conclusion is supported at both ends of the educational spectrum since in Okinawa 31.4 percent, in Panama 21.9 percent, and Hawaii 16.1 percent of the populations had some college or more while Hawaii had 10.3 percent with eight or less grades completed, Panama 5.3 percent and Okinawa only 2.2 percent in this category.

Marital Status

Overall, it was found that about 60 percent of the total population was single, 35 percent married, 4 percent separated or divorced and 1 percent widowed. Hawaii was found to have more single personnel proportionately than the other two populations. This is congruent with the fact that the Hawaii group has younger troops then do the other locations. There is a slight reversal of this trend noticed between Panama and Okinawa. The Panama group has 64 percent of its population; 24 or less while Okinawa has 60.6 percent in this category. However, slightly more troops from Okinawa (55.9 percent) are single as contrasted with troops from Panama (55.0 percent).

Dependents

It was found that U.S. troops in Panama had the greatest number of dependents, those in Hawaii being second and those in Okinawa third.

Rank

The sample from U.S. troops in Panama has a strikingly larger percentage of higher ranking enlisted personnel. 21.0 percent of the Okinawa sample, 10.8 percent of the Panama sample and 6.0 percent of the Hawaii sample held grades E-6 through E-9. At the other end of the enlisted rank continum, 58.7 percent were Privates and PFC's in Hawaii, 52.3 percent in Panama and 35 percent in Okinawa.

Time in Service

As might be predicted on the basis of the data on rank, groups in Okinawa have more experienced personnel than do Panama and Hawaii. 45.5 percent of the Okinawa population has been in the service for three years or more as contrasted with 35.0 percent and 26.3 percent for Panama and Hawaii, respectively. In the eleven months or less of service category, the percentages of populations for Hawaii, Panama and Okinawa are 32.6 percent, 21.5 percent and 13.6 percent, respectively.

Branch

Though the investigators attempted to arrange for a rigorously stratified sample with respect to branch of service, the complexities of

field research are such that compromises had to be made. As it turned out, a fairly good representation of U.S. Army branches found in the tropics was obtained. As can be seen from Table 1, groups in Panama and Hawaii were largely made up of infantry and "other" personnel. The "other" category being comprised of relatively small groups with the following specialties: missile, medics, artillery, support and aviation. Airborne and Special Forces were the largest groups in Okinawa.

Time in Combat

Seventeen percent of the U.S. troop sample taken on Okinawa has had a year or more of combat experience in contrast with less than half that percentage for each of the other populations. It is interesting to note that a difference of 6.2 percent between the cooperative and the uncooperative group having the greater percentage. Nearly 80 percent of the total sample had no time in combat, however.

Battle Stars

Due to the fact that the Okinawa population had much more combat experience than did the other two populations, there were more battle stars possessed by Okinawa troops than by any other group. 14.5 percent of the Okinawa troops as opposed to 9.8 percent of the Panama troops and 8.8 percent of the Hawaii troops had earned battle stars.

Time in Jungle Training Area

The question regarding time in jungle training area was intended to ascertain the total amount of jungle training and/or jungle combat experience possessed by each subject. In retrospect, it was realized by the item writers that the wording of the question was such that the subjects might differentiate between jungle training and actual jungle combat. Apparently, this was done since the troops in Okinawa who had the greatest amount of combat experience had the lowest percentage of personnel with a year or more of time in a jungle training area, 40.5 percent, as contrasted with 57.7 percent for the troops in Panama and 45.3 percent for the troops in Hawaii. Similarly, 19 percent of the Okinawa population, 15.4 percent of the Hawaii population and 9.8 percent of the Panama population had less than three months in a jungle training area. Although the item was intended to assess the amount of jungle experience obtained by the troops, it becomes obvious that the amount of time spent in a jungle training area does not necessarily reflect this. For example, it would seem that the Special Forces who lived for six months, 24 hours a day, in the jungle in Viet Nam received a great deal more jungle experience than the soldiers in Panama who went out in the field once a week; and yet, the item used certainly does not indicate this.

Reason for Entering Active Duty

In both Panama and Hawaii, a larger number of persons entered active duty either because they were drafted or to avoid being drafted

than for any other reason. On Okinawa, this was not true since 37.7 percent of this population was either drafted or motivated to join up by the draft in contrast to 55.5 percent who joined without concern of the draft. This fact seems to be congruent with the general picture which emerges of the Okinawa group as older, higher ranking personnel with more combat experience. In short, it appears that there are more professional, career soldiers on Okinawa than in either of the other two locations.

Season Most Time Spent in Tropics

It was recognized by the researchers that evaluations of certain items of Quartermaster equipment might vary as a function of the tropical season in which the item had been most used by the respondents. The data shows that 70.0 percent of the respondents had spent equal time in the rainy and dry seasons. The remaining portion of the population was split between those who had spent the majority of their time in the rainy and dry seasons. Taken as a whole, it would appear that the population is familiar enough with both seasons to be able to identify any deficiencies of Quartermaster issue equipment which are peculiar to one or the other season.

Region Most Time Spent in Tropics (Viet Nam)

Since, at the time of this report, Viet Nam is the only tropical area which the United States is involved in conflict with, it was deemed useful to determine both how many respondents had been to Viet Nam, and, for those who had been there, what geographical regions or region had they served in. The geographical question was included as a result of some interviews conducted at Fort Bragg during Phase I. The interviewees indicated that there were three clearly defined geographical locations which varied a great deal with respect to topographical conditions. Consequently, the item was included so that this particular variable could be accounted for if, in fact, it seemed to be related to attitudes. A total of 405 respondents had been to Viet Nam or roughly 19 percent of the total sample. Of these personnel, approximately 40 percent had their time equally divided among delta, plateau and mountain regions. Troops from Hawaii and Okinawa had also spent a lot of time in the mountain regions while the troops from Panama who did not have equally divided time in the various regions, had spent more time in the delta region. Overall, a good representation of troops experienced in all of the geographical regions was available.

2. Population Comparisons

The foregoing analysis has been based on gross differences in response frequencies observed among the five population classifications displayed in Table 1. Five of the demographic variables which were viewed by the analysts as being most salient in defining the characteristics of the population to whom the battery was administered were selected for more intensive analysis. The variables chosen were: age,

education, rank, time in Army and combat experience. A contingency calculation (chi-square) was run between the total cooperative and total uncooperative populations, between the Panama and Hawaii, Panama and Okinawa and Hawaii and Okinawa cooperative populations on each of these variables.

The significance levels achieved by these comparisons are shown in Table 1.

a. Cooperative vs Uncooperative Comparisons

For the cooperative vs. uncooperative populations age and education were found to be significant variables. For age, it was found that the cooperative respondents tended to be clustered in the middle age brackets (20-34) whereas the uncooperative respondents were found more often in the extreme age categories of less than 20 and more than 35. Examination of the cells in the contingency table showed that the cooperative respondents are better educated than the uncooperative respondents. There are more observed than expected subjects in the "finished 12 grades" and above cells for the cooperative respondents and less observed than expected in all lower cells. For the uncooperative population, exactly the opposite is true, with observed frequencies exceeding expected frequencies for all cells less than "finished 12 grades", and expected frequencies exceeding observed frequencies for all higher educational categories. Though it is recognized that there is not necessarily a linear, positive relationship between education and intelligence, this data tends to support the idea that one of the major factors causing poor respondent cooperation is simply lack of ability. It is obvious that some linguistic proficiency is required before a subject can successfully cope with the objective instrument. Evidently, some of the subjects did not reach this ability threshold.

b. Panama vs. Hawaii Comparisons

The chi-square values computed for all five variables; age, education, rank, time in Army and combat experiences were all significant at the .001 level. Therefore, there are very clear cut differences between the two populations with regard to the variables probed. The Panamanian population is older, better educated (i.e., those completing 12 grade and more), higher ranking (more E-6 and E-9 proportionately), has more time in the Army and more combat experience. Therefore, a well defined difference between populations exists showing the Panama group to be more experienced, older, better educated, and higher ranking personnel.

TABLE 1

CHI-SQUARE SIGNIFICANCE LEVELS BETWEEN POPULATIONS FOR SELECTED DEMOGRAPHIC VARIABLES

		Populations		
Demographic Variables	Consistent vs Inconsistent	Panama vs Hawaii	Panama vs Okinawa	Hawaii vs Okinawa
Age	.001	.001	.05	.001
Education	.001	.001	.001	.001
Rank	Not significant	.001	.001	.001
Time in Army	Not significant	.001	.001	.001
Combat Experience	Not significant	.001	.001	.001

NOTE: The remaining eight demographic variables did not show meaningful trends between populations.

c. Panama vs Okinawa Comparisons

The Panama vs. Okinawa contingency calculations for the five selected variables were all significant at the .001 level except for age which was significant at the .05 level. As in the Panama versus Hawaii comparisons, there is a clear cut trend in the data showing the Okinawa troops to be older, better educated, higher ranking, and more experienced in military life than their counterparts from Panama.

d. Hawaii vs. Okinawa Comparisons

As would be predicted from the results already reported, the Okinawa population was distinctly older, better educated, higher ranking, had greater time in the Army and had greater combat experience than did the Hawaii population.

3. Overall Sample Characteristics

Contrary to the investigators' expectations, the sample obtained in the three tropical regions studied do differ substantially in demographic characteristics. Though it is not altogether clear why this is so, there is a hierarchy among the three populations with respect to age, education, rank, time in Army and combat experience. The Okinawa population is first in this hierarchy with the oldest, best educated, etc., personnel, Panama is second and Hawaii third. There are no reversals in this trend so it is apparent that a bona-fide phenomenon exists.

The data discussed earlier on reason for entering the services and battle stars awarded both support the view that the Okinawa population is made up of a greater proportion of professional soldiers. Nearly twice as many battle stars have been awarded to the Okinawa troops than to either of the other populations. Also, far more soldiers on Okinawa initially entered active duty without concern for the draft than in either of the other populations. Though this phenomenon leaves the research team with some problems in assigning casuality to attitudinal differences between populations, it does demonstrate that, taken together, the total population is not biased with respect to the variables studied.

The items concerning duration of tropical services, seasonal experience in the tropics and geographical regions experienced in Viet Nam had distributions which indicated no heavy biases in the overall population. There was also a reasonable distribution of branch specialties in the population. The items on marital status and number of dependents showed no useful trends.

B. Collection Methods

1. Sample Validation

Respondent cooperation becomes a rather critical factor when attitudinal data are to be used for equipment evaluation and possible

equipment design resulting therefrom. It would seem that data used for these purposes ought to be derived from respondents who are both interested and capable of indicating their attitudes via the investigators' data collection techniques. Consequently, based on the explicit assumptions that some respondents are more capable and willing to provide valid attitudinal data about themselves than are others, and that there are techniques which will allow differentiation between cooperative and uncooperative respondents, most of the results described herein represent that portion of the sampled population which was assessed to be cooperative.

A procedure called the Respondent Consistency Check (RCC) was developed to assess the consistency of a subject's responses. It is believed that the consistency measure provides sufficient information to allow inferences to be made concerning the cooperation or non-cooperation of respondents. The procedure followed was to have the subject respond twice to the same item, or basic item content, with reversed direction of the scales on the two response situations. If a respondent was inconsistent by three or more units, it was considered a Respondent Consistency Error (RCE). Three or more RCE's out of a possible thirteen was considered a sufficient amount of inconsistency to warrant being classified as uncooperative.

2. Topic Selection

The Army is interested in the possible effects of a tropical environment upon the equipment related attitudes of troops. Consequently, the investigators collected attitudinal data upon at least two major classes of dependent variables; namely equipment related attitudes and situational related attitudes. One of the primary purposes of the study was to examine the relationship of the tropical environment upon the equipment related attitudes of troops. Rather than collect attitudinal data for all classes and kinds of Quartermaster equipment, only the most salient items of equipment and situational subjects were included in the final phase of this study. The saliency determination was made in Phase I.

Another reason for collecting attitudinal data pertaining to situational variables was to "calibrate" the respondents. Obviously, respondents who indicate undeviating negative or positive attitudes for situational variables and all items of equipment alike, seem to have world views somewhat different from those respondents who express preferences for some items of equipment as opposed to others, and who find some situational variables acceptable and not others.

Each piece of equipment such as fatigues, combat boots, etc., or situational variables such as weather, insects, etc., is referred to as a "topic". While there were eleven equipment topics and six situational topics, or seventeen in all, not all of these topics were treated by every respondent, and two of the equipment related topics were each treated as two topics.

One of the complications of this study was the fact that the troops in each of the three locations tested were exposed to different kinds of equipment. This necessitated the establishment of three groups of topics: (1) Common Topics - there were nine topics which were treated in exactly the same way by the entire sample population; (2) Non-Combatant Topics - these were six topics included in the booklet administered to that part of the sample classed as non-combatant, or the troops in Panama and Hawaii; (3) Combatant Topics - four topics which related to equipment that only troops having recently been to Viet Nam would have had experience which were included in the booklet which was administered to the combatant population (Table 2).

3. Topic Dimensions

Theoreticians are somewhat in agreement with the notion that a one item inquiry is very unreliable. If one item were to be used to assess the attitudes of troops toward a piece of equipment, what would be the nature of the item? In all probability it would have to be a general (global) sort of item in the "how well do you like your boots" category. Certainly information of this sort would only leave the Army a lot of room for speculation. If design changes were to be made as a result of global information of this sort, there is some question as to how the data could be used to determine what design changes should be made. For the very pragmatic reasons mentioned above and for other reasons, dimensions and different levels of dimensions were identified whereby the various aspects of a piece of equipment could be examined in a systematic manner. Not every topic is represented by an equal number of levels of dimensions, and not every dimension within a level is treated similarly. This was not because they were not important enough but that the technique was somewhat developmental in nature and only a limited amount of time could be spent with this particular problem. However, some of the topics were broken down into several items, each item representing a particular level. These items range from very general to quite specific and relate to one another in such a way as to permit one score to be calculated from all of the responses of a subject pertaining to a single topic. These scores are referred to as topic scores.

Table 3. lists all of the topics and under each topic all of the dimensions are represented in the three different levels. Briefly, each cluster of lower level dimensions is supposed to represent the attitudes which summate to become the attitude represented by the appropriate dimension at the next higher dimension.

C. Collection Instruments

Several techniques were used, ranging from a highly structured "Objective" questionnaire in which the subjects were forced to select one of seven positions on a scale, to a completely unstructured "Subjective" techniques in which the respondents were provided blank cards with the words "Your Comments" at the top. Some of the techniques were mostly exploratory in nature. The techniques from which the bulk of the

TABLE 2

TOPICS CLASSIFIED BY TYPE AND BY POPULATION FOR WHICH THEY WERE USED.

	Type of Topic	
	Equipment	Situational
Common to Non-Combatant and Combatant	Fatigues	Weather
	Poncho	Insects
	Jungle Boots	Water
	Combat Boots	
	Canteen	
Non-Combatant	Meals	Officers
	Combat Boots (T)	Entertainment
	Pack	Family
Combatant	"Tiger Suit"	
	Hammock	
	Poncho Liner	
	Rucksack	

attitudinal data described herein were drawn, are derived from three main sources: (1) the Osgood Questionnaire, (2) a Sentence Completion and Listing booklet, and (3) "Your Comments" cards.

1. Osgood Questionnaire

The Osgood questionnaire contains 93 items in the non-combatant booklet and 84 items in the combatant booklet. The items were constructed using a modified Semantic Differential scaling technique. Each substantive element and the second (evaluative) part is represented by polar adjectives or descriptive phrases on a seven point vertical scale. For example:

10. For this climate and terrain jungle boots are:

Very poor-------( )
-------( )
-------( )
-------( )
-------( )
-------( )
Excellent-------( )

Note that the subject rates a referent between polar concepts. The polar concepts are usually represented by single adjectives (satisfactory and unsatisfactory) for each concept, although occasionally descriptive phrases are used.

2. Likert Questionnaire

The Likert questionnaire contains 94 items. Each item is composed of a complete statement and a seven point vertical agree-disagree scale. For example:

10. For this climate and terrain jungle boots are very poor.

I agree completely-------( )
I agree quite a bit------( )
I agree slightly---------( )
I neither agree or disagree------( )
I disagree slightly------( )
I disagree quite a bit---( )
I disagree completely----( )

3. Sentence Completion and Listing

The Sentence Completion booklet contains 22 items covering 20 different topics. Each item consists of a word or phrase of a partial sentence which the respondent is asked to complete. For example:

My jungle boots_____

_____

_____

This particular technique may be used to structure either content or tone leaving the respondent a greater or lesser degree of freedom. The example on the previous page illustrates the case where content is partially structured, i.e., the topic of jungle boots to which a subject is asked to address himself has been specified, and tone is unstructured in that he may choose any tone he desires in responding. The subject may choose to respond in terms of a specific dimension or dimensions of the topic in question. Another case is one in which a tonal structure is provided and the respondent is expected to provide topical structure to the sentence.

Data reduction of Sentence Completion data must be characterized with the same care and precaution which characterizes the development of Objective items. The responses must be analyzed for both content and tone, and it must be done by experts who have been carefully trained to be as objective as the situation permits. Once a content area has been identified, it is rated on a seven point scale for tone. Consequently, the tonal ratings of specific content or topical areas may be compared with the subject's responses to the same topic on the Objective questionnaire. The two major advantages of this technique are: (1) it increases the probability that the responses obtained reflect the kinds of attitudes which are most salient to the respondents, and (2) it provides a criterion measure upon which to validate the Objective measuring instrument.

The Listing technique is very straight forward, The respondent is asked either to list three dimensions he likes or dislikes about a certain topic, or he is asked to list three topics which are acceptable or unacceptable with respect to a particular dimension. This technique provides an excellent measure of saliency which allows the investigators the opportunity of determining whether the proper topics and dimensions of topics have been included in the rest of the assessment techniques.

4. "Your Comments" Cards

Three blank cards except for the words "Your Comments" at the top were inserted at strategic points within the Osgood questionnaire. The respondents were told that the investigators recognized that the questionnaire might not include items which represented all of the items of equipment and their different dimensions which were important to them. Therefore, the blank cards were provided so that they could express in their own words their feelings about anything that had or had not been included in the questionnaire. The "Your Comments" responses were reduced and analyzed in the same manner as the Sentence Completion items.

The purposes for inclusion of this technique were twofold: (1) such a completely open ended technique of this, included in the middle of a completely structured technique as the Osgood, seems to offset the frustration experienced by some subjects when forced to choose alternatives not of their own making, resulting in better rapport, and (2) it provided another saliency maasure.

5. Picture Projectives - Written Response

Scenes which depict life in the tropics both from a military and an off-duty point of view are presented to the respondents. The content was selected to correspond with the topical content of the objective scaling techniques. In each scene one or more individuals are engaged in some kind of activity such as talking, walking or just sitting (thinking). Empty cartoon-like balloons are provided for the respondents to write what they think the individuals might be saying or thinking. In some of the pictures, the stimuli are provided by the scene depicted in conjunction with a comment by one or more figures, and in some cases this is augmented by other written material. In other cases, there are no comments, hence the initiating stimuli are produced by the scenes alone.

Eighteen pictures were used in the pilot study. The emphasis of the first trial was exploratory in nature. The investigators were primarily interested in what ways the respondents would respond rather than what their actual responses were. Due to the fact that the administration took longer than seemed desirable, three pictures were arbitrarily eliminated, leaving a total of fifteen in the final Phase One instrument.

6. Picture Projectives - Color Response

Pictures similar to the ones discussed above are presented to the respondents. Some of the same pictures employed in the Written Response approached are included, as well as others which are different. Two major differences exist between this method and the written response projective pictures:

1. None of the pictures contain writing or balloons, and

2. Each subject is given a box of ordinary wax crayons containing eight colors and is asked to color the scenes in any way he desires.

D. Baseline Data

Two of the equipment topics were treated in such a way as to allow the troops to be their own control group. If one of the primary interests of the project is to assess the effects of the tropical environment upon equipment related attitudes, then some data must be acquired from troops not located in the tropics. While neither time nor budget permitted the acquisition of data from a control group, and although the data collected will not be as reliable as it would be if collected from a bona fide control group in a temperate zone, the respondents were required to rate the same topic couched in two different time domains. For example, each item relating to poncho appeared in the questionnaire twice. One time the individual was to express his attitude toward the

poncho in terms of its effectiveness when he used it in the United States. Essentially, the items pertaining to poncho received two ratings which could be systematically compared, one for tropical use and one for use in a temperate climate. This comparison, in a very gross way, allowed some interpretations as to the effects of the tropics on the attitude of troops. While this approach has the advantage of a one group - two condition experimental design and is therefore not subject to the "equal groups" assumption, there are other problems which perhaps are more serious. For example, the assumption is made that by phrasing the items in a Stateside context the subjects will respond as they would if they were in the States. Also, their attitudes about conditions as they used to exist back in the States might very well be affected by the "grass is greener" phenomenon. In short, the present investigators view this technique as rather limited, probably not as valid as actually testing groups in a temperate zone, but better than no control group at all.

The two topics used for the zonal control were "Poncho" and "Combat Boots". For "Poncho", both tropics and Stateside treatments are included in the nine common topics, such that all of the samples received both treatments. For "Combat Boots", only the Stateside treatment was included in the nine common topics and the tropics treatment appeared in non-combatants booklet because the majority of the Viet Nam returnees had not worn combat boots at all while on their six months' tour. Hereafter, the two treatments, "Stateside" and "Tropics" of the two topics shall be differentiated by the letters (S) for Stateside and (T) for tropics, appearing after the topic name.

V. ATTITUDINAL RESULTS

Each of the seventeen topics is treated separately in this chapter. The results are discussed in terms of the total sample, such that the attitudes which represent what the troops in general think about the effectiveness of their equipment as it is used in a tropical environment might be identified.

In the final portion of this chapter the various implications suggested by the results are discussed in detail. The items of equipment and their characteristics which appear to be acceptable are identified, and those items of equipment and their charcteristics which have been found to be unacceptable by the troops are discussed in terms of the possible alternatives available to correct the situation.

Table 3 presents the breakdown of each topic into its component dimensions, along with the mean attitude ratings for these dimensions as reported by the entire sample.

TABLE 3

Division of Topics into Dimensions and Levels and Their Associated Mean Ratings

Topic	Dimension	Level	Mean Rating
Fatigues			3.88
	Global	1	3.86
	Comfort	2	3.60
	Durability	2	3.03
	Protection	2	4.00
	Camouflage	3	4.60
	Insects	3	3.56
	Underbrush	3	3.71
Poncho (S)			4.30
	Global	1	3.98
	Durability	2	5.24
	Protection	2	4.46
	Comfort	2	3.21
Jungle Boots			5.14
	Global	1	5.25
	Comfort	2	5.01
	Traction	2	5.20
	Durability	2	3.61
	Cracking	3	3.47
	Rotting	3	3.63
	Stitching	3	4.22
Combat Boots			5.38
	Global	1	5.38
	Traction	2	4.65
	Protection	2	5.38
	Durability	2	5.32
	Cracking	3	4.94
	Rotting	3	5.56
	Stitching	3	5.67

NOTE: Possible attitude scores range from a minimum of 1.00 to a maximum of 7.00, with 4.00 being the hypothetical neutral point.

TABLE 3 - (Continued)

Topic	Dimension	Level	Mean Rating
Canteen			5.02
	Global	1	4.86
	Portability	2	5.49
	Durability	2	4.83
	Capacity	2	4.41
Poncho (T)			3.80
	Global	1	3.68
	Durability	2	4.22
	Protection	2	3.74
	Comfort	2	2.15
	Fit	3	2.97
	Movement	3	2.87
	Temperature	3	1.77
Weather			3.31
	Global	1	3.30
	Temperature	2	3.76
	Humidity	2	2.14
	Rainfall	2	2.41
Insects			2.61
	Global	1	2.03
	Quantity	2	1.94
	Danger	2	4.16
	Annoyance	2	1.94
Water			4.73
	Global	1	4.29
	Availability	2	5.37
	Healthfulness	2	4.33
	Taste	2	4.90

TABLE 3 - (Continued)

Topic	Dimension	Level	Mean Rating
Meals			4.05
	Global	1	3.76
	Variety	2	4.19
	Quantity	2	4.02
	Quality	2	4.19
	Taste	3	3.55
	Greasiness	3	3.21
	Preparation	3	3.72
Combat Boots			3.62
	Global	1	3.43
	Traction	2	3.11
	Protection	2	4.04
	Durability	2	3.04
	Cracking	3	3.32
	Rotting	3	3.09
	Stitching	3	3.71
Pack			3.97
	Global	1	3.65
	Durability	2	4.12
	Capacity	2	3.83
	Comfort	2	3.44
	Weight	3	4.49
	Fit	3	3.82
	Movement	3	4.05
Officers			3.86
	Global	1	3.74
	Experience	2	3.41
	Common Sense	2	3.86
	Understanding	2	3.83

TABLE 3 - (Continued)

Topic	Dimension	Level	Mean Rating
Entertainment			3.19
	Global	1	2.82
	Quantity	2	3.29
	On-base	2	2.90
	Off-base	2	3.60
Family			4.36
	Global	1	4.91
	Authorization	2	3.35
	Quarters	2	3.57
	Acclimation	2	2.95
Tiger Suit			5.22
	Global	1	5.44
	Comfort	2	4.91
	Durability	2	4.27
	Protection	2	4.90
	Camouflage	3	5.49
	Insects	3	4.20
	Underbrush	3	4.69
Hammock			4.67
	Global	1	4.70
	Portability	2	4.26
	Protection	2	4.94
	Durability	2	4.13
Poncho Liner			4.86
	Global	1	4.78
	Portability	2	4.99
	Durability	2	4.70
	Protection	2	5.04

TABLE 3 - (Continued)

Topic	Dimension	Level	Mean Rating
Rucksack			4.90
	Global	1	4.58
	Durability	2	4.72
	Capacity	2	5.64
	Comfort	2	4.21
	Weight	3	3.97
	Fit	3	4.71
	Movement	3	4.32

A. Equipment Topics

1. Fatigues

Troops in the tropics may be characterized as being displeased with their fatigues. Though the over-all topic rating given fatigues is just below the Hypothetical Neutral on the seven-point attitude rating scale, there were a number of specifics focused upon in both the Objective and Projective data which indicate troop dissatisfaction with the fatigues in the tropics.

"Durability" and "Comfort" were both felt to be lacking in the standard issue fatigues. The men were uniformly convinced that the fatigues did not hold up under tropical conditions, particularly when subjected to launderings of unusually high frequency. When the respondents were asked to list the three items of equipment that wear out the quickest in the jungle, fatigues were identified as being the least durable item of issue by a substantial margin. It was pointed out by some that this condition is accentuated by the rough treatment which seems to typify Army laundries.

Related to the requirement for repeated launderings is the fact that the current fatigues are too heavy. Therefore, the men sweat a great deal which in turn creates the need for frequent laundering. Though the objective data indicates a lesser degree of dissatisfaction with "Comfort" than with "Durability", the "Your Comments" cards data indicate that "Comfort" is probably at least as important and at least as lacking in the present fatigues as is "Durability". Over 140 respondents used the "Your Comments" cards to point out that the material used for fatigues is too heavy and that they are too hot to wear in the tropics. A similar number of respondents made the completely unprompted suggestion that lightweight, short sleeved fatigues be developed for garrison use. It was recognized by the troops that long sleeves are needed for use in the jungle, but a lighter weight material for the whole fatigue uniform was suggested. As a concomitant of the recommendation for short sleeved fatigue uniforms for garrison use, it was stated that the uniform would be made even more comfortable if the pants were not bloused.

The troops also used the "Your Comments" data to conclude that, since the present fatigues are not durable and therefore require frequent replacement, that either their clothing allowances should be raised or more fatigues issued without cost to them.

The troops seemed to feel that the protective aspects of the present fatigue uniform are acceptable. The global response for "Protection" was right on the mean. The "Camouflage" protective characteristics of the uniform were highly regarded. The fatigues were believed to be somewhat more effective as protection against underbrush than as protection against insects. In this latter regard, one respondent suggested it might be wise to launder fatigues in some form of insect repellent.

Having portrayed the attitudes of troops in the tropics as a whole towards fatigues, it is useful to note the amount of relative agreement or disagreement among the various populations on the dimensions of fatigues which were studied. From a global standpoint, the Panama group thought the fatigues were less satisfactory than either the Okinawa troops or the Hawaii troops, in that order. This ordering was maintained for the objective responses on "Comfort" and "Insect Protection". The Hawaii group probably has a more positive attitude towards "Comfort" and "Insect Protection" because Hawaii has a more moderate climate and fewer insects than either of the other two locations.

For the "Durability dimension, Panama maintains its position as having the most negative attitude, but Hawaii and Okinawa exchange places as holding the most positive attitude. This is also true for the broad dimension of "Protection" and the specific dimension of "Underbrush Protection". The Panama troops probably hold the most negative attitude on these dimensions because, insofar as limited observation permits, it seems that the Panama troops are more often exposed to the densest form of rain forests than the other two populations. Obviously, garment durability and protection are both functionally related to jungle density.

The remaining dimension treated by the Objective questionnaire "Camouflage Protection", was rated very highly relative to the other dimensions by both the Hawaii and Panama populations. However, in this instance the Okinawa group dissented and showed a markedly more negative attitude. This is interesting since the Okinawans have more combat experience, and specifically more experience in Viet Nam than do either of the other populations. Therefore, it appears possible that the judgement of the Okinawa troops is more salient on this issue even though the question was cast in terms of "Camouflage Protection" in the respondents' present location.

In summary, the troops in the tropics want a cooler, lighter weight and more durable fatigue uniform for use in the jungle. They believe the present uniform is deficient in these respects. Also, a large number of respondents feel that a short sleeved fatigue uniform for use in garrison is needed. By and large, the protective aspects of the present uniform are considered acceptable, but some improvements in insect and underbrush protection would be desirable.

2. Poncho

Troops in the tropics were queried as to their attitudes towards the poncho both in the tropics and back in the States. This was done because data collected in the first phase of the project indicated that there appeared to be a substantial difference in the way the poncho was viewed in the States and in the tropics. The troops were asked the same broad dimensional question on "Durability", "Protection" and "Comfort", relative to the poncho in both locations. Also, the specific dimensions of "Fit", "Movement" and "Temperature", subsumed under "Comfort", were investigated.

A clear-cut difference exists between the attitude towards the poncho in the States and tropics. In every case, the attitudes are more positive towards the poncho in the more temperate region. "Comfort" is the only dimension for the population as a whole that falls below "Hypothetical Neutral" (4.0) for the poncho in the States. On the other hand, when viewed as an item of personal equipment to be used in the tropics, only one dimension, that of "Durability" was above 4.0. For the three dimensions and the global mean, the ratings follow one another very closely.

The best liked feature of the poncho for both locations was its "Durability". Comments made on the "Your Comments" cards and Sentence Completion items concerning the poncho as an item of apparel in the jungle indicate that its desirability is diminished because of tearing on the underbrush. Evidently, this condition is not too acute since the poncho was ranked sixth by respondents asked to rank order the items that wear out most quickly in the jungle. It is evident from the data that the Stateside "Durability" of the poncho is great.

The dimension "Protection" was felt to be somewhat more negative than that of "Durability". Responses elicited by the Projective techniques show the main area of dissatisfaction in that the legs and feet become very wet quickly due to its short length. Over-all, the "Protection" afforded by the poncho under Stateside conditions was deemed adequate while that offered under tropical conditions was deemed inadequate.

The evaluation of the responses to items on "Protection" is complicated by the fact that the protective aspects of the poncho are frequently exploited for non-apparal purposes. Two hundred two respondents used the Sentence Completion technique to comment on other uses of the poncho. The principal uses cited were as a shelter, sleeping wrap, ground cover and raft. There was a very strong positive attitude towards the poncho for these non-apparel uses. Some respondents used the "Your Comments" cards to indicate while the poncho was poor as a jungle garment, it was invaluable as a general purpose, protective device. Okinawa troops, in particular, tended to emphasize the utility of the poncho for just about everything in the jungle except a garment. The degree of utility rank order the items of personal equipment of most value in the jungle, the poncho was deemed the third most valuable of 22 items identified by the total population.

"Comfort" was categorically and strongly found to be unacceptable, both in the States and in the tropics. The three "Comfort" dimensions, "Fit", "Movement" and "Temperature", were all rated quite negatively but "Temperature" was by far the lowest of the three with an overall mean of 1.75. This objective data is stongly supported by the protective data in that 339 Sentence Completion responses focused on the "Comfort" of the poncho. Only two of these comments were positive. Likewise, the sweating induced by the poncho when worn as a garment was frequently mentioned in the "Your Comments" cards.

The Panama and Hawaii populations expressed more positive attitudes towards the poncho in a temperate zone (back in the States) than in the tropics. The Okinawa troops, however, gave the edge to the poncho in the tropics. Viewed as an item of personal equipment for use in the tropics, the Okinawa troops had the most positive attitude, the Hawaii troops the second most positive attitude and the Panama troops the least positive attitude. Analyses of variance computed among the three populations comprising the sample show a decisive (.01) level difference in attitude toward the poncho both in the tropics and in the States. For use in the States, the Panama group viewed the poncho most favorably, followed by the Okinawa and Hawaii groups.

The Hawaii group also rated the poncho as the most valuable piece of personal gear in the jungle, but did not stress its multipurpose nature quite as much. The Panama troops were not quite so enthused about the poncho in the tropics as were the other two samples. When the fact that the Panama group gave the poncho the highest rating back in the States is coupled with the fact that they did not stress the "other uses" as much as did the other two samples, it seems reasonable to infer that the Panama group viewed the poncho more as a rain garment than as a general purposes protective covering. Even so, it is still possible to conclude that while the poncho is uncomfortable and does not afford optimal protection as a garment its durability and versatility make it a very desirable part of the tropical soldier's personal equipment.

In summary, it may be stated that the poncho is regarded favorably with respect to durability and protection in temperate regions. However, even under such conditions it is not comfortable as a garment. In the tropics the poncho is very poor as a garment because it causes excessive sweating. However, when viewed as a general purpose protective device its uses are manifold and troops like it very much. Some troops went on to suggest that for rain protection in the jungle a loose fitting rain suit would be valuable.

It would seem that there are several possible ways to improve upon the undesirable aspects of the poncho and still retain its desirable features. One approach would be to provide the poncho with better ventilation for comfort and to lengthen it somewhat for protection of the lower legs as a rain garment. Another possibility would be to develop a light, loose fitting, well-ventilated rain suit for weather protection and also furnish the troops with a general purposes protective cloth made out of the material which is currently used for ponchos.

3. Jungle Boots

The global attitudes as well as specific attitudes towards the "Comfort", "Traction" and "Durability" of the jungle boot were probed. Also, the broad dimension of "Durability" was further explored with respect to "Cracking", "Rotting" and "Stitching". Examination of the data shows that the overall attitude of tropical troops towards

jungle boots is favorable. That jungle boots achieved a topic score of 5.25 which is the second highest topic score for the non-combatant population and the third highest topic score for the combatant population emphasizes the degree of acceptance of this item. "Comfort" and "Traction" of jungle boots are highly regarded. The functional utility of the jungle boot is also great since they were ranked fourth by the total population as the item of personal equipment of most value in the jungle. It is also evident that the jungle boot is deficient with respect to "Durability". "Cracking" is reported as the biggest durability problem followed closely by "Rotting". Though the over-all "Durability" of the jungle boot is viewed negatively, the specific aspect of "Stitching" is acceptable.

The simplicity and straightforwardness of these findings are confused somewhat by the fact that after the field data collection was begun, it was discovered that several generations of jungle boots were in use. The troops were asked to identify the type of jungle boots their ratings applied to on the "Your Comments" cards, but limited cooperation made it difficult to ascertain the distributions within populations for the different types of boots. As best the experimenters could tell, from the data obtained, the majority of the respondents who had used jungle boots expressed their attitudes in terms of the older type. The older boots were characterized as having a buckle at the top of the boot rather than laces. "Your Comments" cards data indicated that while these older boots were a help in jungel terrain, they deteriorated rapidly. Sentence Completion responses relating to "Durability" focused on soles cracking and heels coming off. The consensus of the troops concerning the old jungle boot as set forth in the "Your Comments" cards was that the design was acceptable but the materials used were not durable enough. Further light was shed on this matter by oral comments made by some respondents following the administration of the attitude battery. It was stated that part of the problem with the old jungle boot stemmed from the fact that they had been in storage for years in many cases and had experienced deterioration as a result of this storage.

Over-all, the jungle boots were deemed as a valuable asset to troops functioning in a jungle environment. The only major area of negative attitude was that the boots were not durable enough. "Your Comments" cards data indicate that new jungle boots are somewhat more durable than the older variety but still lack sufficient durability. Indeed, several respondents indicated that two weeks of hard field use completely finished a pair of new jungle boots. Soles cracking and heels coming off still seem to be the major problems. Negative comments by troops having the older type boot without drain holes and the absence of complaints relative to drainage in the new boot indicate acceptance of this feature. Some troops felt the boots should offer better arch and ankle support and other stressed that better water repellency characteristics should be incorporated into the design of the boot.

Examination of the Objective questionnaire data furnished by the three populations shows a marked similarity between the Panama and

Hawaii population attitudes towards the jungle boot. Both populations yielded an over-all topic score of approximately 5.05 which indicates a substantial degree of acceptance . Both populations also expressed positive attitudes towards the "Comfort" and "Traction" of the boots, though in both cases "Comfort" was somewhat less highly regarded than "Traction". Over-all, "Durability" was unacceptable to both populations, but more so to the Panama troops than the Hawaii troops as represented by a difference of 0.4. The troops in Panama also were more negative with respect to all of the specific aspects of "Durability". Both groups viewed "Cracking" as the worst problem followed by "Rotting" and "Stitching". The only aspect of "Durability" receiving an attitude rating above the mean of 4.0 for either group was "Stitching". Evidently, it presents the least severe aspect of the "Durability" problem among the dimensions probed.

Therefore, there is a good deal of concordance between the two populations in their evaluations of the jungle boot. As previously explained, these ratings apply largely to the older type jungle boots.

The Okinawa sample, who had the greatest percentage of new jungle boots, expresses a more positive attitude towards nearly all aspects of the jungle boots. The Okinawa topic score of approximately 5.35 indicates that the troops really like the jungle boots. "Comfort" and "Traction" were rated higher by Okinawa troops than be either of the other populations. "Cracking" and "Rotting" are viewed as problems of equal magnitude by the troops in Okinawa. "Cracking" is shown to be less of a problem, but "Rotting", while much better than in Panama, is lower than the Hawaii group rating. "Stitching" is rated as being above 4.6 so it presents no problem at all in the new boots.

Over-all, the troops in the tropics view the jungle boot as one of their most valuable pieces of equipment when in the jungle. High topic scores for all three geographical regions a preponderance of positive (328) to negative (73) global Sentence Completion responses, and high saliency as a "Your Comment" topic all support this conslusion. The only area of real dissatisfaction is with the durability of the boot. The data support the assertion that the new type jungle boots have been improved in this regard but still require further improvement.

4. Combat Boots

As in the case of the poncho, troops in the tropics were called upon to express their attitudes about wearing combat boots in the tropics and about wearing them back in the United States. However, part of the entire sample was provided with the opportunity to respond to both kinds of items due to the fact that very few combatant troops wore combat boots in the tropics. In short, the non-combatant population responded just to items pertaining to use of combat boots in the United States.

Combat boots used in the tropics are viewed a great deal differently than they are for use in the United States. All of the

mean differences of the several dimensions are large, with a range of differences from 1.3 to 2.4 and a mean of 1.8. All of the "States" dimension means are well on the positive side of Hypothetical Neutral. Except for "Protection" all of the "Tropics" means are clearly below Hypothetical Neutral. In short, the combat boots are quite acceptable for use in a temperate zone such as the United States, but are unacceptable for use in a tropical environment.

With a couple of exceptions the data from the two zones varies together, which indicates the inter-dimension relationships are somewhat the same for the tropics as for the States. In both cases, "Traction" seems to be the least acceptable dimension and is considerably lower than the topic score. This data is supported by the data from the listing technique. The respondents were asked to list three ways combat boots could be improved. The improvement for which there was by far the most agreement was "Traction".

While the combat boots provide adequate protection insofar as States use is concerned, the "Protection" dimension mean is no greater nor less than the topic or global mean. For tropics use "Protection" is the only dimension which is not viewed as negative by the population. Although the "Protection" mean is more neutral than positive, it is well above the topic mean or any of the other dimension means. The fact that on the Sentence Completion item only 23 comments, 16 of which were negative, were made about the "Protection" aspect of the combat boots seems to support the Objective data.

In both cases, States and Tropics, "Durability" did not deviate far from its topic mean. In the United States "Cracking" was viewed as the least positive sub-dimensions of "Durability" while "Rotting" appears to be the greater factor in the tropics.

There were some other characteristics of combat boots which were not covered in the Objective instrument, but which the troops referred to in the less structured instruments. Three very salient dimensions are "Ventilation", "Drainage", and "Weight". It was reported that combat boots are much too hot to wear in the tropics and need better ventilation. Also, once water gets into the boots (which is inevitable) there is no way for it to escape when the boots are taken off. Another complaint of combat boots is their weight. The "Weight" dimension ranked third for saliency scores on the listing technique and 53 negative to just three positive comments on the Sentence Completion item.

Generally speaking, there are few differences among the combat boot related attitudes of U.S. troops stationed in Panama, Hawaii and Okinawa. Insofar as reporting upon the effectiveness of the combat boots when used in the United States, there was a slight difference between each of the groups, with the Okinawa group the least positive, the Panama group the most positive and the Hawaii group in between. It should be pointed out, however, that even the least positive was

above 5.0 which is a relatively high mean for a seven point scale. It is interesting to note that although the Okinawa group was not called upon to respond to the Combat Boots (T) items, the other two groups reversed their positions. The Panama group views the combat boots slightly more negatively than the Hawaii group. While the two groups have almost identical means for "Protection" and "Durability", the Panama group has noticeably lower means for the sub-dimensions of "Durability", "Cracking", "Rotting", and "Stitching". The fact that the two groups have similar means with respect to "Durability" and different means on the sub-dimensions might very well be explained by data collected from the more "unstructured" techniques and the situational topics.

The situational variable which seems to be most closely related to attitudes pertaining to the sub-dimension of "Durability" is "Weather". The Hawaii and Panama groups differ significantly with topic means of 4.02 and 2.86, respectively. For the most part, the troops stationed in Panama regard the weather there as wetter, hotter and more humid than do the troops in Hawaii. These attitudes appear to reflect actual conditions in Panama and Hawaii in that the mean temperatures are 80 degrees and 74 degrees, respectively, and in Hawaii there is considerably less rainfall than in Panama. The conditions in Panama do seem to be more conducive to "Rotting", "Cracking" and "Stitching" problems than in Hawaii, which probably accounts for the lower sub-dimension means of the Panama group.

On the other hand, the means for "Durability" do not differ between the two groups, and based on the sub-dimension means the expectation is that the "Durability" mean for the Panama group would be considerably lower than the mean for Hawaii. A possible explanation of this might be the fact that the troops located in Hawaii occasionally trained in volcanic areas, and they reported that combat boots were torn to pieces by the volcanic rock. While a sub-dimension of this sort was not included in the Objective instrument it would appear this aspect of durability influenced responses to the "Durability" item.

It is apparent that the combat boots are regarded as quite acceptable in temperate zones such as the United States, and not acceptable for use in tropical environments. In the tropics, which has been the primary interest of this study, combat boots are unacceptable. In asmuch as the troops are neutral with respect to the protective qualities of combat boots, the over-all topic effects must be attributable to "Traction" and "Durability". In wet, humid tropic rain forests, the terrain provides a series of hilly, slippery obstacles which require soles designed for the maximum in "Traction". Many of the troops reported that they had soles with special treads put on their boots, but that while they were rather effective, they came off too easily.

Combat boots are impossible to keep dry in the tropical rain forests due to the large amounts of rain and high humidity. These conditions led to a great amount of rotting not usually characteristic of combat boots, which greatly decreased the life of a pair of combat boots.

It would seem that the troops in the tropics are looking for a boot made of durable, lightweight, rapid drying material with holes strategically placed to provide air circulation and water drainage, and which has durable soles and heels designed for maximum traction. Interestingly, enough these "desirable" characteristics appear to be found in the jungle boot issued by the Quartermaster and troops in the tropics find them to be quite acceptable. This fact supports the results obtained in the Combat Boots topic.

5. Canteen

One of the nine common topics was the canteen. The dimensions other than general acceptability which were investigated were "Portability", "Durability" and "Capacity". Every mean is positive with the topic mean slightly less than 5.0. The over-all acceptability of the canteen is further demonstrated by the fact that when all of the Topic Score means are rank ordered from most acceptable to least acceptable, Canteen is third out of fifteen possibilities for the non-combatant population and fourth out of thirteen for the combatant population.

As far as inter-dimension relationships are concerned, "Portability" is most positive and above the Topic Score and Global means, while "Durability" and "Capacity" are less positive in that order, and are both below the Topic Score and Global means. According to this data, it would appear that troops in the tropics characterize the canteen as relatively easy to carry, acceptably durable and having a capacity which is just barely acceptable for use in jungle environment. The canteen is seen as second only to the machete as important personal equipment used in the jungle.

Although the frequency with which Canteen responses were made on the "Your Comments" cards was somewhat less than the most frequently mentioned topics, some commonly held notions were identified which the Objective technique precluded. For example, the attachment chain rattles and impairs safety, the metal corrodes too quickly and the stoppers are lost too quickly. While the objective items did not differentiate between the metal and bladder type canteens, enough responses were made on the "Your Comments" cards to allow the general observations that: 1) capacity is even more acceptable than that for the metal canteen; 2) the water tastes better; 3) they snag and tear on bushes too easily; 4) they are too difficult to fill.

For the most part, dimension acceptability of the canteen does not seem to be a function of tropical location. All of the dimension means for all three groups are above Hypothetical Neutral, and the inter-dimension relationships are practically the same for each of the three groups.

In summary, the canteen is a highly regarded item of equipment. It is easy to carry, quite durable, and generally holds a

sufficient amount of water. Some suggested improvements are: the method of cap attachment should be improved so as to eliminate the noise caused by a rattling chain; the material of which the canteen is made should be changed in order to prevent metal corrosion and also to improve the taste of the water.

6. Pack

The attitude of a sample of non-combatant, tropical U.S. troops stationed in Panama and Hawaii toward the pack were assessed relative to the broad dimensional areas of "Durability", "Capacity" and "Comfort". Specific sub-dimensions of "Comfort" were also probed. Those investigated were "Weight", "Fit: and "Movement".

The troops found the pack acceptable relative to "Durability", slightly unacceptable relative to "Capacity" and highly unacceptable with regard to "Comfort". Examination of the Sentence Completion data confounds these rather obvious conclusions drawn from the Ojbective data since generally they contradict these inferences. There are, however, a substantially greater amount of negative than positive "Global" responses. (170 negative versus 92 positive) to the Sentence Completion items. Some of these unspecified negatives may account for a portion of the apparent contradictions. The three specific dimensions of "Comfort" are deemed more acceptable than "Comfort" itself. Therefore, it is concluded that there must be other salient aspects of "Comfort" which were not identified in the instrument, and which are viewed more negatively by the subjects than those which were rated.

By far the most favorably regarded aspect of the pack is its weight. This is supported by both the Ojbective and Sentence Completion data. There were some subjects who demurred via the "Your Comments" cards, but over-all, the pack's weight was quite acceptable to the troops. "Fit" was found to be marginally unacceptable and "Movement" slightly more unacceptable. Sentence Completion responses on the dimension "Movement" did not coincide (128 positive, 23 negative) with the objective data. The extent of this disparity is great enough to introduce suspicion that perhaps some subjects' responses pertained to the rucksack rather than the pack. Though "Movement" was one of the least positive dimensions of the topic "Rucksack", the fact that it had a mean of 4.32, implies a great enough degree of acceptance that, if there was confusion in the minds of some persons whether the word "Pack" was to be interpreted specifically or generically, some of the divergence between techniques might be accounted for by this confusion.

For the broad dimensional areas probed, "Durability", "Capacity" and "Comfort", the U.S. troops stationed in Panama expressed more positive attitudes than did those stationed in Hawaii. Evaluation of the specific attitudinal dimensions of "Comfort", i.e., "Weight", "Fit" and "Movement is mixed with the Hawaii troops being more positive with respect to "Weight" and "Movement" while the Panama troops regard "Fit" more favorably than do the Hawaii troops. Overall, it would appear

the U.S. troops stationed in Panama find the pack more acceptable than do the Hawaii troops. The topic score for the Panama sample was slightly above Hypothetical Neutral while the Hawaii sample was slightly below the level. Global means for both populations are equivalent and indicate a lesser degree of acceptance (3.66) than do the Topic Scores.

Over-all, the pack is viewed by non-combatant tropical troops as being a borderline case relative to acceptability. Some contradictions in the data elicited by the various techniques complicates the interpretation of how the troops feel about this topic.

On the whole, it appears that the dimensions probed are marginally unacceptable excepting "Durability" and "Weight" which are acceptable and "Comfort" which is quite unacceptable. The fact that the Global mean for the non-combatant population is lower than all dimensions other than "Comfort" indicates that this dimension is of the greatest saliency to the troops. Therefore, it would appear that the most important improvement which could be made in the pack is to make it more comfortable to wear.

7. Meals

Attitudes of non-combatant troops towards meals were assessed by questioning the subjects with respect to the broad dimensional areas of "Variety", "Quantity" and "Quality" of food used in their mess halls. Specific dimensions of "Quality" which were also probed were: "Taste", "Greasiness" and "Preparation". These dimensions focused on the end product meal rather than the basic foodstuffs. The broad areas probed are viewed positively, though marginally so, by the troops. It is also strikingly evident that there is a substantial disparity between the rating given the broad dimensional area "Quality" and the specific dimensions relating to "Quality", i.e., "Taste", "Greasiness", and "Preparation". The reason for this disparity is that over-all, the troops find the basic foodstuffs purchased for their mess acceptable. What does elicit negative attitudes is the "Preparation" given this food. Obviously, "Preparation" varies from location to location, but on the whole, troops viewed it negatively. "Greasiness" elicited a good many negative comments, stressing that grease is particularly unpalatable in the tropics.

The Panama population viewed all dimensions relating to meals more positively than did the Hawaii population. A difference of .42 on the Global question and .51 on the Topic Score indicates a substantial difference between groups. It is interesting to note that though there is this absolute difference between populations, a comparison of the rank orders of dimensions for both locations shows only one reversal. "Quality" is most positive with "Variety" second in Panama while the opposite is true for the troops stationed in Hawaii.

Over-all, the troops viewed the food purchased by the Army for their local mess halls as being acceptable. "Quality" and "Variety" were seen as being somewhat more acceptable than "Quantity" which was

right on Hypothetical Neutral for the total non-combatant population, though unacceptable in Hawaii. "Preparation" and the dimensions related to it, "Taste" and "Greasiness" are viewed as being unacceptable by the troops. This assertion is substantiated by both the "Your Comments" cards and Sentence Completion data. The most unacceptable "Preparation" of food is the "Greasiness". It was emphasized by the troops that grease is particularly unpalatable in the tropics.

8. Rucksack

Combatant troops attitudes towards the rucksack were probed found to be positive. Broad dimensional areas explored were "Durability", "Capacity" and "Comfort". Additional specific dimensions subsumed under "Comfort" which were investigated were "Weight", "Fit" and "Movement". The only dimension receiving an attitude rating below the neutral rating of 4.0 was "Weight". Even so, the 3.96 rating given this dimension does not reflect a significant degree of dissatisfaction. The general high esteem in which the rucksack is held is further attested to by the fact that the rucksack received the sixth highest attitudinal topic score for the 13 topics evaluated by combatant troops. Listing of personal equipment of most value in the jungle resulted in a rank order of twentieth out of 22 items. The fact that few other than the combatant group had any experience with the rucksack is probably a major factor in the lowness of this particular rating.

The interest in the rucksack was great enough to achieve a rank order of fifth out of 14 selected topics for "Your Comments" cards for the troops in Okinawa. "Your Comments" responses indicated acceptance of the rucksack. "Size", "Comfort", and "Waterproofing" were the major foci of these comments.

Most of the troops believe that the rucksack's capacity is optimal. However, Sentence Completion responses which differentiated size from carrying space indicated that, though the capacity was good, the external size was too great. The "Durability" of the rucksack is also portrayed as being good by the troops on the Objective items but this conclusion is somewhat dubious since the rucksack ranked seventh out of 12 pieces of equipment identified as wearing out quickly in the jungle. "Comfort", though acceptable, is the least favorable aspect of this piece of equipment's design. "Weight" and "Movement" are appreciably less acceptable than "Fit" as they relate to the comfort of wearing the rucksack.

Over-all, combatant tropical troops had very positive attitudes towards the rucksack as an item of personal equipment. Its "Capacity" is thought to be appropriate though it is too large externally, and it is thought to be quite durable. The "Comfort" of wearing a rucksack is acceptable, but not highly so. Specific aspects of "Comfort" which are poor relative to other aspects of the rucksack design are "Weight" and "Movement". The "Fit" of the rucksack is quite acceptable to the troops.

9. Tiger Suit

The tiger suit is not an item of government issue to U.S. troops. There is no single manufacturer or source of tiger suits, but rather it is a generic term describing a lightweight, camouflaged fatigue uniform. This topic was included in the study because during the early phases of the program it was found that a large number of personnel serving in Viet Nam purchased these items for use in jungle warfare.

The combatant troops have a very positive attitude towards the tiger suit, as might be surmised from the nature of the tiger suit.

Comparison of the responses from the same population to identical questions regarding conventional fatigues and tiger suits shows a markedly more positive attitude towards the tiger suit on the part of the combatant sample. Table 10 presents substantial evidence that the short-comings of conventional fatigues under conditions of tropical combat are corrected by the tiger suit. Therefore, the development of a government issue tiger suit for tropical troops is recommended.

10. Hammock

U.S. troops with recent combat experiences in the tropics were queried concerning the "Portability", "Protection" and "Durability" of the new jungle hammock. The troops had positive attitudes towards the item of personal equipment. The dimension which was deemed most acceptable was "Protection". Probably this esteem is directed mainly at "Insect Protection", since some of the "Your Comments" data indicate that one is a "sitting duck" in the new hammock both because it can be easily spotted by the enemy and because it takes too long to get out of. This is a minority opinion but of enough importance to be reported. Unfortunately, due to the fact this aspect of "Protection" was not questioned specifically, it is not possible to state categorically how the majority of troops feel on this issue. "Portability" and "Durability" are both viewed as being acceptable by the troops, but not as highly acceptable as was "Protection". "Your Comments" data indicated some dissatisfaction with the bulkiness of the hammock.

Despite these specific areas of dissatisfaction, the generally positive evaluation of the hammock is attested to by the fact that the hammock ranked seventh out of 22 items identified as being "Most Valuable" in the jungle. Likewise, this topic received the eighth highest Topic Score for the 13 topical areas about which combatant troops were questioned.

The hammock is regarded as a valuable item of personal equipment for troops engaged in jungle warfare. Positive attitudes were expressed towards all dimensions probed. Some dissatisfaction with the hammock's bulkiness, ease of exit, and visibility were expressed, but these factors were overshadowed by the good features of the hammock when the attitudinal ratings were made.

11. Poncho Liner

The Okinawa sample, representing the oldest, most militarily experienced group participating in the study and also the sample having the greatest number of personnel having been to Viet Nam, was queried concerning the new poncho liner.

The data clearly demonstrate that the troops have a consistently positive attitude towards the poncho liner. The dimensions probed were "Portability", "Durability" and "Protection". The lowest mean rating on any of these dimensions was 4.70 for "Durability". Both "Portability" and "Protection" were highly esteemed with means of nearly 5.0.

The over-all acceptance of the liner was emphasized by the fact that even though only the Special Forces troops stationed on Okinawa had been issued the poncho liner, it still ranked fifteenth out of the 22 items of equipment identified by respondents from all locations as being of greatest value in the jungle. Oral comments heard from some of the Special Forces troops on Okinawa indicated that the poncho liner is an extremely valuable multi-purpose protective covering, even better than the poncho itself.

All available evidence indicates that tropical troops who have used the poncho liner have very positive attitudes towards it. It is viewed as a valuable and versatile item of equipment.

B. Situational Topics

1. Water

Broad dimensional areas investigated concerning the acquisition of drinking water in the tropics were: "Availability", "Healthfulness" and "Taste". There were distinct differences among the three populations with respect to these areas. For every dimension probed, the Hawaii sample was the most strongly positive, the Panama sample second and the Okinawa sample third. The responses on all dimensions were close to the mean for both the Hawaii and Panama populations. The Okinawa populations, on the other hand, responded both above and below the mean concerning the various dimensions of the topic "Water".

Examination of the data indicates that the "Availability" of drinking water was not viewed as a problem by the populations studied. The data also shows that the "Taste" of drinking water found in the tropics is acceptable. However, the "Your Comments" cards were used by the troops to point out that the "Taste" is poor when it is necessary to add water purification tablets to the water.

The thing that really does concern the troops is the "Healthfulness" of the water which is available. Though the total population attitude is above the mean (4.27), the troops in all three locations were

more negative towards "Healhfulness" than any of the other dimensional areas. Interestingly enough, the population Global mean is approximately equal to this lowest dimension. This seems to indicate that "Healthfulness" is the most salient issue to the troops. Though personnel in all locations viewed "Healthfulness" as the least favorable aspect of the local drinking water, only the Okinawa attitude scores indicated that the "Healthfulness" was unacceptable. The low Global score (3.22) given water by the Okinawa sample, plus the fact that "Healthfulness" was rated below the mean, indicates that there is significant difficulty in acquiring healthful water in Okinawa. The Panama group also seems to harbor some doubts about the "Healthfulness" of local water, but still believes it to be acceptable. The U.S. troops in Hawaii have no problems with water at all since high positive attitudes were given in responses to questions on all dimensions.

2. Weather

Examination of the data on weather indicates a clear-cut hierarchy among the three geographical locations relative to the weather. Attitudinal responses indicate that the Hawaii population regards their weather favorably, the Okinawa sample somewhat negatively and the Panama sample quite negatively. Respective Topic Scores for the three populations are 4.02, 3.25 and 2.86. This trend held for all dimensions with only one exception. This exception was a reversal between Hawaii and Okinawa on "Rainfall". Evidently, this is about the only aspect of the Hawaiian climate which is quite annoying to the troops. "Humidity" is also given a rating below the mean (3.02 by the Hawaii population) but this is still a great deal higher than the rating given by either the Panama or Okinawa samples.

Over-all, the "Humidity" is viewed as the major weather problem in the tropics with "Rainfall" a close second. "Temperature", though receiving an overall rating below the mean is consistently regarded as the least troublesome aspect of the environment.

In short, the "Humidity" and related "Rainfall" are the aspects of a tropical environment which really bother the troops, not the "Temperature". This data would seem to indicate a need for well-ventilated, light weight, easily drying clothing, and moisture and rust resistant field equipment.

3. Insects

The attitudes of the troops in the tropical areas in which testing took place can be characterized quite simply with respect to insects. All the troops believe the insects to be a problem, but the magnitude of the problem varies from location to location. The Panama troops are most negative, followed by Okinawa and Hawaii troops. This trend holds for all insect dimensions.

The troops do not regard tropical insects as presenting a significant "Danger" to them. A slightly negative attitude towards this dimension was present in the Panama and Okinawa samples but still it was very much less negative than any other dimension.

The "Quantity" and "Annoyance" of insects was highly negative in both Panama and Okinawa. Overall population scores of 2.25 and 2.10 reflect the degree of dissatisfaction these troops have with insects. The Hawaii troops were quite negative relative to "Quantity" and "Annoyance" also, but noticeably higher than the other two populations. The fact that insects received the lowest over-all Topic score of both the 15 non-combatant topics and 13 combatant topics further emphasizes the magnitude of the problem created by insects in the tropics.

In summary, it may be said that none of the troops like insects. They do not view them as a significant health menace but find them extremely annoying due to the quantities in which they are present. The annoyance problem is quite acute in both Panama and Okinawa. Evidently the troops in Hawaii do not find insects such a severe problem as demonstrated by their consistently less negative responses.

4. Officers

The non-combatant troops were questioned concerning the broad dimensional areas of "Experience", "Common Sense" and "Understanding" of officers. A striking similarity was found between the Panama and Hawaii troops on these dimensions, with the greatest difference being 0.13 on the dimension "Understanding". Though the differences between population were extremely small, the Panama population tended to be less negative than the Hawaii group.

Lack of "Experience" on the part of some officers is the principal factor which the troops regard as unacceptable. Though dissatisfaction with the dimensions of "Common Sense" and "Experience" is evident (3.84 and 3.83, respectively), the troops' degree of negativeness is not great enough to say that the officers are viewed as being unacceptable in these regards. Indeed, the fact that the Global rating is much nearer the ratings for "Common Sense" and "Understanding" than to that on "Experience" tends to indicate that "Common Sense" and "Understanding" are more salient than "Experience" to the troops.

Sentence Completion responses concerning officers brought forth a variety of characteristics that were viewed negatively by the troops who responded to this technique. "Experience", "Considerateness", "Young Officers" and "Decision Making Capabilities" were among the items viewed negatively by those who responded in terms of specifics. However, the Global comments made indicated a 2 to 1 positive attitude towards the officers. Over-all, there were more negative comments (749) than positive comments (516), but for the most part those respondents who had positive attitudes did not define why they liked their officers in contradistinction to the specifics cited by those with negative attitudes.

Drawing together the data it would appear that the troops do not like young, inexperienced officers and evidently feel there are too many around. "Considerateness" or "Understanding" appears to be one of the most important facets of an officer's personality as perceived by the troops. Over-all, the attitude towards personality traits is negative, though not strongly so. "Common Sense" is also viewed in a similar manner. Sentence Completion responses focusing on "Fairness" indicated an even split on this dimension between those holding positive and negative attitudes.

5. Entertainment

Based on the assumption that entertainment is an important aspect of the over-all environment of a soldier, particularly when stationed overseas, the non-combatant tropical troops were queried concerning the "Quantity" of entertainment available in their locations. They were also asked to express their specific attitudes towards both "On-Base" and "Off-Base" entertainment. The fact that entertainment is an important situational variable is attested to by the fact that entertainment ranked fifth for both Panama and Hawaii out of fourteen topics which elicited a substantial number of "Your Comments" responses.

The troops feel that sufficient entertainment is not available to them. The degree of dissatisfaction of the non-combatant troops with entertainment is indicated by the fact that the entertainment Topic Score ranked fourteenth out of fifteen topics for non-combatant personnel. In all cases, the Panama troops were substantially more negative about entertainment than the troops in Hawaii. The relative rank order of attitudes towards the dimensions probed was similar except for a reversal between "Off-Base" entertainment and "Quantity" for the Hawaii group relative to the Panama group.

Both populations seem to feel that the over-all "Quantity" of entertainment available to them is inadequate and both have more positive attitudes towards the "Off-Base" than "On-Base" entertainment. In Panama, the "On-Base" entertainment was deemed unacceptable with a mean of 2.51. The differential between this value and the "Off-Base" mean (1.06) was much greater than that for the Hawaii troops (0.36). The extreme dissatisfaction of the Panama troops with "On-Base" entertainment is probably due to the fact that at the time the attitude battery was administered the troops had experienced several months of restriction to base following the January 1964 Panamanian disorder. The fact that this restriction had aroused the hostility of the troops was apparent from both the tone and content of many Panama "Your Comments" cards.

The Hawaii sample, though less negative towards entertainment, in all respects, than the Panama sample, was not happy with the entertainment opportunities open to them. "Your Comments" responses indicated that the major area of dissatisfaction was the high cost of entertainment in Hawaii. The general impression was gained that there

was a good potential for entertainment in Hawaii but that high cost precluded most G.I.'s from enjoying it to a significant degree.

Over-all, a generalized dissatisfaction with the entertainment situation is evident in both Panama and Hawaii. Special circumstances in both locations, i.e., restriction to base in Panama and high cost in Hawaii, probably tend to make the over-all appraisal more negative than might otherwise be the case.

6. Family

The non-combatant population's responses to questions concerning dependent families living in the tropics reflects a fairly wide range of attitudes. In both Panama and Hawaii, a quite positive attitude was expressed towards having one's family with him in the tropics. It certainly comes as no surprise that this is desired by both populations. It is, however, evident that the mechanical aspects of implementing this desire are viewed negatively. Examination of Figure 18 shows that "Acclimation" is difficult for the families of the U.S. troops in the tropics. Obtaining "Authorization" to have their families with them is evidently a very severe problem for troops stationed in Panama (2.76), but poses no problem at all in Hawaii (4.30). "Quarters" are viewed similarly by both populations. Attitudes are negative in both cases but not strongly so.

The high cost of living and the unfriendliness of the local population towards enlisted personnel were focused on in the "Your Comments" cards from the Hawaii group. Most of the "Your Comments" complaints from U.S. troops stationed in Panama stressed poorness of the housing available to them.

Over-all, men in both locations desire to have their families with them. Both populations experience difficulty in carrying out this objective but it is evidently much more difficult for the troops to get permission to have their families with them in Panama than in Hawaii. The Hawaii sample believes the attitudes of the local populace and the high cost of living make "Acclimation" for their families difficult. "Acclimation" is less of a problem in Panama but since initial "Authorization" for having one's family there is not easy to obtain, it is difficult to conclude which group is better off.

C. Summary

The topics for which attitudinal data has been collected, processed and analyzed in this study may be classified two different ways; by type of population to which the assessment battery was administered, and by type of topic. There were two types of population, non-combatant and combatant, and a topic which was administered to both of these populations is referred to as a Common Topic. Topics administered exclusively to the non-combatant populations are referred to as non-combatant (NC) and combatant (C) topics, respectively. The other method of classification

is simple in that each topic pertains to some item of equipment or some situational variable. These two classification schemes are displayed in Table 2.

Although an oversimplification, an attempt has been made to identify the items of equipment and situational variables with respect to acceptability. Topic Score means of 4.1 or greater are considered to indicate group acceptance, means of 3.9 or less are considered to indicate group non-acceptance and means between 3.9 or less are considered to indicate group non-acceptance and means between 3.9 and 4.1 are neutral. On some topics some characteristics are acceptable while others are not and this tends to confuse the issue somewhat, but most of the deviation within a topic is of degree rather than of kind.

Without exception, those items of equipment which were developed with use in a tropical environment as a prime consideration were regarded as acceptable by the troops in the tropics. These items of equipment are: jungle boots, tiger suit, hammock and poncho liner. The assumption is made here that the tiger suit, which for the most part was developed by the Japanese, due to its light weight, durability and camouflage characteristics, was designed especially for use in the tropics. Those items of equipment which apparently were designed without use in the tropics as a prime consideration were seven in number of which two were acceptable (canteen and rucksack), two were regarded as neither acceptable or non-acceptable (meals and pack) and three were not acceptable (fatigues, poncho and combat boots). Interestingly enough, two of the three items which were deemed not acceptable (poncho and combat boots) by the troops were regarded as acceptable for use in the United States.

Of the six situational topics, the troops were required to express attitudes about, three were not acceptable (weather, insects, and entertainment), one was neither acceptable nor unacceptable (officers), and two were acceptable (water and family). The acceptability of the topic "Family" is somewhat misleading in that the investigators were trying to determine if having families with the troops in a tropical environment was desirable or undesirable insofar as the troops were concerned. While the general feeling was very positive insofar as desiring the families to be with them, the troops indicated that it was a very difficult administrative task to accomplish and once in the tropics the families found it very difficult to become acclimated.

Ten of the topics included the dimension of "Durability". Table 4 indicates that three of the topics were unacceptable with respect to "Durability", one was neutral and six were acceptable. "Comfort" seemed to be the most bothersome dimension in that half of the six topics which included "Comfort" as a measure were viewed as unacceptable on that dimension. The rest of the most commonly used dimensions on all of the topics were acceptable to the troops. Note that only one dimension of only one of the items of equipment designed for use in the tropics was found to be unacceptable, and that was the "Durability" dimension of jungle boots.

It would seem that those items of equipment which have been designed with some of the problems inherent in a tropical environment in mind are much more likely to be accepted by the troops than equipment not specially designed for use in the tropics. Also, of the several equipment characteristics examined in the present study, "Durability" and "Comfort" appear to elicit the most negative responses.

It is interesting at this point to report the results of the "experiment". One hundred eighteen subjects were administered the test battery the day before and the morning of the flag incident in Panama. Although somewhat of a serendipity, the following research design resulted from the incident. The conditions under which the 118 troops were tested may be though of as the pre-test conditions; the alert status and riot situation in which troops and rioters were killed during the flag riots is the major intervening effect; and the second test administration to the same troops a few months later, after riots, is the post-test experimental condition.

TABLE 4

ACCEPTABILITY OF SELECTED DIMENSIONS OF EQUIPMENT TOPICS INCLUDED IN OSGOOD QUESTIONNAIRE

	Global	Durability	Comfort	Protection	Portability	Capacity
Designed for Tropics						
Jungle Boots	+	-	+			
Tiger Suit	+	+	+	+		
Hammock	+	+		+	+	
Poncho Liner	+	+		+	+	
Not Designed for Tropics						
Fatigues	-	-	-	N		
Poncho	-	N	-	+		
Combat Boots	-	-		+		
Canteen	+	+			+	N
Pack	N	+	-			+
Rucksack	+	+	+			+

NOTE: + = mean greater than 4.1
N = mean between 3.9 and 4.1
- = mean less than 3.9

Of the 118 respondents, 87 were Mechanized Infantry and 87 were Medics. It was hoped that enough of each group would be available for the post-test to prevent the necessity of combining the groups. Unfortunately this hope was not fulfilled. Through attrition of one kind or another, fifty per cent of each group was lost during the time which elapsed between pre- and post-tests. The post-test groups had N's of 47 and 14 for Mechanized and Medics, respectively, or a total of 61.

It will be noted in Table 5 that for the mechanized group fourteen of the fifteen mean differences are in the same direction. In 14 cases, the means for the Experimental Condition II are more negative than the means for Experimental Condition I, and five of the differences are statistically significant beyond the .05 level of confidence. There were no trends in either direction with respect to mean differences between the Medic experimental groups. The mean difference for poncho (S) was the only one which was significant.

To insure the legitimacy of the comparison between the means of Experimental Conditions I and II, means were computed separately for that part of Group I, which was not tested under Condition II. This precautionary measure was taken because of the possibility that those respondents who were lost through attrition after the pre-test might have had significantly more positive attitude scores than the group remaining. Such a condition as this could have accounted for the drop on all of the means in the post-test. As it turned out there were no significant differences between the sub-group lost through attrition and the total group.

For the mechanized group, there appears to be a very definite shift in attitude between Conditions I and II. The mean responses after the combat situation are statistically significantly more negative in more than one third of the cases and more negative for all but one of the topics. When examined for a possible relationship between shift magnitude and kind of topic, it would appear that there was a slightly larger negative shift for situational topics than for equipment related topics.

The medics were not subjected to statistical analysis on the basis of the very small N of the Experimental Condition II group.

It was originally intended to include a control group into the design by administering the battery to a group in Hawaii on route to Okinawa, and then test them again on the way back. This would have allowed two administrations to the same group with about a month's interval in between, but without the combat situation intervening. Military scheduling, both of troops and transportation for the investigators, did not permit implementation of this plan.

As expected, a considerable amount of attitude change appears to have taken place in the interim between the pre-test and the post-test. The interpretation of the change, however, is made rather

difficult due to the long time period after the "combat situation" commenced in Panama. In fact, rather than measuring effects of the combat situation (shooting and killing and fear of being shot and killed) upon attitudes, it seems more likely that the effects measured were of a somewhat different nature.

TABLE 5

MEANS AND STANDARD DEVIATIONS OF THIRTEEN TOPICS BEFORE (EXPERIMENTAL CONDITION 1) AND AFTER (EXPERIMENTAL CONDITION 11) A COMBAT SITUATION

Topic	Means			Standard Deviation		
	Condition 1	Condition 11	Diff.	Condition 1	Condition 11	Diff.
Fatigues	4.10	4.00	-.10	1.65	1.52	-.13
Poncho (S)	4.84	4.26	-.58***	1.56	1.26	-.30
Jungle Boots	5.21	5.05	-.16	1.50	1.47	-.03
Combat Boots (S)	5.91	5.64	-.27	1.04	0.86	-.18
Canteen	5.51	5.14	-.37	1.33	1.48	+.15
Poncho (T)	3.78	3.21	-.57**	1.71	1.36	-.35
Weather	3.49	3.20	-.29	1.78	1.72	-.06
Insects	2.55	2.09	-.46**	1.41	0.97	-.44
Water	5.31	4.68	-.63***	1.39	1.38	-.01
Meals	4.12	4.20	+.08	1.57	1.62	+.05
Combat Boots (T)	3.97	3.45	-.52*	1.63	1.33	-.30
Pack	4.30	4.17	-.13	1.71	1.46	-.25
Officers	3.70	3.41	-.29	1.66	1.83	+.17

* .05 level of significance
** .02 level of significance
*** .01 level of significance

NOTE: The positive and negative signs in the Difference columns are indicators of the direction in which the Condition 11 group differs from Condition 1.

There is considerable evidence to support the notion that the general hostility level of the troops increased appreciably between the pre-test and the post-test, and that this increased hostility acted as a negative global attitude which influenced other attitudes in a negative direction. The mean difference for "Entertainment" between the Panama and Hawaii groups was greater, with Panama more negative, than for any other topic save one. The tone and content of many of the "Your Comments" cards from the Panama group indicated exceptionally strong feelings about the restrictions imposed on them following the January 1964 disorder in Panama. It was, in fact, true that the troops had been restricted to base and on constant alert during the interim period following the flag incident up to the post-test session.

In summary, it would seem that although the change of attitude which took place between pre- and post-tests cannot be directly attributable to combat involvement variables, there is strong support for the notion of a general adverse feeling created by the restriction and confinement due to the incident.

VI. METHODOLOGICAL RESULTS

A. Data Analysis Procedures

1. Objective Techniques

Respondents marked their choice positions on Univac Optical Scan Cards which were included in the Objective questionnaires as answer sheets. The Optical Scan Cards were read by the Remington Rand 5340 Optical Scanning Punch which is a machine that reads marks on standard cards and transforms these marks into punched holes. Once all the cards were punched they were run through the International Business Machine 7044 Computer and all of the information was stored on tape. The necessary programs were written to permit statistical computations by the 7044.

This data collection - processing system allowed that data to pass from the respondent directly to the computer with no intermediate manual data manipulations. This capability resulted in a great savings in time and effort, with increased accuracy. However, the system was not developed without some difficulty. The largest single obstacle which had to be overcome was the development of an answer sheet (card) format which would accommodate the types of items to be used and that could be read by the Optical Scanner. A special optical scan card layout was developed for the job and then plug boards were wired to allow the 5340 Optical Scanning Punch to read and punch 90 degrees off the usual mode of operation.

Some difficulties were incurred were incurred with the initial batch of data which had been collected in Panama. Erasures were being punched as well as actual marks of respondents, which resulted in a series of double punches, thereby confounding the data. Two measures

were successfully taken to rectify the situation. The sensitivity of the 5340 Optical Scanning Punch was adjusted such that erasures would not be detected and counted as marks, and the optical scan cards themselves were cleaned up inasmuch as the respondents were sometimes quite careless, in spite of repeated warnings of the administrators.

2. Projective Techniques

Two major criticisms of using projective techniques for data collection, especially in taking data from groups, were that data reduction and analysis is too time consuming and too subjective. The present authors concur that data reduction and analysis are difficult and that there is a certain amount of subjectivity inherent in the approach, but would further assert that subjectivity characterizes the "objective" techniques as well, only at a different stage of the process. With the projective techniques the investigator projects his own idiosyncrasies into the system by way of his perceptual processes as he attempts to structure the unstructured responses. With the "objective" techniques, the investigator projects himself into the system when he structures the questionnaire to which the subjects are to respond. Consequently, subjectivity must be dealt with in either case. A systematic approach to the problem, be it structuring items and response categories for a questionnaire or structuring responses once they have been elicited, must be carefully developed.

A systematic technique for coping with projective data has been developed and incorporated into the present research. Although several projective techniques have been employed, the data collected with each have been reduced in approximately the same manner.

a. Sentence Completion

The data acquired by way of the Sentence Completion technique were reduced as described below. The raters normally worked independently so as to avoid rater - rater bias. In the initial step each rater went through the data of a group of respondents independently, listing all of the possible categories of responses they could envision for a particular topic. At this point, the two raters and the project director would confer to discuss the categories, combining appropriate categories, deleting some and adding some which seemed necessary. Using a finite number of categories each rater went back to the data with which he had been working in an attempt to place every response in one of the then existing categories. After each rater had coded the same responses, the investigators again conferred and the ratings were examined subject by subject, and all differences were discussed so as to allow the raters to adopt the same rating criteria. At this point the data from a different group of subject were coded and another discussion ensued. The purpose of the final rating discussion session was to insure that the categories in use were not group specific and that the raters were maintaining whatever convergent thinking they had attained in earlier discussion.

Once the categories were tentatively established, the same iterating procedures were followed in rating the responses for tone that were used for determining categories. By and large, the raters were able to attain a high level of agreement.

b. Listing

The Listing data was reduced to the form of Saliency Scores. Saliency Scores are weighted scores and were calculated by assigning different values to the three choice positions, calculating the frequency with which a topic was listed within each choice position, multiplying frequency times choice position values, and then summing the choice position scores. The topics were then rank ordered according to Saliency Scores.

c. Picture Projectives - Written Response

As with the Sentence Completion technique, an iterative approach was used. Raters worked independently, listing all of the categories of responses for a particular picture in order to classify for content. After a discussion of the categories established by each rater, a finite number of categories were selected for further exploration and each rater returned to the data which he had previously worked. These ratings were then compared and the categories were modified in number and kind where it was deemed necessary. New groups of responses were then rated using the updated categories.

d. Picture Projectives - Color Response

The employment of data collection techniques based on the assumption that there are color correlates of attitudes was, needless to say, exploratory. The novel nature of the work certainly did not lend itself to any immediate, clearly defined, tried and proved procedures which could be easily instituted for reducing and making sense of the data. Rather, the investigators were faced with an enormous amount of data and insufficient time to fully investigate the many courses of action which could have been followed in developing techniques which would provide optimal information. What was attempted, however, was reduction of the color response data in the most objective manner possible in hopes that such a reduction would then provide meaningful approaches to data analysis.

Each picture was divided into three categories for purposes of reduction and analysis: foreground, background, and extra detail. Foreground constituted these elements of each picture which the investigators wished to emphasize. It was hoped that the subjects would respond freely and more frequently to these elements than to the rest of the picture. The background included these necessary parts of a scene which help to provide the context in which the major stimuli are couched. Extra detail consisted of those responses in which the respondents added detail to the picture through structure rather than merely coloring the already present stimuli.

Each major category of each picture was rated for completeness, and each picture was rated for emphasis, reality, neatness and stroke density. Color usage frequency was determined for each major detail. The number of colors used per person was determined.

It was hoped that the data could be reduced in such a manner as to provide the following kinds of information:

(1) The kinds and frequencies of colors used for each major detail in each picture.

(2) Identification of those pictures and elements of pictures which elicited color responses.

(3) The extent to which the pictures elicited reality vs unreality responses.

An attempt was made to reduce the data in such a way as to be useful for nomethic or ideographic investigation, although the former was expected to be of primary concern in this project.

The iterative practice technique was used in training the raters such that even though most of the parameters were unique and heretofore unmeasured, agreement was reached on rating criteria. Wherever possible, the measures have broken down in such a way as to require but simple counting procedures, thereby objectifying the measures.

e. "Your Comments" Cards

Due to the completely unstructured nature of the "Your Comments" cards technique, a large variety of responses was anticipated. An attempt was made to identify the most frequently mentioned topics first of all, paying little or no attention to the way in which the topics were presented. After identifying the most frequently mentioned topics, it became apparent that the response could be grouped into several categories: 1) suggested modifications to equipment/situation/practices; 2) dissatisfaction with specific aspects of equipment/situation/practices; 3) general dissatisfaction with military life. Response categorization in the above manner seemed to provide an arrangement of the data which would be extremely helpful in data analysis and interpretation.

B. Respondent Cooperation

Forty-seven subjects out of two hundred made three or more "Respondent Consistency Errors" (RCE's) in Phase I. On the basis of this relatively high percentage (.23) of respondents who made at least three RCE's, it was predicted that 10 to 20 percent of the sampled population on Phase II would meet the rejection criterion. The more conservative percentage estimate for Phase II was based on the

assumptions: 1) more combat experienced respondents would be included in the Phase II sample, and they would be more attentive and commit fewer RCE's than the less experienced, less serious soldiers; 2) only the Osgood scale would be used instead of both Osgood and Likert which would provide clearer task definitions to the troops which, in turn, would results in fewer RCE's.

As it turned out, only 12 percent of the total sample were classified as "Uncooperative Respondents" (UR) according to the RCE criterion, which was relatively close to the expected minimum. Little or no differences existed between percent of Uncooperative Respondents in Panama, Hawaii and Okinawa. In fact, a chi-square was computed and there was no significant difference between groups. However, a noticeable difference is indicated between some of the branches within a location. The most apparent contrast is the Special Forces in Panama vs the Airborne in Panama with UR percentages of .03 and .18, respectively. On the assumption that the UR percentage difference between the two groups was a manifestation of some basic characteristics the groups were compared on the demographic variables of age, education, rank, time in service, combat experience, and jungle training experience. Chi-square values were computed between the two groups on each of the demographic variables and all six were significant at the .01 level or greater. The Special Forces group was significantly older, more educated, had higher ranks, had longer service time, more combat experience and had spent more time in jungle training.

The aame six variables were examined for the infantry in Panama which had the same percentage of UR as the Airborne. The Chi-square values computed indicated that there were no significant differences between the Airborne and the Infantry with respect to age, education and rank, but that the infantry was significantly less in service time, combat time and jungle training.

On the basis of these data, it would appear that, insofar as tropical conditions are concerned more consistent responses can be expected from troops who are older, more educated, higher ranked, have spent more time in the service and have had more combat and jungle training experience.

If indeed, the sample population can be classified as either "cooperative" or "uncooperative populations were made. Probably the most striking finding is that in <u>every</u> mean comparison the mean of the "uncooperative" group is lower, or more negative. Although half of the mean differences are not statistically significant, it appears relevant that all differences are in the same direction. Also, in twelve of the fifteen standard deviation comparisons the "uncooperative" group was higher, indicating less group homogeneity.

In summary, although fewer than expected, a large number of respondents made three or more RCE's and were placed in UR category. A comparison of these two groups in terms of independent (demographic),

and dependent (attitudes) variables indicated significant differences between the two groups. The assumption that the three major locations, Okinawa, Hawaii and Panama were representative of different degrees of combat and jungle experience was not entirely born out. The fact that in Panama it became possible to collect data from Special Forces troops resulted in more interested and highly motivated respondents than had been expected. This in turn had profound results on the expected outcome of RCE's committed in each location.

C. Topic Dimensionality

The nature of the items used for response elicitation allowed the data to be processed and analyzed so as to account for the various beliefs and feelings an individual has about an attitudinal object and which yields a resultant attitude. Not all beliefs and feelings a subject has regarding some object are necessarily of similar directions and strength, and it is the way these differences relate to one another which is of interest in the present research.

A rather wide, diversified, range of values was found. In most cases, the topic has some dimensions represented above the "Hypothetical Neutral" of four, and some dimensions represented below the "Hypothetical Neutral" point. In short, the data indicate that most of the topics have some characteristics which are acceptable and some which are not.

Obviously, the dimensions of a topic are not necessarily equivalent in importance. Although global means seem to reflect an average of the dimension means in most cases, there are some instances in which the global mean is more like the most deviant of the dimensions. Assuming that the most important dimensions are adequately represented it would seem that the most deviant dimension in this case would be regarded as the most important to the respondent. This point is illustrated by the data on Jungle Boots. The dimensions "Comfort" and "Durability" both are more negative than the global, and "Durability" is more negative. "Traction", on the other hand, is practically the same value as the global mean and significantly different from the other two dimensions. It would appear that "Traction" had the greatest influence on the global mean and consequently, was probably the most important of the dimensions.

Another example which illustrates the same phenomenon is the topic of "Weather". The global mean for "Weather" is very closely associated with "Temperature", while the "Humidity" and "Rainfall" means are both much more negative. It would appear that, while the troops regarded the various aspects of weather conditions as somewhat undesirable, two of the dimensions were much more undesirable than the third. "Temperature", however had the most influence on the general attitude toward "Weather" and consequently resulted in a higher global mean than would be expected.

"Pack" is another case in point. While the dimensions of "Durability" and "Capacity" were viewed on the acceptable side of "Hypothetical Neutral", the "Comfort" dimension was not acceptable, which is also what the global mean reflects.

D. Projective Techniques

There are some who would argue that projective techniques do not provide meaningful, reliable data, and some who argue that reduction of projective data is prohibitive due to the level of effort required to accomplish the task. Consequently, in this volume projective results are considered in terms of data reduction efficiency and data meaningfulness.

1. Listing

Data reduction of data collected by way of the Listing technique was comparatively straightforward. The reductionists were able to accomplish their task at the rate of 200 items per man hour. While eliciting a rather wide range of responses, the Listing technique allowed rapid manual data reduction procedures. The data which were reduced and the topical dimensions and their weighted usage frequencies derived therefrom are displayed in Tables 6, 7, 8, and 9. Four of the eight items included in the Listing technique were selected for complete reduction and analysis. The data from the remaining four items were not appropriate for the present analysis and were set aside for possible future exploration.

The Listing technique is considered one of the better saliency measures of the present instrument. The topics and dimensions included in the Phase II data collection instruments were selected in large measure on the basis of Listing results which had been obtained during Phase I. Assuming the Panama sample used in Phase I was adequately representative, Phase II Listing results should therefore compare rather highly with the topics and dimensions used in Objective Instrument of Phase II. The following reports the results obtained from the four items selected for analysis.

Saliency scores were calculated for each topic and/or dimension listed in each of the four items. Saliency scores are weighted scores and were calculated by assigning different values to the three choice positions. For example, in item 24 the respondents were to list three bad things about sleeping in the jungle. Their first choice was assigned a value of 3, and second choice a value of 2, and third choice value of 1. The assumption made here that the thing each respondent considered to be worst about spending the night in the jungle would be most salient and would therefore be listed first.

A topic saliency score then, is a function of two variables; namely, usage frequency or the number of times the topic is listed, and the choice position which is selected when the topic is listed. Topics with saliency scores of 100 or greater are considered salient topics.

TABLE 6

TOPIC SALIENCY:

Bad Things About Sleeping in The Jungle

Topic	Panama				Hawaii		Okinawa	
	Mech. Infantry	Airborne	Missiles	Special Forces	Infantry I	Infantry II	Special Forces	Total
Insects	159	218	197	160	135	157	152	1178
Wetness	68	100	90	108	131	153	108	758
Snakes	94	67	147	35	91	27	45	506
Terrain	5	13	12	9	34	26	24	123
Heat	8	12	14	20	10	10	17	91
Animals	17	9	12	8	18	10	8	82
Cold	7	10	5	4	14	19	4	63
Wet Clothes	-	8	-	37	-	13	-	58
Enemy	-	-	-	3	4	-	20	27
Mud	9	-	-	1	5	11	-	26
Lack of Shelter	4	7	4	-	6	3	1	25

TABLE 7

TOPIC SALIENCY:

Changes Which Would Make Combat Boots Better for The Tropics

Topic	Panama				Hawaii		Okinawa	
	Mech. Infantry	Airborne	Missiles	Special Forces	Infantry 1	Infantry 11	Special Forces	Total
Sole - Traction	87	141	36	114	46	80	55	559
Vents, drainage and air circ.	52	37	29	53	44	39	58	312
Lighter Weight	20	56	46	19	45	38	49	273
Waterproof	8	30	45	22	56	61	19	241
Better Leather	31	20	20	23	27	22	12	155
Stronger sole and heel	29	26	10	12	32	12	16	137
Stronger stitching	13	14	13	12	5	7	3	67
Zipper at side	12	1	3	1	2	10	25	54
Uppers - other material	3	6	3	10	10	12	7	51
Faster drying	-	5	-	9	7	10	12	43
Higher cut	2	1	13	6	6	4	9	41
Lower cut	5	1	13	2	4	12	3	40
Steel plate (sole)	-	-	-	9	7	5	14	35
Arch Support	1	5	6	4	5	9	3	33
More flexible	-	10	-	2	4	3	11	30
Hard Toe	-	-	6	6	10	5	1	28
Cushion innersole	3	1	1	3	5	5	4	22
accesibility	-	2	1	7	6	2	2	20

TABLE 8

TOPIC SALIENCY:
Pieces of Personnel Equipment Found To
Be Most Useful in The Jungle

Topic	Panama				Hawaii		Okinawa	
	Mech. Infantry	Airborne	Missiles	Special Forces	Infantry 1	Infantry 11	Special Forces	Total
Machete	89	90	86	92	50	83	32	513
Canteen & Cup	79	120	46	69	58	73	54	499
Poncho	13	24	43	102	66	86	81	415
Jungle Boots	54	48	27	16	31	13	24	213
Knife	31	22	14	33	28	18	32	178
Insect Bar	19	40	23	16	34	14	11	157
Hammock	-	-	-	66	-	-	60	126
Weapon	24	8	13	2	12	19	16	94
Compass	6	7	14	29	5	8	8	77
Pistol Belt	13	19	16	3	6	17	3	77
Soft Cap	17	23	5	10	1	4	9	69
Insect Repel.	2	10	18	2	12	8	-	52
Clean/dry clothes	-	3	19	3	11	8	5	49
Rope	15	2	6	7	6	5	3	44
Poncho Liner	-	-	-	-	-	-	42	42
Lt.Wt. Fatigues	4	-	-	4	2	-	28	38
Ent. Tool	3	9	7	1	7	3	6	36
Shelter Half	2	3	9	-	-	11	8	33
Bayonet	4	2	-	-	11	14	-	31
Rucksack	-	-	-	1	1	-	28	30

TABLE 9

TOPIC SALIENCY:

Three Issue Items That Wear Out Quickest

Topic	Panama				Hawaii		Okinawa	
	Mech. Infantry	Airborne	Missiles	Special Forces	Infantry 1	Infantry 11	Special Forces	Total
Fatigues	142	147	121	125	147	152	139	973
Combat Boots	41	149	142	35	205	193	10	775
Jungle Boots	142	13	6	127	3	13	134	438
Underwear	55	66	89	30	59	30	39	368
Socks	48	37	44	30	35	38	32	264
Poncho	5	20	5	25	22	34	28	139
Rucksack (new)	-	-	-	24	-	-	11	35
Gloves	3	-	2	7	8	7	5	32
Soft Cap	8	3	3	-	8	4	-	26
Jungle Hat	-	-	9	11	-	2	4	26
Waterproof Bag	-	-	-	15	5	-	-	20
Air Mattress	-	-	-	2	4	3	6	15

A topic saliency score then, is a function of two variables; namely, usage frequency or the number of time the topic is listed, and the choice position which is selected when the topic is listed. The Topics with saliency scores of 100 or greater are considered salient topics.

2. Sentence Completion

Although twenty-two Sentence Completion items were included in the administration, after careful study, only nine of them were selected for intensive analysis. These topics were: "Meals", "Combat Boots", "Officers", "Machete", "Jungle Boots", "Pack", "Poncho", "Raincoat" and "Rucksack". The selected items were those which elicited responses or sufficient range and consistency as to be amenable to a meaningful categorization scheme, and which represented the topical areas which were believed to be of most concern to the sponsor. Using two raters who had received one day of initial training, approximately 80 responses per man hour, were categorized for content and rated for tone.

While responses from 300 Sentence Completion questionnaires were reduced for analysis, it became apparent that a sample of 100 would have been sufficient to establish the salient categories and the tonal means of the group represented. Any larger sample merely increased the frequencies within established categories and did not seem to affect tonal means. A sample size of 300 was selected in this case in order to adequately represent each of the three tropical locations from which the data were collected.

Responses to Sentence Completion items were rated for tone as well as for content. To check rater-rater reliability, three coefficients of reliability were computed. Both raters' evaluations were correlated on each of three groups of fifty respondents. The coefficients were calculated using tonal ratings of the raters, but no such statistical technique could be applied nor was it deemed necessary to test to the reliability of content classification because, of 171 response independently classified as to content by the two raters, there were only 5 discrepancies between them.

From a methodological standpoint, the principal function of the Sentence Completion items included in the attitude assessment battery was to serve as a measure of the saliency of the topics and dimensions of topics used in the Objective Instrument.

Though there were 22 sentence stems, each probing a different item of personal equipment or condition of tropical military service, seven of the nine topics that were used in the analysis were items which had been probed by objective questions. Three of the seven topics with objective counterparts were common topics, three were in the non-combatant questionnaire, and one in the combatant questionnaire

For the seven topics which are directly comparable with objective questions, the following ratios of identical dimensions resulting from the Sentence Completion analysis to dimensions contained in the objective questions were obtained.

Ratios:	1.	Meals	7/7
	2.	Combat Boots	5/7
	3.	Officers	3/4
	4.	Jungle Boots	4/7
	5.	Pack	6/7
	6.	Poncho	4/4
	7.	Rucksack	3/4

The fact that even the lowest among these ratios is greater than one-half indicates that the topic dimensions which were chosen for inclusion in the Objective booklet were salient.

The analysis of the results of the Sentence Completion items also yielded another methodologically useful product. This product is the identification of still other topics and dimensions which are salient to the troops. The "Machete" and the "Rucksack" were identified as being salient by this technique. The "Machete" received the highest ratio of positive to negative responses, 925/267, of any of the nine topics. While there were not nearly so many responses for the "Rucksack", its saliency as a topic for any future follow-on research is assured by the fact that though there was no sentence stem for "Rucksack", a significant number of respondents answered the "Pack" question in terms of the "Rucksack".

Likewise, it was possible to identify new dimensions of the Sentence Completion topics which are viewed as being important by the troops. A good example of the utility of this process is furnished by the "Jungle Boot" questions. Though the objective "Jungle Boot" questions. Though the objective "Jungle Boot" questions included four aspects of "Durability", i.e., "Durability" (global) and "Cracking", "Rotting", and "Stitching", it was found that the "Durability" of "Soles" and "Heels" would have been even more salient to question. Both the Sentence Completion and "Your Comments" techniques served to point up the fact that the soles on the jungle boots tend to crack and the heels come off under severe field usage.

Therefore, the Sentence Completion items have been used to assess the saliency of items included in Objective instruments and also to identify other salient aspects or dimensions of these topics. These aspects or dimensions of topics have two principal uses. First, they

permit the analyst to interpret the objective data accurately and secondly, having been identified, can be included in the objective portions of follow-on research.

When used as a tool to aid in the interpretation of the objective data, it is important for the analyst to know the relative saliency of the Sentence Completion items. When this is done by rank ordering the total number of responses for each of the nine topics which emerged from the Santence Completion analysis, the following ordering from most to least salient is obtained: 1) "Meals", 2)"Combat Boots", 3) "Officers", 4) "Machete", 5) "Jungle Boots", 6) "Poncho", 7) "Pack", 8) "Raincoat", 9) "Rucksack".

As a further aid to objective data interpretation, a comparative measure of the degree of troop acceptance of various Sentence Completion topics may be obtained. This measure is simply a ratio of the positive and negative responses on each topic. Ordered from most positive to least positive, the results are: 1) "Machete", 2) "Pack", 3) "Jungle Boots", 4) "Rucksack", 5) "Combat Boots", 6) "Poncho", 7) "Meals", 8) "Officers", 9) "Raincoat".

By excluding the "Machete" and "Raincoat" items for which there were no analogous objective items, it is possible to cross-verify the objective and Sentence Completion techniques by rank ordering the means of the means of the same seven topics obtained from the objective questions and correlating the two ordered listings. The spearman rank correlation coefficient $\bar{r}$ equals .39 for this statistical comparison. This value is not statistically significant, but at least demonstrates some degree of association between the reponses elicited by the two techniques.

Essentially, the Sentence Completion technique has a threefold role in this research. First, this technique provides a means of assessing the saliency of topics and dimensions of topics included in the objective questionnaire; secondly, it identifies new topics and dimensions deemed salient by a particular population, and third, it provides ancillary, supportive information which aids in the interpretation of the objective data.

3. Picture Projectives -- Written Response

While the objective questionnaire is highly structured and the "Your Comments" cards offer relatively little explicit structure, the Picture Projectives - Written Response technique falls in between the two extremes in varying degrees of structure, depending upon the particular picture. In some of the pictures the only structure provided was the scene itself, while in other pictures a comment or comments were made by the characters depicted in addition to the pictorial theme. This particular approach requires respondents who have enough imagination to be able to project themselves into the situation depicted by the picture.

For the most part, the respondents of the present study seemed incapable of coping with the Picture Projective - Written Response. At any rate, their responses were mostly literal, irrelvant, or pornographic in nature. The pictures did not seem to elicit equipment directed attitudinal responses in great enough frequencies to be of any value for purposes of equipment evaluation. This was the case in spite of the fact that during the administration respondents were instructed that, although they had been told to write anything they though the characteris in the pictures might be saying or thinking, they should keep in mind that the main interest was in how the troops felt about their equipment.

Generally speaking, the responses were very superficial, and did not seem at all to reflect the subjects' attitudes toward the pertinent topics in any measurable way. It would appear that the pictures need a great deal more structure. The stimulus situation of necessity should include a specific statement about some topics, to which the respondent could then write a reply.

4. Picture Projectives - Color Response

The color responses required more time per respondent for reduction and analysis than any other technique in the battery. However, very little of the total reduction and analysis time was spent on the color responses because of the comparatively small sample who were administered the technique.

Forty-two man hours were required to reduce the data of 750 pictures, or three pictures each for 250 respondents. The rate of color picture reduction was 18 per man hours. As the case was with the other projective type data, two raters worked on all of the data such that every thing was rated and reduced at least twice. Inter-rater reliability coefficients were computed for the two segments of data reduction which required rating, i.e., completion and neatness. The coefficients obtained were .91 for "Completion" and .76 for "Neatness". Although both correlations are significant beyond the .01 level of confidence there is a rather large difference between the two. This outcome was not unexpected because the "Completion" rating was characterized by more definitive criteria than was the "Neatness" rating which allowed more subjectivity. In any event, the ratings of the two raters were sufficiently correlated so as to accept their data as reliable.

With very few exceptions most items in the pictures were colored realistically. Choice of color seemed to be determined in large measure by the "actual color" of the real object represented in the picture. For example, in picture No. 3 the uniform was colored green 68 percent of the time and brown 20 percent of the time with all other colors combined used by 12 percent of the respondents. The same was true of the combat boots; 75 percent of the time they were colored black, and brown 19 percent of the time.

On the assumption that cooperation on the objective items, as measured by the Respondent Consistency Check (RCC), might be correlated with the extent to which the respondents completed coloring the pictures, a Pearson Product Moment correlation was computed on two variables. As it turned out, the relationship between them was not significant. Other variables which are expressive in nature, and which are probably manifestations of basic personality traits, were examined for possible relationships with the objective materials. "Density", "Reality" and "Neatness" all appeared to be unassociated with attitudinal variables as expressed by the responses to the objective instrument.

While the results of the color techniques do not support the specific hypothesis that colors used to color an object are related to attitudes toward that object, neither do they disprove the more general hypothesis that there are color correlates of attitudes.

5. "Your Comments" Cards

The reduction of the "Your Comments" card data for the entire sample was carried out in two phases. The first phase involved the classification of all responses into topical areas. This task required approximately three man days for a trained rater. Based on this data, 14 topical areas were chosen for intensive analysis. It was the task of the analyst to go through all the cards and to assign dimensions to comments relating to any of the fourteen chosen topical areas. This task required an additional 4 man days. Therefore, it was possible to reduce a large number of completely unstructured responses quite economically, (Table 10).

The inclusion of "Your Comments" cards in the attitude assessment battery developed by the investigators was based on several considerations. First and foremost was the conviction that the degree of specificity required by objective techniques forces the respondent to case his answers in terms established by the item writers. From a phenomenological viewpoint, this is unfortunate since the force fitting of a respondent's attitudes into pre-established categories may either serve to distort the way the subject really feels and/or may arouse the hostility of the subject by making him feel that "this crazy survey cannot be of value since my attitudes are not really portrayed by any of the possible answers." During the first phase of this project a systematic test of this hypothesis was made and it was found to be valid. Therefore, "Your Comments" cards were provided in the Phase II objective instruments to promote maximum cooperation by all respondents.

Many subjects elected to use this avenue to qualify or elaborate on their objective responses. A good example of the way in which the respondents used the "Your Comments" cards is furnished by a series of questions concerning the poncho. Primarily, these questions focused on the poncho as an item of apparel. Many respondents used the

"Your Comments" cards to point out that while the poncho was very unsatisfactory to wear in the jungle, it was valuable as a ground cover, for makeshift shelters and other such uses. Had this avenue of expression not been open to the respondents, it could not have been possible to evaluate the results of the objective questions in a realistic manner. Therefore, not only do the "Your Comments" cards provide a means of increasing respondent cooperation, but they also provide ancillary data which is useful in interpreting the objective findings.

Another use to which the "Your Comments" card data has been put is to identify topical areas or dimensions of topics considered salient by the respondents. The identification of such topical areas has a twofold purpose; to serve as a rough measure of the saliency of topics chosen for inclusion in the Objective instrument, and to identify other salient topics suitable for inclusion in future related research. Using 10 or more responses in any of the three populations as an acceptance criterion, all 17 of the basic topics probed by the objective instrument were found to have been commented upon by the subjects.

Using the same criterion, 6 other topical areas were identified by the respondents as being important to them. These areas are: 1) "Army Lift", which includes a number of specifics relating to such things as passes, laundry and morale; 2)"NCO's", 3) "Hawaiian Living Conditions", 4) "Storm Jacket" or "Rainsuit", and 6) "Clothing/ Equipment Fit". It is possible to conclude on the basis of this data that the questions asked in the Objective instrument were salient. Likewise, the 6 topical areas discussed by the respondents which were not included in the Objective questionnaire should be considered for inclusion in any related follow-on research.

There were also a number of responses relating to the questionnaire itself. These questionnaire-centered responses mainly objected to the repetitious nature of the Objective questionnaire. Evidently, many respondents did not recognize that, though sentence stems were frequently repeated, different dimensions were being probed by the use of different polar descriptors. The RCC's were repetitious and some respondents specifically identified this fact, but for the most part it is believed that use of slightly different stems for probing different topical dimensions would have lessoned the troop dissatisfaction with this aspect of the Attitude Assessment battery. Some troops also used the "Your Comments" cards as an opportunity to vent some hostility toward the general concept of troop testing, while others said that more opportunities to communicate with those who design the soldier's equipment are needed.

In addition, to the verification of the saliency of the topics included in the Objective instrument, a brief look at the saliency of the dimensions of three topics was taken. The three topics chosen for this analysis were "Jungle Boots", "Combat Boots",

and "Poncho". In the objective questionnaire the following dimensions were assigned to combat boots: "Global", "Traction", "Protection", "Durability", "Cracking", "Rotting", and "Stitching". Jungle boots had the same dimensions as did "Combat Boots" except that "Protection" was deleted and "Comfort" put in its place. As explained elsewhere in this volume, there are three levels of dimensions represented by the seven categories for each topic; a broad dimensional area represented by "Traction", "Protection", "Durability" and "Comfort"; and the specific level represented by "Cracking", "Rotting" and "Stitching which are subsumed under the broader classification of "Durability". There were no specific level dimensions analogous to "Cracking", "Rotting" and "Stitching" for "Traction", "Protection" or "Comfort" since the inclusion of six more items for each three-level question would have made the size of the Objective questionnaire too great. Therefore, as might be expected, some specifics emerged from the "Your Comments" data which would have made appropriate specific level dimensions of "Protection" and "Comfort". It is interesting to note, however, that "Traction" response were not specific in nature.

Primarily, the respondents focused on "Durability", "Fit" and "Traction" for the combat boot; "Fit" being an aspect of comfort. "Durability", "Fit" and "Support" were the principal response areas for jungle boots. Both "Fit" and "Support" are specific attributes of comfort. Therefore, it would appear that the basic categories for both jungle boots and combat boots were well chosen with the possible exception of "Protection" as a dimension of combat boots since "Comfort" seemed somewhat more salient than "Protection" to the troops. Also, more useful data probably could have been obtained from the Objective questionnaire by breaking down "Comfort" into specifics rather than "Durability". Another possibility is that other specifics such as heels coming off or soles splitting would have proven more useful as a breakdown for "Durability".

The topic "Poncho" was divided into two levels in the Objective questionnaire with the dimensions "Global", "Durability", "Protection" and "Comfort". Responses for the three basic dimensions, "Durability", "Protection" and "Comfort" all exceeded the criterion of 10 or more unsolicited responses in any of the three populations. Two other dimensions also emerged as being important to the troops. These dimensions were "Other Uses" of the poncho and a number of comments on the "Cumbersomeness" of the poncho as an item of apparel.

In order to test the hypothesis that saliency varies as a function of combat readiness, the total number of responses to 14 of the 23 topical areas exceeding the 10 or more mentions criterion were rank order for each population. The 14 topics so ranked were: "Fatigues", "Poncho", "Jungle Boots", "Army Life", "Meals", "Entertainment", "Canteen", "Combat Boots", "Officers", "Rucksack", "Family", "Pack", "NCO's", and "Tiger Suits". Spearman rank correlations were then run between the ranks of these topics between Panama and Hawaii, Panama and Okinawa and Hawaii and Okinawa. Since Panama and Hawaii represent

non-combatant populations and Okinawa represents a combatant population, the hypothesis would be supported if the Panama-Hawaii correlation was high and the Panama-Okinawa and Hawaii-Okinawa correlations were low. This is exactly what happened since for the Panama-Hawaii correlations r equalled .947. This statistic was significant beyond the .001 level of confidence for a two-tailed test and neither of the other correlations was significant even at the .20 level.

Another hypothesis stated that "Topics pertaining to personal comfort such as 'Food', 'Entertainment', 'Insects', 'Climate', and the like will elicit a larger percentage of unsolicited suggestions from troops stationed in Viet Nam." Translated into terms congruent with the actual locations from which data was collected, the hypothesis would be altered to read Panama and Hawaii for non-combatant conditions and would read Okinawa for combatant conditions. The gross response frequency rank orders of the 14 selected topics displayed in Table 10 serve to illustrate the differences which exist between the non-combatant and combatant populations.

The methodological function of the data derived from the "Your Comments" cards is threefold. First, the technique is used as a means of optimizing respondent cooperation on the Objective instrument, and secondly the data derived from this technique are useful in interpreting the objective data. The third function of the technique is to provide a means of assessing the saliency of specific topical areas and dimensions to either the total population or specific subpopulations. Several hypotheses made during Phase I of this study predicting differences in the topics on which unsolicited suggestions were made from combatant and non-combatant populations were also verified.

E. Objective Techniques

Item construction, scale construction, and test administration are very difficult methodological endeavors to which all too often too little attention is given. In the present research program considerable attention has been given to methods of scaling and item construction with a modification of Osgood's Semantic Differential scaling technique selected for the main objective data collection instrument. The other scaling procedure which was seriously considered along with the Osgood Scale was Liker's Method of Summated Ratings. The authors hypothesized that the Osgood-type scale would elicit more valid data than the Likert-type scale. One of several findings in the Phase I results which supported this hypothesis was the fact that the troops made twice as many Respondent Consistency Errors when they responded to Likert-type items than when the same troops responded to Osgood-type items. For verification, the same types of comparison was made in Phase II.

TABLE 10

FREQUENCY OF "YOUR COMMENTS" CARDS RESPONSES BY POPULATION
TO
FOURTEEN SELECTED TOPICS

Rank-Order	Panama	Hawaii	Okinawa
1	Fatigues	Fatigues	Jungle Boots
2	Poncho	Poncho	Poncho
3	Army life	Meals	Fatigues
4	Meals	Army life	Canteen
5	Entertainment	Entertainment	Rucksack
6	Jungle boots	Jungle boots	Tiger suit
7	Officers	Combat boots	Army life
8	Canteen	Family	Combat boots
9	Combat boots	Officers	NCO's
10	Pack	Canteens	Meals
11	Family	Pack	Officers
12	NCO's	NCO's	Family
13	Rucksack	Rucksack	Entertainment
14	Tiger Suit	Tiger Suit	Pack

A one group - two condition factorial design was used in Phase II. A group of 185 Airborne troops stationed in Panama were administered both the Osgood and Likert questionnaires. Half of the respondents were administered the Osgood first while the other half were administered the Likert first in order to control for practice effects. Half again as many inconsistent responses were made on the Likert than were made on the Osgood. There were fewer RCE's made on second administration than on the first indicating the possibility of some practice effects. The results of an analysis of variance indicate that the difference between the Osgood and Likert is statistically significant beyond the .01 level, while the difference due to practice effects, is not statistically significant at the .05 level. However, careful examination of the data provided further information on this. The Osgood-Likert sequence group scored fewer RCE's than the Likert-Osgood sequence group on both questionnaires. Although the interaction F score was slightly smaller than necessary to be significant at the .05 level, there appears to be a practical difference. Either the two Airborne groups were inherently different such that one was more prone to make RCE's, or, and this is more likely, administration of the Osgood first provided better task clarification and allowed more consistent performance, while the converse is true of a situation in which the Likert is administered first.

In any event, regardless of any other effects, the respondents made statistically significantly fewer RCE's on the Osgood than the Likert, which supports the results obtained in Phase 1 and the original hypothesis that the Osgood scaling technique would elicit more valid responses than the Likert scaling technique.

It is interesting to note that almost without exception the Likert topic means are more negative than the Osgood topic means. Four of the differences are statistically significant. This same phenomenon occurred in Phase I and suggests the strong possibility of some other differential effects of Osgood vs Likert techniques not covered in the present report.

F. Inter-Technique Comparisons

The data from the various techniques were used to excellent advantage in validating and interpreting the results. The standard objective approach, if used alone, would not permit a saliency analysis contrasting the different groups as the "Your Comments" technique did. This technique not only permitted the investigators to determine the direction and intensity of the group attitudes with respect to different topics, but it allowed the investigators to determine which topics were of most concern to which groups as well. Another example is the dimension saliency notion. Topics and dimensions were included in the objective instruments as a result of data collected through a series of pilot studies. However, there was no assurance that the most critical topics and dimensions of topics were included for troops stationed in Hawaii or Okinawa. The various unstructured techniqeus permitted the investigators to assure themselves the right areas had been

investigated and allowed identification of subject areas which might be investigated in any further work.

Probably one of the most important contributions of the multi-technique approach is the means provided for validating the instruments. Although this type of validation relies on internal consistency rather than external criteria, practically, it yields sufficient information to indicate whether the data are meaningful or not. Without exception, those topics and dimensions of topics which were acceptable or not acceptable according to one technique, were found to be regarded in like manner according to the other techniques. Although rather gross in nature, this kind of information allows a higher measure of confidence in the data.

Pursuing the validation notion further and in a more quantitative manner, the responses to "Poncho" items in the Osgood were correlated with responses to the "Poncho" items in the Sentence Completion for subjects in each of five different groups. The coefficients of correlation obtained were .21, .29, .29, .44 and .57 for the five groups. The first coefficient is not statistically significant but the ramining four are significant at the .05, .05, .01 and .01 levels of confidence, respectively. Time did not permit the calculation of any further correlational coefficients of this sort, but the fact that all five correlations run were positive and four of them of magnitudes which are statistically significant is interpreted as strong support for the reliability, and in the broadest sense, the validity of the data.

VII. CONCLUSIONS

The principal objectives of this study were twofold: (1) to develop new and more effective means for measuring attitudes (accomplishment of this objective is reported in full in Volume Two of this report), and (2) to apply the newly-developed techniques to the measurement of tropical troops' attitudes toward selected items of Quartermaster issue. These dual objectives were pursued in a two-year research effort.

A. Attitudinal Conclusions

Two types of information resulted from analysis and interpretation of the attitudinal data. First, attitudes toward specific items of Quartermaster issue such as the poncho, jungle boots, and canteen resulted and have been reported herein. Secondly, interaction effects among population elements and situational variables were detailed. After careful analysis of the equipment specific data, the data related to situational variables and their interactions, a number of conclusions were reached. These conclusions are presented below.

1. Broad Attitudinal Conclusions

Conclusion 1

The jungle boots, hammock and poncho liner, all members of a new generation of equipment designed with jungle warfare in mind, are regarded as valuable items of personal equipment by U.S. troops serving in the tropics. The only aspect of any of these items deemed unacceptable was the "Durability" of the jungle boots.

Conclusion 2

The tiger suit, though not developed by the Quartermaster finds a high degree of acceptance among troops who have served in Viet Nam. Many of the aspects of the conventional fatigue uniform which are unacceptable in the tropics are rectified by the tiger suit.

Conclusion 3

Those items of issue which were developed without focusing upon the needs of the tropical soldier were divided in their overall acceptability to tropical troops. The canteen and rucksack were regarded as acceptable, meals and pack were regarded as marginal and fatigues, poncho and combat boots were deemed unacceptable in the tropics.

Conclusion 4

Major areas of dissatisfaction relating to equipment used in the tropics were "Durability" and "Comfort". Jungle boots, fatigues and combat boots were deemed unacceptable with respect to "Durability" in the tropics. Similarly, the "Comfort" of fatigues, poncho and pack were viewed negatively by tropical troops.

Conclusion 5

Weather, insects and entertainment were evaluated as unacceptable aspects of the environments provided by tropical military service. The situational topic "Officers" was marginal acceptability while "Family" and "Water" were acceptable.

2. Equipment Specific Attitudinal Conclusions

Conclusion 6

The fatigue uniform is both too hot and not durable enough for use in the tropics.

Conclusion 7

While U.S. troops stationed in the tropics recognized the need for long-sleeved fatigues for protection in the jungle, they desire a short-sleeved version for use in garrison.

Conclusion 8

The poncho is not comfortable as a garment under either temperate or tropical conditions. In the tropics it is regarded as being particularly poor in this respect since it induces excessive sweating. Despite its limitations as a garment the poncho is highly regarded by tropical troops as a multi-purpose, protective covering.

Conclusion 9

Jungle boots are liked very much by troops training in the jungle or engaging in jungle warfare. Limited "Durability" is the facet of the boot's design which needs substantial improvement according to the troops.

Conclusion 10

Combat boots are regarded as being acceptable in temperate zones and not acceptable for use in the tropics. The "Traction" and "Durability" features are both inadequate for jungle operations. Also, the large amounts of rain and high humidity present in the jungle induce a great deal of "Rotting" and discomfort due to dampness.

Conclusion 11

Over-all, the metal canteen is highly regarded as an item of equipment. It is easy to carry, quite durable and generally is thought to hold sufficient water. Despite the over-all acceptance, too much noise is caused by the rattling of the chain connecting the cap with the body of the canteen. Also, canteen metal corrodes quickly in the tropics.

Conclusion 12

Though fairly limited data was available on the new bladder type canteen, the following inferences were possible: the increased capacity is desirable; the water tastes better; they snag and tear on bushes too easily and they are too difficult to fill.

Conclusion 13

The pack is viewed as being marginally unacceptable by non-combatant U.S. troops stationed in the tropics. The dimensions of "Durability" and "Weight" are acceptable to the troops; "Capacity", "Fit" and "Movement" of marginal unacceptability and "Comfort" is very unacceptable to the troops.

Conclusion 14

The non-combatant troops regard the food procured by the Army for their mess halls as being quite acceptable with respect to "Quality" and "Variety" and marginally acceptable with respect to "Quantity".

Conclusion 15

The "Preparation" given the food by local mess halls cooks is unacceptable on the whole. "Taste" and "Greasiness" are both viewed negatively with particular stress being laid on the fact that greasy foods are very unpalatable in the tropics.

Conclusion 16

The rucksack is thought to be a very acceptable item of equipment by combatant U.S. troops stationed in the tropics. Its "Capacity" is viewed as being just right and its "Durability" good. "Comfort" and the related dimensions of "Weight" and "Movement" are acceptable, but not highly so. "Fit" is the most acceptable aspect of "Comfort". Negative attitudes were expressed towards the over-all external size of the rucksack, however.

Conclusion 17

The poncho liner is viewed as being a very good piece of equipment in the jungle. Its versatility is highly valued.

Conclusion 18

The new jungle hammock is well accepted with regard to "Portability", "Protection" and "Durability" by the combatant sample. Bulkiness, ease of visit and visibility drew some negative comments from the troops.

Conclusion 19

The tiger suit is very highly regarded and very much desired as an item of issue by the combatant sample. It is acceptable in all respects. "Durability" and "Insects" are not rated as highly acceptable, but are decidedly within the acceptable range.

3. Situational Attitudinal Conclusions

Conclusion 20

Water is generally available in the tropics which has a satisfactory taste. However, in some areas it is a matter of considerable concern whether the water is healthful or not. When water purification tablets must be added to the water acceptability of the "Taste" of the water is greatly diminished.

Conclusion 21

Non-combatant U.S. troops stationed in the tropics desire to have their families with them for the most part. In some areas

it is difficult to get "Authorization" for one's family. "Acclimation" can be a severe problem as can the cost of living and "Quarters Availability" for those soldiers having their families with them.

Conclusion 22

The non-combatant sample viewed the entertainment opportunities open to them negatively.

Conclusion 23

Young, inexperienced officers are viewly negatively by the non-combatant population. "Considerateness" and "Understanding" are important to the troops and are seen as being somewhat unacceptable on the whole. "Fairness" as a trait is thought to be positive by some, negative by others. Over-all, the officers are of a marginal acceptability as seen by their troops.

Conclusion 24

The acceptability of weather to troops in the tropics varies as a function of location. The two related elements of the weather which cause dissatisfaction among tropical troops are "Humidity" and "Rainfall".

Conclusion 25

Attitudes towards insects in the tropics are, to some degree, also a function of location. Over-all, insects are thought not of as a health menace, but are felt to be extremely annoying in some areas.

B. Methodological Conclusions

Conclusion 1

A significant proportion of the sampled population were inconsistent enough to question the validity of the data, when not controlled for consistency.

Conclusion 2

There is a relationship between response consistency and the demographic variables of age, education, rank, time in service, combat experience and jungle training experience.

Conclusion 3

Respondents who make three or more Respondent Consistency Errors have more negative attitudes than the more consistent respondents.

Conclusion 4

The relationships and magnitudes of topic dimensions attitudes can be identified and subjected to mathematical analysis.

Conclusion 5

Projective, or "unstructured" data collection techniques provide attitudinal data not captured by the more structured techniques.

Conclusion 6

The Listing technique is valuable for identifying salient topic dimensions, salient topics, and for updating instruments which are developed on pilot samples and used on larger populations.

Conclusion 7

The Sentence Completion technique is a useful one for assessing topic and dimension saliency, and for validating the objective techniques.

Conclusion 8

Responses to objective items correlate significantly with responses to sentence completion items of the same topic.

Conclusion 9

The thematic stimuli provided in the Projective Pictures - Written Response Technique were inadequate for eliciting the appropriate topic related attitudinal responses.

Conclusion 10

The colors used on the Projective Pictures - Color Response Technique did not indicate any relationships to attitudes as measured with the other techniques.

Conclusion 11

Respondents tended to color the pictures realistically which did not lend itself to attitudinal interpretation. These reaults do not preclude the possibility of some other approach for color/attitudinal analysis.

Conclusion 12

The expressive elements of the coloring task such as neatness, reality, completeness, etc., might very well reveal attitudinal correlates if subjected to further analysis.

Conclusion 13

The "Your Comments" cards assist materially to gather attitudinal data by establishing the proper rapport (allowing respondents complete freedom of response in an otherwise totally structured situation) and by providing a mechanism which encourages a phenomenological viewpoint on the part of the investigators.

Conclusion 14

Osgood's Semantic Differential technique is clearly superior to the "I agree - disagree" version of Likert's Method of Summated Ratings.

Conclusion 15

The use of quick-change optical scan cards inserted in the objective booklets provides an excellent system for response indication due to the fact that the respondent's physical mark goes all the way to the data processing computer without further human handling other than to remove the cards from the booklet and place them in the computer system.

Conclusion 16

A multi-technique data collection system, which consists of a variety of structured and unstructured techniques, eliciting responses pertaining to similar topic areas, provides an effective means for validating and interpreting the data in a way not offered by standard attitudinal data collection procedures.

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13. ABSTRACT

Data were compiled to determine the effects of tropical operations on opinions and attitudes of the soldier regarding food, clothing, and equipment. Three groups, both combatant and non-combatant, from Panama, Okinawa, and Hawaii, participated. The objective was to obtain, summarize and suggest uses for this information for more effective military operations in the tropics.

Items of clothing and equipment developed for a tropic environment were regarded as generally acceptable. Overall, foods were acceptable with quality preferred over quantity.

Cooperation or uncooperation in responses was linked to factors of age, education, rank, time in the Army, and combat experience. The Panama group rated the highest in most of these categories. Other variables included water, climate, insects, entertainment and family associations. Specific conclusions are listed regarding methodology and equipment.

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