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IMPACT OF HORTICULTURAL
INFORMATION ON TELEVIEWERS

Thesis for the Degree of M. S.
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Louis Michael Berninger
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This is to certify that the

thesis entitled

The Impact of Horticultural
Information on Televiewers

presented by

Louis Michael Berninger

has been accepted towards fulfillment
of the requirements for

M. S. degree in Horticulture

Donald P. Watson

Major professor

Date 27 May 1954

IMPACT OF HORTICULTURAL INFORMATION ON TELEVIEWERS

By

Louis Michael Berninger

A THESIS

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This study is dedicated to Miriam, the
author's wife, for her constant aid,
interest, and inspiration.

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INTRODUCTION

Research in consumer education, an area of increasing interest and importance, has received minor attention in the field of horticulture. Consumer education is the process of bringing to the potential consumer of a product the information with which to make an intelligent purchase. The rationale was that unless the individual possessed some basic information regarding a product to be purchased, unless he could link its use or application with certain of his real or imagined needs, he could not make an appropriate choice regarding its purchase.

The mass media of communication has assumed the primary role of delivering information concerning available products and their use directly to the people. With the advent of television this type of communication activity has been increased many fold. The effectiveness of producing an increase in knowledge through television has been demonstrated by Rock, Duva, and Murray (Not Dated b).

Sponsors of television advertising had many unanswered questions regarding the effectiveness of television in terms of two minute productions. Of extreme importance to these people, as well as potential sponsors, was the effectiveness of two minute productions in relation to the information obtained, the retention of this information, and the possible

effects it may have on attitudes relating to the products discussed.

It was decided to produce five two-minute television programs to describe the use of three horticultural products. Three programs were related to the quality, the care, and the use of the rose flower; one program was devoted to frozen vegetables; and one program was designed to describe the use of nursery crops.

EXPERIMENTAL HYPOTHESES

The five productions, which were recorded by kinescope, were used to test the following hypotheses:

1. Given a two minute program relating to a specific product, a significant increase in the amount of information regarding the content will accrue.

Both "live" television and kinescope recordings have been reported more effective than normal classroom procedures in aiding the increase in knowledge (Rock, Duva, and Murray, Not Dated, s.; Wilson, and Moe, 1951). In general, previous studies have been based on programs ranging in time from one-half to one hour. The effectiveness of shorter productions in aiding the learning process has not been reported previously. It should be noted that two minutes is the length of time generally devoted toward television commercials.

In a review of mass communications, Schramm (1948) reported an abundance of information indicating that most communications could result in a significant increase in learning. The question still remains whether or not two minute television productions are effective in aiding the process of learning.

2. Given the same conditions as hypothesis one, an increase in the amount of information

regarding the content will be accompanied by a significant change in attitude.

On May 4, 1954, the relationship of attitude and knowledge was discussed at the Midwestern Psychological Association Symposium.* It was concluded by many communication workers that this correlation theoretically existed and that it was a worthwhile topic of investigation.

A decision to pursue a course of study of horticultural topics was dictated by the knowledge and information of the investigator. Concurrent with the information acquired over a period of years, a more favorable attitude toward horticultural subjects was developed. Theoretically it had been the acquisition of information that had created a favorable attitude toward this field of study. This same relationship may well have been the foundation for every consumer's purchasing decision.

This correlation, theoretically so important, would appear to be the basis for studies by advertising personnel. If so, such studies were apparently "trade secrets" since very little have been reported.

Recently, a report was made available on a communications study using tea (Smythe, 1954) as a horticultural crop. A series of commercials over a period of six months resulted in a significantly favorable change in attitude toward the product.

* By private correspondence.

No other publications have been found regarding this relationship of attitude and knowledge. The question of its existence still remained.

3. Given the same conditions as hypothesis one, but increasing the quantity of exposure and the variety of information, there will still be a significant increase in the amount of information learned regarding the content.

The United States Navy recently reported (Vincent, Ash, and Greenhill, 1949) on the effectiveness of television when increasing the quantity of information and the length of exposure. The results demonstrated that a thirty-minute level of exposure was not as effective as a fifteen minute program with only half the quantity of information. Increasing the quantity and variety of information did not result in a proportionate increase in learning.

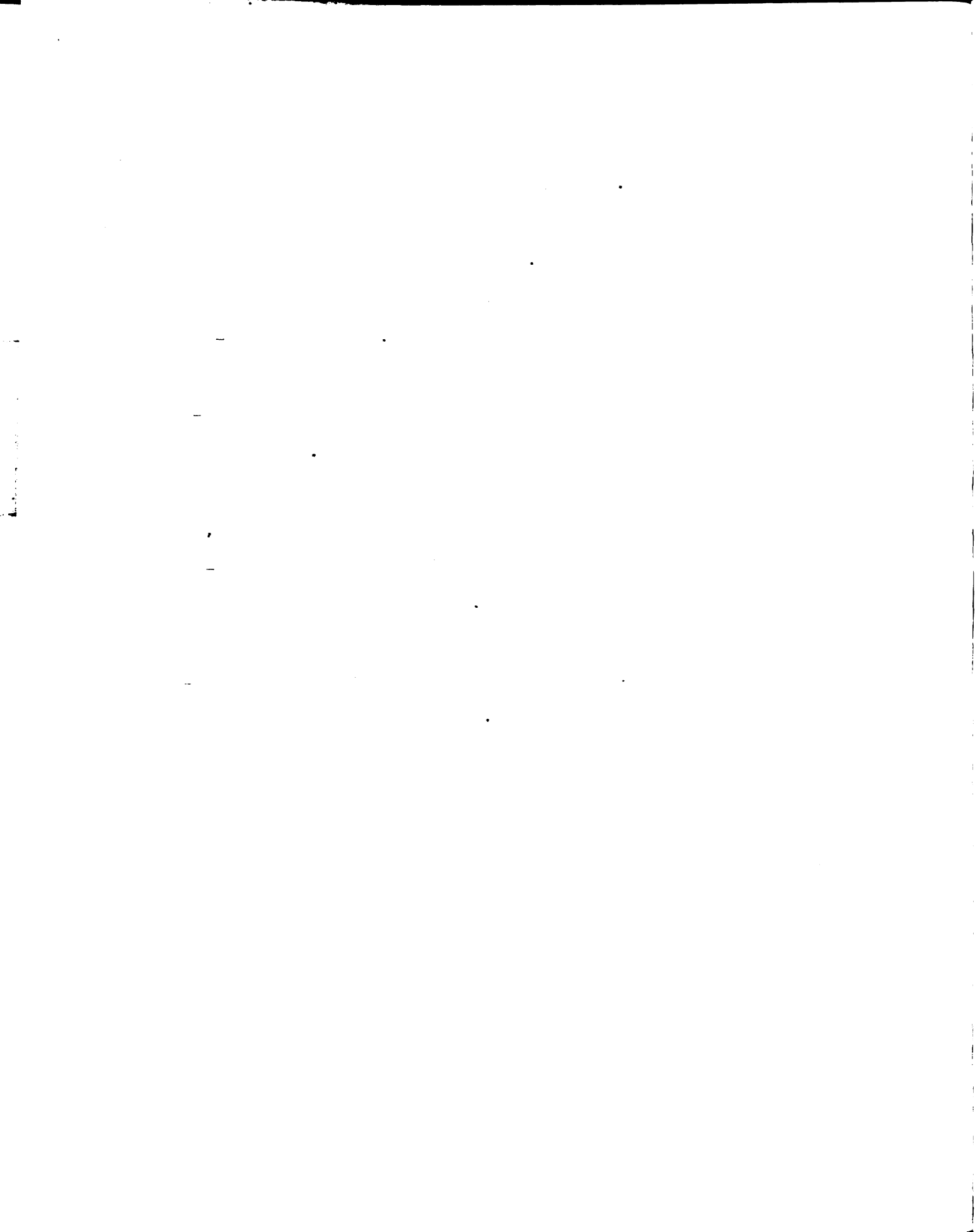
This discussion of increasing the two factors, exposure and information and their effects on learning, has been debated. The interaction of previous results to the field of horticulture and to two minute productions has not been demonstrated.

Another aspect relating to two minute productions was the retentive value of the information learned. A previous study by Hovland, Lumsdaine, and Sheffield (1949), reported steadily decreasing levels of knowledge immediately following

exposure to information. A "sleeper effect" was also reported when positive attitude changes were first noticed 12 weeks after exposure to communication.

The retentive value of advertising by television was extremely important to advertising personnel. The investigation was designed to include the recall value of television commercials and the possibilities of "sleeper effects" occurring on attitudes several weeks following exposure.

Many people are known to have reacted negatively to a propaganda type of advertisement supplied by a manufacturer. In the present study we were attempting to furnish basic information about a series of products. It was important to learn whether the consumers would approve of this form of educational advertising, a phase which was measured as preference for commercials of this nature.



REVIEW OF LITERATURE

The United States Navy in connection with leading universities had conducted several studies on the effectiveness of television, kinescopes, and films in aiding the learning process. Kinescopic recordings were reported by Jackson (1952) to be superior to classroom procedures for instructing an audience. These recordings were also found to be more effective than instructional films. When it was announced to an audience that they would view a kinescopic recording, the group, although viewing a normal film, produced significantly higher results than a similar group viewing the identical film, and made aware that it was a normal film.

A comparison of the effectiveness of television, television recordings, and classroom procedures was made by Rock, Duva, and Murray (Not Dated, a.). Both television and television recordings were reported significantly more effective than normal classroom procedures. Television recordings were 16 per cent less effective than "live" television, and the recordings were 40 per cent more effective than classroom procedures.

A second report by Rock, Duva, and Murray (Not Dated, b.), was devoted to a study on the learning and retention of information from television programs. Television instruction

was found to be effective in producing statistically significant gains in knowledge. The retention of this information was found to be good after four to six weeks following the exposure.

The relationship of the length and the quantity of information to the effectiveness of motion pictures was reported by Vincent, Ash, and Greenhill (1949). Increasing the length of exposure from 15 to 30 minutes and supplying twice the amount of information did not result in a proportionate increase in learning. The shorter program also proved more effective when it was compared to a program of similar length but containing twice the quantity of information.

Significant decreases in information immediately following exposure to information was reported by Hovland, Sheffield, and Lumsdaine (1949). A "sleeper effect" on changes in attitude was noticed first twelve weeks after exposure to information.

A recent report by Hard and Watson (1953) suggested horticultural techniques for television. The drama, lecture, and discussion methods of presenting horticultural topics were tested through this medium. It was reported that the three types of presentation were of equal value for conveying horticultural material, but that the dramatic type of presentation had more audience appeal.

The National Broadcasting Company in cooperation with the Schwerin Research Corporation of New York (1952) reported on methods of increasing the effectiveness of television commercials. Announcements were proven more effective when the audio and visual portions of a commercial advertisement were correlated, when each claim made by a sponsor was demonstrated, and when the programs were fairly simple in content.

PROCEDURE

Overview

Eight sections of university students enrolled in a course in Basic English were used for the testing program. Three testing sessions, a pre-test five days before exposure, a post-test immediately following exposure, and a recall test three weeks after exposure, were employed to determine the effects of exposure to information.

Open-end questions (Appendix II) were employed to measure the results of information on learning and the retentive value of this information over a period of three weeks. A series of scales (Appendix II) were used for the measurement of attitude changes as a result of exposure to information.

The Wilcoxin non-parametric paired replicate test and the analysis of variance test were then used to determine the significance of the results.

Testing Procedure

At normal classroom sessions of university students, the investigator introduced himself as a member of the Agricultural Communications Project. A brief outline of the study was given to each group attempting to obtain their

fullest cooperation. Instructions (Appendix III) were read to the groups and clarified.

Subjects

Students enrolled in Basic English 113 at Michigan State College were used as subjects for the testing program. Eight sections, averaging twenty-five students each, were selected at random. Approximately 75 per cent of the students were freshmen and the remainder were sophomores. The male students slightly outnumbered the female students with a six to four ratio.

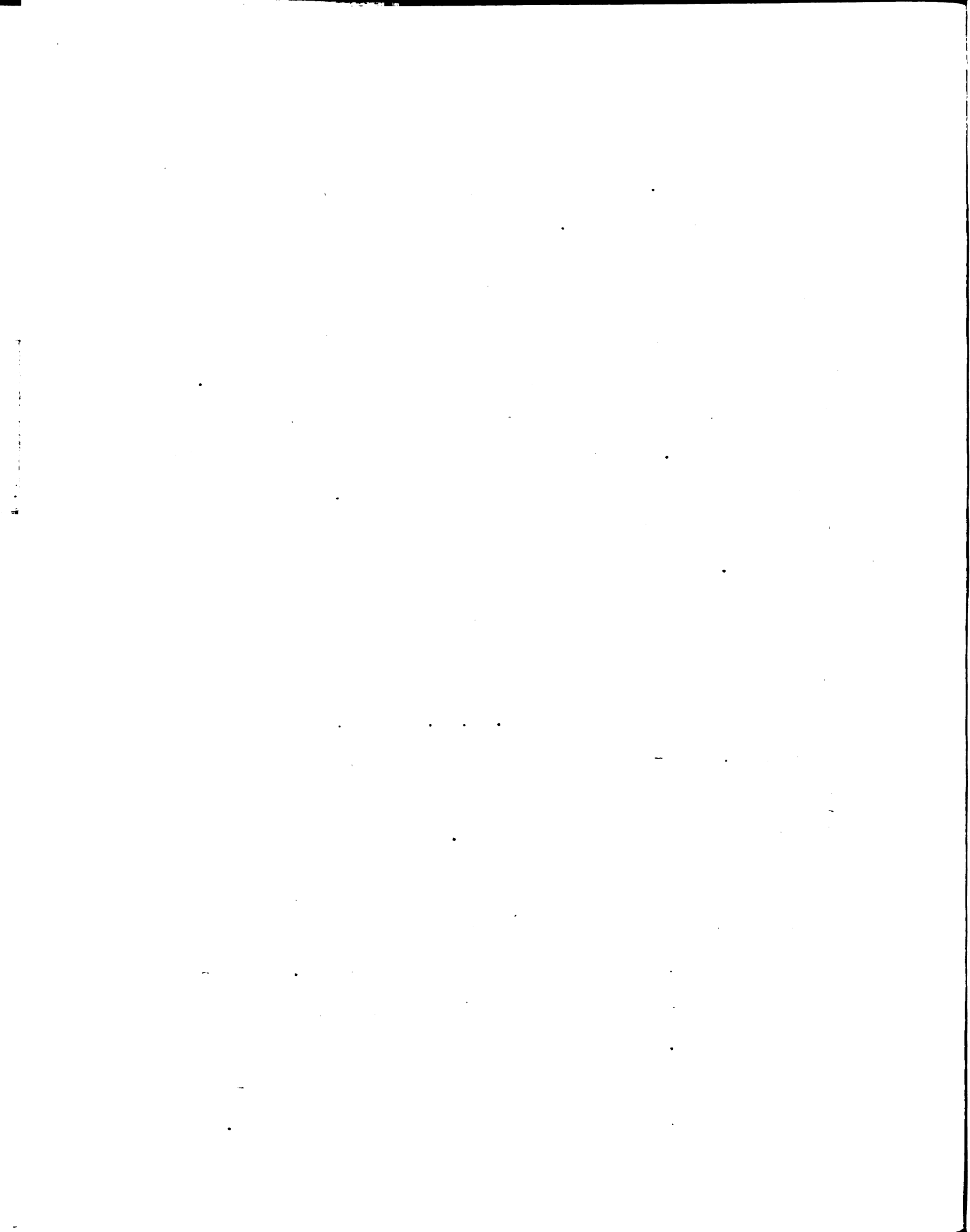
Measuring Devices

Information

On professional advice of Dr. H. L. Dahnke, Michigan State College, open-end questions (Appendix II) were designed to measure the effectiveness of the productions on learning and the retention of this information.

Attitude

For the assessment of attitude and attitude change in this investigation, a novel instrument was employed. Essentially it was a by-product of Osgood's work (1952) in the measure of meaning. The system of measurement included the judgment of a particular concept along a series of seven-step descriptive scales, each defined by a pair of polar terms.



A selected number of these scales were used as measures of attitude (Appendix II), the basis for selection being the results of a large-scale factor analysis study. The validity, reliability and objectivity of this method of attitude assessment was recently reported by Tannenbaum (1954 b).

In the study mentioned above, two additional dimensions of meaning were isolated, tentatively identified as "potency" and "activity" factors. Measures of these two factors were also taken in the present experiment, although their results did not relate directly to any of the hypotheses under investigation.

Preference Measure

An open-end question was used to obtain the student's reaction and preference immediately following exposure. The question read:

What would be your opinion of these films if used
as commercials on a television station?

Design

Three testing sessions, April 9, April 14, and May 5, 1954, were scheduled at normal classroom meetings to obtain the required information.

Pre-test

The pre-test presented on April 9, was designed to obtain the beginning knowledge and attitude levels of the students

TABLE I
THE SCHEDULE FOR COMMUNICATIONS EXPOSURE

GROUPS	TREATMENTS			
	Quality	Roses	Frozen Vegetables	Shrubs
Control	--	--	--	--
I	x	--	--	--
II	--	x	--	--
III	--	--	--	--
IV	x	x	--	--
V	x	x	--	--
VI	--	--	x	--
VII	--	--	--	x

x = Exposed to recordings

-- = Not exposed to recordings
Groups IV and V received additional exposure for the testing of hypothesis 3.

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in relation to the products discussed in the production.

Exposure

The groups were exposed to the recordings five days following the pre-test. The schedule for exposure may be found under Table I.

Post-test

A communication exposure post-test was administered on April 14, immediately following exposure to the recordings. This test was designed to measure the effectiveness of the recordings on the basis of both attitude and knowledge.

Recall Test

Three weeks after exposure, a recall test was administered to measure the learning-recall value of the productions on roses.

Scripts and Cast

Only one person was used for the cast when the lecture-demonstration presentation was adopted for all productions. The type and length of material governed both the selection of this format and the selection of the performer.

The author, an inexperienced script writer, and the performer, having a professional background in acting, cooperated in producing the final drafts of all scripts. A copy of the scripts may be found under Appendix I.

It was generally concluded by those viewing the productions, that the performer was adroit. This added a professional touch to the productions which was thought to be beneficial in aiding the learning process.

Program Productions

Three areas representing horticultural industries were selected for this study. Two minute television productions were prepared using the rose as a cut flower, peas as a frozen vegetable, and narrow-leaved evergreens as a nursery crop. The three areas were chosen in the belief that they were suitable for a consumer education program and were adaptable to the medium of television.

To broaden the scope and the intensity of this study, three productions were devoted to roses and one program to each of the other two commodities.

All kinescopes were designed to correspond with television commercial announcements and were approximately two minutes in length. Only the fundamental values and benefits of the products were demonstrated.

The first production was directed toward the identification of a good quality rose from the purchaser's perspective. Selection was based on the degree of openness of each bud, the strength of the stem, and the absence of brown discoloration on the petals.

How to care for roses in order to enjoy them longer was the theme of the second program. As soon as roses arrive in the home, viewers were urged to cut the stems with a sharp knife, and remove the leaves that would be under water.

The third production centered around the theme of showing how one dozen roses could be more fully enjoyed in the home as a result of their proper arrangement and distribution.

The program relating to frozen vegetables explained why frozen peas were superior to fresh or canned peas. Viewers were requested to follow closely the directions on each package to insure maximum flavor and nutrition.

The importance of planning the location of your shrubs and trees was emphasized in the production devoted to the nursery crops. The selection of plant materials was shown to be influenced by the amount of room provided for each plant, and its requirements of sunlight and shade.

Rehearsals and Meetings

Several meetings were held prior to rehearsals with the director, performer, and producer in attendance. A discussion of the objectives of this study and of the characters portrayed took place at the first meeting. It was evident at this time that the technical phases of television would limit

some of the producer's desires. Originally several scenes had been planned for each program. Due to the size of the studio (10 by 12 feet), and the difficulty of moving cameras from one position to another, these plans were abandoned in favor of one basic scene for each program. In general the productions were fairly simple and required the solving of only minor problems.

All phases of the productions, including the lighting and set requirements, were clarified at a later meeting. The simplicity of the programs eliminated the need for special lighting effects and for complex sets and scenery.

The first rehearsal was scheduled five days prior to studio production. Interpretation of the parts and contents of the scripts were reviewed for agreement. The various "camera shots" were discussed allowing the performer to visualize more clearly his actions. This also allowed the director to become familiar with the performer and his various motions.

Complete memorization of the scripts was required at the second rehearsal, the night before studio production. Handling of the visuals was stressed by the director and a discussion of "camera shots" in relation to the handling of visuals was reviewed.



Fig. 1. Performer and author during a studio rehearsal.

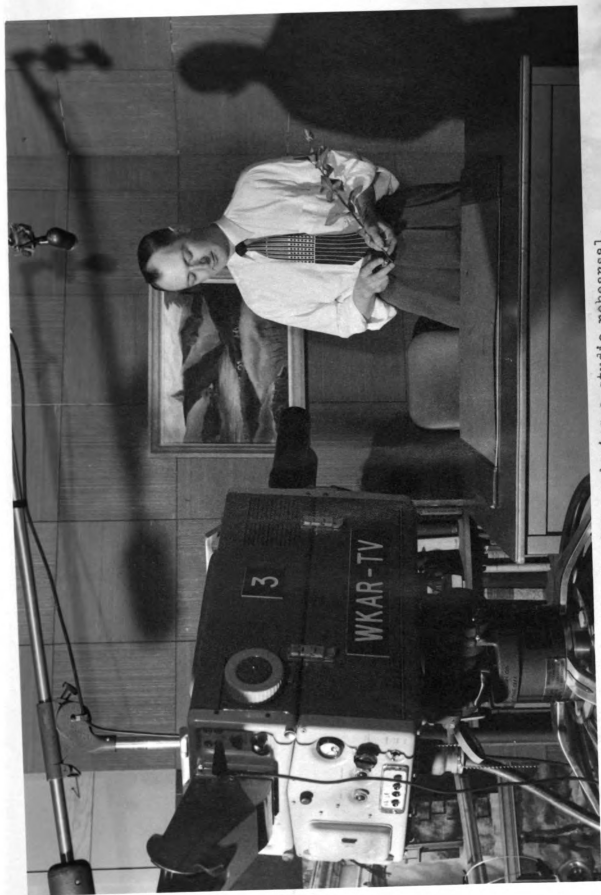


Fig. 2. Performer during a studio rehearsal.

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Props and Materials

Each program opened with a slide bearing the name of the Horticulture Department, and was followed by a title card. The studio film library supplied the slide. Title cards were produced by the Art Director of the Television studio.

For the productions on roses, the performer wore a florist's "smock." For the production on frozen vegetables he wore a business suit, the coat of which was removed for the production on nursery crops.

The materials required for the productions consisted of two dozen roses and a package of frozen vegetables. Several charts were used to illustrate various factors under discussion.

Only one basic set was used for all productions. It consisted of a desk and a plain backdrop. Figures 1 and 2 show the performer and the author, and the author, respectively, on the set during a rehearsal. Special scenery and special effects were not required. This allowed the use of general lighting for all productions.

Studio Production

All personnel concerned with the productions reported to the television studio on the morning of April 2, 1954. Several

"dry" rehearsals were conducted prior to camera rehearsals to familiarize the performer with the studio and placement of cameras.

A normal operating crew and two cameras were employed for these recordings. Prior to camera rehearsals, the director discussed each program with the floor director, and the camera crew.

Two camera rehearsals were devoted to each production prior to the recording of the program. This was of invaluable aid to both the performer and the studio crew in attempting to produce a smooth operating unit.

At times the camera crew was slow in focusing on the object under discussion. As a result the audience for short periods of time was viewing one object and listening to the discussion of another object. As reported in a previous study by the National Broadcasting Company (1952), this coordination between "audio" and "video" was extremely important for maintaining interest and attention.

Only one technical problem arose during the recording of the programs. The production on the use of roses was repeated due to faulty camera operation. The second recording was much superior both technically and in the performance of the actor.

TABLE II

RESULTS OF THE INFORMATION TESTS

(Comparison of Results Before and Immediately After Exposure)

Group	Number of Subjects	Correct Answers	Mean Before	Mean After	Mean Difference
QUALITY					
Control	14	3	.65	.51	-.14
I	23	3	.74	2.61	1.87**
IV	17	3	.53	2.41	1.88*
V	21	3	.53	2.58	2.05**
CARE					
Control	14	3	.58	.51	-.07
II	18	3	.56	2.33	1.77**
IV	17	3	.41	2.24	1.83**
V	21	3	.34	2.24	1.90**
USE					
Control	14	5	2.08	1.65	-.43
III	25	5	2.52	3.92	1.40***
V	21	5	2.10	3.96	1.86***
FROZEN VEGETABLES					
Control	14	4	1.58	1.65	.07
IV	22	4	1.78	2.60	.82
NURSERY CROPS					
Control	14	4	.72	.79	.07
VII	21	4	.86	2.01	1.15

* Beyond 5 per cent level of significance ** Beyond 1 per cent level of significance
 *** Very close to the arbitrarily accepted 5 per cent level of significance.

RESULTS

Information

The Wilcoxin non-parametric paired replicate test was employed to determine the significance of results. The mean pre-scores were subtracted from the mean post-scores to determine the mean difference as a result of exposure to information. The control group in all instances did not produce significant changes in learning.

The results in Table II showed that only two recordings produced a significant positive change in learning. The production on the use of roses was very close to the arbitrarily accepted five per cent level of significance. This change in learning was in the desired direction and very close to the generally accepted level, and therefore may be considered as a fairly significant change. Although increases in learning were reported by the productions dealing with frozen vegetables and nursery crops, the actual changes were not significant.

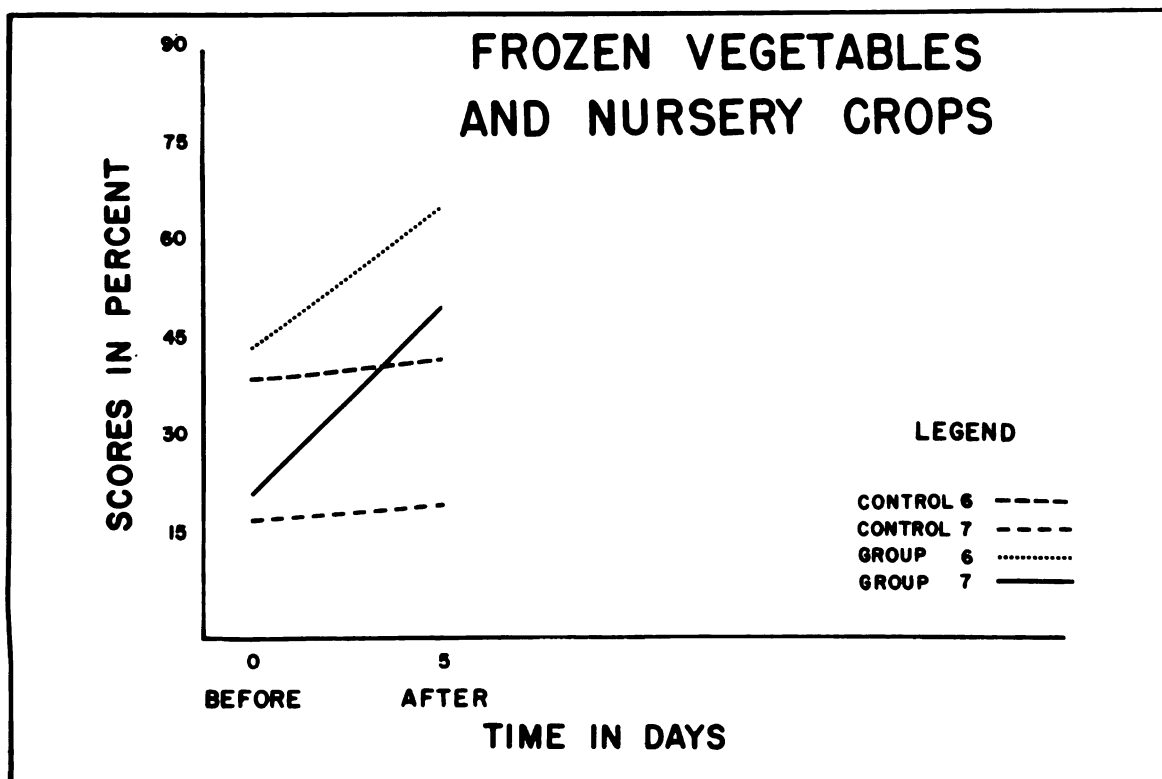
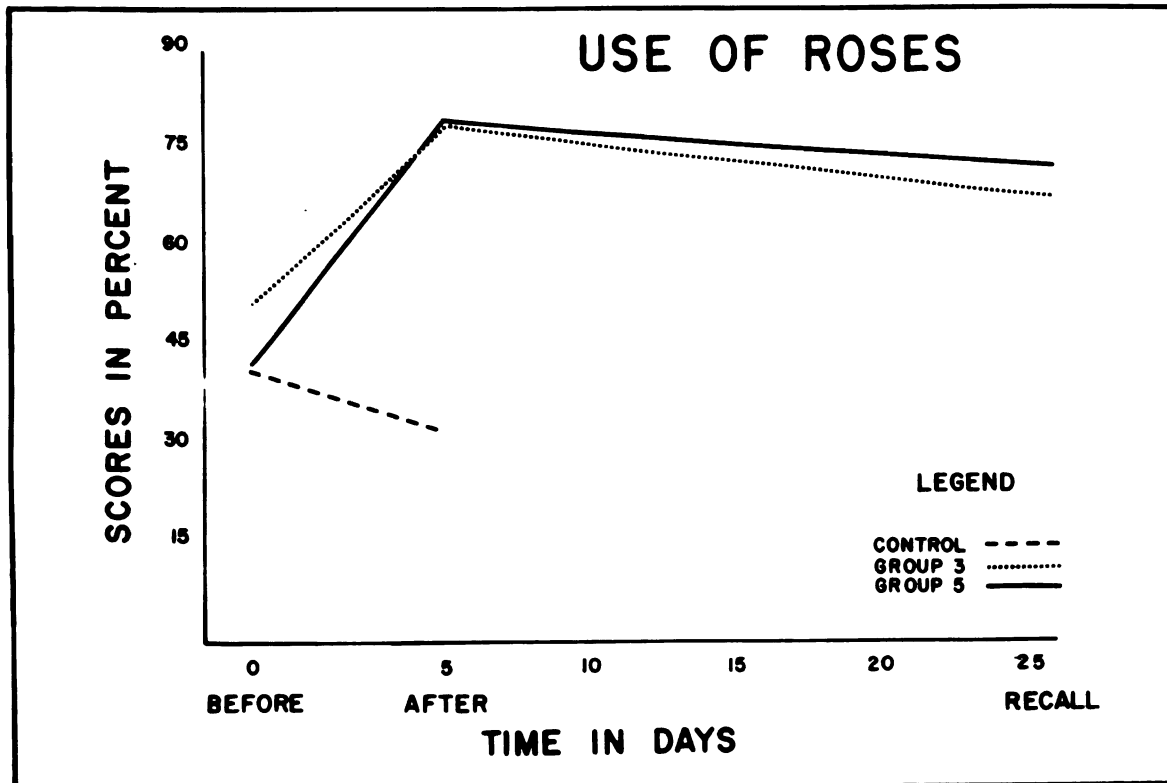
Therefore hypothesis one was verified by two productions, and might be verified by one production that was very close to the accepted level of significance. The several factors believed to have been responsible for the insignificant results will be discussed later.

Fig. 3. Influence of exposure as indicated by immediate and recall tests for quality of roses.

Fig. 4. Influence of exposure as indicated by immediate and recall tests for care of roses.

Fig. 5. Influence of exposure as indicated by immediate and recall tests for use of roses.

Fig. 6. Influence of exposure as indicated by immediate and recall tests for frozen vegetables and nursery shrubs.



The results presented in Table II demonstrated that increasing the quantity and the variety of exposure resulted in a proportionate increase in knowledge. Groups IV and V, receiving four and six minutes of exposure respectively, produced significant increases in learning on all tests and therefore confirm hypothesis three. While Group V apparently improved the greatest on all tests, an analysis of variance test, did not indicate a significant difference between the groups.

The results of each recording on information learned and retained were demonstrated in Figures 3, 4, 5, and 6. All scores were changed to a percentage basis for purposes of comparison.

Attitude

The Wilcoxin non-parametric paired replicate test was employed to determine the significance of a change in attitude and the direction of the change. The mean difference scores were determined by subtracting the mean pre-scores from the mean post-scores on all scales.

The pre-attitude level was considered very favorable for all groups. In a recent study (Berninger, 1954) the average perception level of twenty five local florists was approximately equal to the level reached by the groups exposed to the recordings on roses.

The control group in all instances except on the Evaluative scale of the nursery crops test, produced significant decreases in attitude. This was believed to have been because of a lack of cooperation on the parts of the students, as a result of having had to repeat a long test within a short period of time.

The results of this test indicated that only two significant changes in attitude occurred. Group V produced a significant positive change in attitude (five per cent level) for the "Rose" perception scale. This was the same group that received six minutes of exposure and produced significant increases in learning.

A significant negative change in attitude was produced by Group IV on the "Florist" perception scale. It was believed that complete cooperation was lacking on the part of the viewers and resulted in a negative change.

Changes in attitude and total perception toward the concepts judged by all other groups were not significant.

The results indicated that hypothesis two was confirmed by Groups IV and V, although the former group was not believed a true indication of the students' reaction to exposure. A significant positive change in attitude was therefore demonstrated when exposure to information was increased to six minutes.

TABLE III
RESULTS OF THE RECALL TEST

Group	Number of Subjects	Correct Answers	Mean After	Mean Recall*	Mean Difference**
QUALITY					
1	21	3	2.61	2.14	-.47
4	16	3	2.41	2.00	-.41
5	18	3	2.58	1.78	-.80
CARE					
2	18	3	2.33	1.89	-.44
4	16	3	2.24	1.56	-.68
5	18	3	2.24	1.28	-.96
USE					
3	24	5	3.92	3.38	-.54
5	18	5	3.96	3.61	-.35

* Approximately 10 per cent of the students showed an increase in learning.

** The change for all groups was not significant.

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Recall

The Wilcoxin non-parametric paired replicate test was employed to determine the significance of difference between the mean "post" and the mean "recall" scores on information and attitude tests. The recall test was supplied only to the groups exposed to recordings on roses. Groups VI and VII did not receive this test because of the insignificant results obtained on the "post" tests.

The results of the recall test as presented in Table III, showed the value of the two minute productions on the retention of information over a period of three weeks. Significant decreases in learning did not occur on any of the Groups receiving exposure to two, four, and six minutes of information.

It should be noted that ten per cent of the students showed increases in information when given the recall test. The majority of these students were exposed to the productions on the use of roses.

The same groups were also tested on the "Rose" perception scales. No significant changes were reported on any of the scales. Group V, which reported a significant increase in attitude immediately following exposure, produced no significant decrease in attitude on the same scale at that time.

Three weeks after exposure, the recall value of information learned was excellent for all groups previously exposed

TABLE IV

RESULTS OF THE STUDENTS' OPINION QUESTION

Group	"No" Answers	Unfavorable Answers	Favorable Answers	Enthusiastic Answers
I	1	4	13	4
II	0	4	12	3
III	1	4	13	6
IV	0	2	14	1
V	1	4	6	10
VI	3	6	10	3
VII	0	8	13	0
Total	6	32	81	27
Per cent	4.11	21.92	55.48	18.49
Total Per cent		26.03 Unfavorable	74.97 Favorable	

to the recordings on roses. Significant changes in attitude did not occur on any of the scales tested.

Preference

After sampling the replies to the preference question, four categories of answers were apparent. The enthusiastic group consisted of those students showing the greatest degree of preference for the recordings by listing several answers for their decision. The favorable category was composed of those students indicating a preference for the recordings, but limiting their answers to a brief statement. The unfavorable group was composed of those students opposed to the use of these films for commercial purposes.

A minority of students chose not to answer this question. They were classified with the unfavorable group in comparing the total number of viewers. A lack of cooperation was believed responsible for the omission of answers to this question.

The results presented in Table IV indicated a definite preference by the students for use of these recordings as commercials. They were strengthened when it was noted that increasing the exposure to information did not result in a decrease in preference. Students in Groups IV and V were better qualified to answer this question as a result of exposure to several recordings. The latter group produced significant results in both learning and attitude changes, and also responded with the highest percentage of most favorable replies.

Approximately 50 per cent of the unfavorable replies resulted from Groups VI and VII, the two groups that did not produce significant increases in their learning levels. The highest percentage of favorable replies resulted from those recordings that were successful in increasing the general level of knowledge.

DISCUSSION

Horticultural industries seem to have regarded the consumers as being fully cognizant of the availability and uses of most fruits, flowers, vegetables and ornamental crops. The present study demonstrated that very little horticultural information was possessed by a random selection of university students. This was an indication that horticultural industries might be recommended to reverse their assumptions of the existing levels of knowledge of consumers.

It must be realized that consumers have had the privilege of accepting or disregarding information designed to increase their knowledge. Therefore, knowledge of the consumers' reaction to the presentation of information through short television announcements was very essential. The results of this study have indicated to a purchaser of television advertising time, the potential effectiveness of similar television recordings.

As indicated in the results, television was effective in aiding the learning process, when exposure was only of short duration. A "captive" audience immediately absorbed a high percentage of information. In viewing television apparently a fully receptive audience might not be necessary for the absorption of information.

As exposure to information was increased to four and six minutes, proportionate increases in learning occurred. In light of these results there was an indication that exposure to several short commercials over a period of a few hours might also produce continual increases in learning.

Of significant importance was the fact that a "captive" audience, after being exposed to only six minutes of horticultural information, increased in favorable attitude. What was previously considered a favorable attitude toward roses resulted in a more favorable attitude. One previous study (Smythe, 1954) also reported the same correlation of knowledge and attitude.

Manufacturers whose products had aroused unfavorable attitudes on the part of the public, through traditions and misconceptions, might have been advised to alter their methods of advertising. As indicated in this study, an advertiser could have accomplished increases in both knowledge and attitude through informative commercials. Also many products entering competitive fields might have immediately created favorable attitudes through a well-informed public.

The three programs on roses, although only of short impact, possessed sufficient impact to remain with the students for a period of three weeks. Significant changes in knowledge and attitudes were not reported. These results were not in complete agreement with those of Hovland, Sheffield, and

Lumsdaine (1949). It was possible that had exposure been increased beyond six minutes, the retention of information might have decreased. Increasing the exposure might have also resulted in a change in attitude had the groups been retested 12 weeks later.

To a sponsor the retention of knowledge and attitude levels might have indicated that continual reinforcement of the information was not essential for at least a period of three weeks.

A significantly large percentage of the students expressed a desire for television commercials similar in nature to the programs viewed. This suggested that the public would accept information through this method of communication.

All phases of the two minute productions studied, indicated that they had a high potential in obtaining and sustaining a more enlightened consumer. Advertisers were advised to try "informative" television announcements for increasing the consumption levels of their products.

CRITIQUE

The importance of reinforcing learning with a strong clear summary was vividly demonstrated. In the recording "The Care of Roses," the performer omitted the use of a sharp knife in summarizing the discussion. Forty-five per cent of the students on the post-test and 75 per cent of the students on the recall test omitted this factor when answering the question.

The production "Arranging Roses for Your Home," discussed the various rooms of a home where flowers could be displayed. Two of the five rooms mentioned were not generally considered by the consumer as normal rooms for displaying flowers. This production did not have a summary and the majority of the students listed only the familiar rooms in answering the question.

Although there were no specific examples to illustrate it, weak summaries were believed to have been partially responsible for the insignificant results obtained from two of the five productions.

These results of inadequate summaries were not believed limited to the medium of television or to horticultural topics of discussion. In the light of a report by Tannenbaum (1954 a), these results were not unexpected. Tannenbaum reported that

the retention of information was heightened when a summary of the discussion concluded each session. Advertising personnel have basically used this same philosophy of continually reinforcing brand names in the minds of the consumers.

The program "Why Frozen Vegetables," while of general interest, may have been considered directed more toward the women who normally purchase the household items. In a class of 24 students, the men outnumbered the women nineteen to five. The possibility existed that a lack of interest on the part of the male students may have influenced the results.

The production "Planning Your Location for Shrubs" contained only one diagram in its use of visual aids. It was believed that more illustrative material might have emphasized the major points of discussion and heightened learning.

The selection of professional actors may be advisable for production of horticultural programs. Previously it had been considered desirable to employ specialists in each area of horticulture, but it was found that with two minute productions, a professional actor was adroit.

When using professional performers, without the facilities of a script writer, it was suggested that the performer be consulted in order to facilitate his natural style and phraseology.

The learning process was markedly heightened when visual aids highlighted the major points of each production.

It was found that careful consideration should be given to the color of materials and their reaction on the television gray scale.

Briefing the camera crew was extremely important and cannot be overemphasized. Coordination between "audio" and "video" portions of television was of prime necessity, especially when "close ups" were desired. A full briefing session and several camera rehearsals were valuable to acquaint the crew with the programs. Even with two minute productions, it was suggested that coordination be a strict requirement.

It should be noted that only a few facts should be included in each production. The tendency to include too many might often have retarded the learning process.

SUMMARY

Five two minute television programs relative to products representing three horticultural industries were produced and kinescoped. Three recordings were devoted to the quality, the care, and the use of roses. One recording was related to frozen vegetables and one to nursery crops.

The testing program consisted of a pre-test, five days prior to exposure, a post-test, immediately following exposure, and a recall-test, three weeks after exposure. Eight sections of a basic English course, composed of approximately 25 students per section were used for the testing program.

Open-end questions were selected for the measurement of knowledge, the retention of information, and the students preference for the recordings. A series of scales were chosen for the measurement of attitude. The Wilcoxin non-parametric paired replicate test and the Analysis of variance test, were used to measure the significance of results.

The results of the tests showed that the beginning levels of knowledge on various horticultural topics were extremely low, while the beginning attitude levels were favorable.

Two minute television programs were demonstrated to be effective in aiding the learning process. A significantly high percentage of information was immediately absorbed.

Over a period of three weeks the retention of this information was excellent, with no occurrences of significant decreases in knowledge.

An audience exposed to six minutes of information, produced a significant positive increase in attitude. When retested, three weeks following exposure, no significant changes in attitude were found.

A high percentage of the students viewing the two minute productions expressed a desire for their use as television commercials, in spite of the fact that the recordings were not completely professional in character.

The learning and retention of information, as indicated in this study, was heightened by the reinforcement of information through a brief but strong summary.

The general conclusion may be stated as follows: a series of two minute television announcements on roses were demonstrated to be effective in aiding the learning and retention of information, and in producing a significant increase in favorable attitude toward the horticultural crop.

APPENDIX

- I. Scripts
- II. Measuring Devices
- III. Testing Instructions

I. SCRIPTS

Determining a Good Quality Rose

Audio

"If you were going to buy some roses, which of these would you choose? Which of them would give you the most value and the lasting pleasure?

"If I had to choose between these two, from the point of view of a florist, I would take this one, and there are three very definite reasons for my choice.

"Notice on this rose how the petals are already spread as compared to this one which is just beginning to unfold. The spread of the petals shows approximately how old, or mature, a flower is. Under the same conditions this rose will last longer than the older one. The best choices in roses are those that are just beginning to unfold their petals.

"Again you can see how the outside petals of this one have several areas that are just beginning to turn brown at the edges. This happens to all roses when they get older, so it is another way to determine the age and quality of a rose.

"Now compare the two roses again. You can see how this one droops while this one stands comparatively straight. As a rose matures it spreads its blossom and if the stem is weak it will droop and may even break off.

"While with a stem like this one, the rose can come to full maturity without the disappointment of having it droop so that the head is facing the floor rather than looking up.

"This rose best illustrates the three points to look for. The petals are just beginning to unfold, there are no brown spots on their edges, and it has a straight, strong stem. A check of these three points will help you to get the best quality and longest pleasure from your rose purchases."

The Care of Roses

"How long can a rose live after it has been cut? Speaking as a florist, that is one of the questions that is asked of me many times. I can't say exactly because there are many variables involved, but I can give you some hints that will keep them fresh and attractive longer.

"As with all living things, a rose needs water. It gets water through this stem opening. But just putting them in water isn't enough. You see, by the time you have **received** them, certain substances have already formed on the cut that clog the cells and prevent the absorption of water. To overcome this and to make sure that water will enter each stem, you should take a sharp knife and cut the lower portion of each stem on an angle like this. As you can see by the chart, a cut like this increases the absorbing surface of the stem, whereas a straight cut will give you less than half the area.

"Cutting the rose this way keeps the stem from standing flat against the bottom of the vase. You can see by this chart how the rose always has free access to water.

"When you make this cut it is quite important that you use a sharp knife. A dull knife, instead of cutting through the cells, will force its way through and squeeze them together. This also prevents the intake of water.

"Another thing is to remove the leaves from the part of the stem that will be under water. If the leaves are left on they will begin to decay and contaminate the water. This will help to block the entrance to the cells in the stem.

"By doing these two things, cutting the stem of the rose at an angle and with a sharp knife, and removing the leaves that would be underwater, you will be able to enjoy the beauty of your roses much longer."

Arranging Roses for Your Home

"There was a song going the rounds a few years ago that made us florists very happy. It was entitled 'One Dozen Roses'. The first line went something like this, 'Give me one dozen roses, put my heart in beside them, and send them to the one I love.' Well, we could furnish the roses, but the sender had to provide his own heart.

"Seriously, though, a dozen roses can be a problem. What shall I do with them? Shall I put them all in one arrangement

or shall I divide them up and scatter the arrangements through the house? If you will permit an obvious answer, I shall do both.

"Here I have arranged eight roses into a centerpiece that can be used for a dinner table. The only equipment you need for something like this is a low container, a pin holder, and your own imagination. I say imagination because there is an infinite number of ways that flowers can be arranged. I would add one word of caution though, keep your arrangements low so that you can see across the table without interference. Flowers were meant to add distinction to your table, not distraction.

"The other four roses can be used in a different manner and for a different purpose, with the help of a small container or a bud vase like this one. For your own private enjoyment you could put one on your dresser and one in the kitchen.

"It's nice to put one near the entrance to greet your guests and you could put the other rose on your coffee table or somewhere else where a touch of color and variety will add to the attractiveness of your setting.

"With just a dozen roses you can add beauty, color, variety, and distinction to almost every room in your home."

Frozen Vegetables

"Have you ever heard of suspended animation? According to the dictionary suspended means to stop for a while, and

animation can be defined as life, so the phrase "suspended animation" would generally mean to stop life. Modern science has developed a way to do this with certain foods, and we in the vegetable business have taken advantage of this development to bring you our product at its best in flavor and nutrition.

"You see, just a few hours after harvesting, a vegetable literally begins to feed on itself so that it loses its flavor and nutrition.

"Through the process of freezing, we are able to catch the vegetables at their peak before any breakdown starts. A very few hours after harvesting, each vegetable has been sorted, cleaned, and frozen solid, or placed in a state of suspended animation so that when it reaches your home it is capable of giving you the same satisfaction as a vegetable taken directly from the garden.

"You will notice I said capable, because the cook plays a very important part in keeping this high quality. You see all vegetables are partially cooked before they are frozen, so it isn't necessary to cook a frozen vegetable the same length of time that you would usually cook a so-called fresh product.

"Each package of frozen vegetables contains specific cooking directions to help make sure you will have a good-tasting vegetable for your dinner. Cooking them longer than the suggested time will only destroy the flavor and vitamin

content of your vegetables, so if you will follow the simple directions you will get complete satisfaction from each package."

Planning Your Location for Shrubs

"This is a landscape plan. By way of definition it might be said that landscaping a home is the science, or art, of arranging plants and shrubs around a house, both to provide a setting and to accentuate the lines of the structure.

"Literally, landscape gardening is like the frame of a picture. It defines the structure itself and provides for an easy transition for the eye from the surrounding lawn to the house.

"Certain problems must be faced by a landscape planner that the builder doesn't have to worry about. For instance, a builder knows that a piece of lumber or a brick will keep its shape as long as it lasts. A plant or a shrub however, is a living thing and will continue to grow and develop its shape, so in planning I have to remember what size the plant will be at maturity.

"Another thing to be remembered is that a plant grows underground as well as above, so that I have to allow for root space and proper drainage. And if plants are too close together they will compete for water and soil minerals, and even if one or the other doesn't die, neither of them will attain full size and give the effect that they are intended to give.

"You will notice on this plan the directional arrow pointing north. You must keep that continually in mind when you are planning your landscape, not only in the sense that most plants need sunlight to grow, but there are certain plants that grow better in the shade, such as Rhododendron, which I have placed on the north side of the house.

"On the south side of the house, where there will be more sunlight during the year, I have planned for Juniper and a dwarf Japanese Yew. This Yew tree must be planted at least three feet from the foundation of the house to allow enough space for root expansion and to give it enough ground to draw the necessary minerals it needs for life.

"When you are planning to do some landscaping work, it is best to get advice from your nursery man, or to read one of the many books that have been written on this subject.

"The principal points that are to be remembered then are the maximum size of the plants, underground as well as above ground, and the amount of sunlight a plant needs or does not need. By considering these things in the planning stage, you will be able to avoid disappointment and financial loss in arranging a setting for your home."

II. MEASURING DEVICES

Open-end Questions and Answers

Quality

Question: Please list the points you think make up a good quality rose.

Answer : The petals are just beginning to unfold. The absence of brown discolorations on the petals. A strong straight stem.

Care

Question: In taking care of cut roses in your home, please list the things you would do to make them last longer.

Answer: Take a sharp knife and cut the lower one-inch off of each stem.
Remove the leaves that normally would be underwater when placed in a container.

Use

Question: Please list several possible places in your home where you might use or place one dozen roses.

Answer: Kitchen, bedroom, hallway, living room, dining room.

Frozen Vegetables

Question #1: Which of the three --canned, frozen or store-fresh --vegetables will generally be highest in flavor, and nutrition when they reach your home? Why?

Answer: Frozen. Because they are frozen solid before internal breakdowns occur causing a loss in flavor and nutrition. Within a few hours after harvesting, they have been cleaned, sorted, and frozen. This all occurs before the many internal breakdowns have occurred.

Question #2: Mrs. Smith, who has been cooking for twenty-five years, never reads the directions on a package of frozen vegetables. Is she acting wisely? Why or why not?

Answer: No. Frozen vegetables have been partially precooked, and consequently do not need to be cooked as long as a fresh product. Cooking longer than the specified time only results in a loss in flavor and nutrition.

Nursery Crops

Question: Please list the things or points you need to keep in mind before purchasing shrubs and trees for your property.

Answer: Shrubs will continue to grow, both above and below ground.

Be sure you know the maximum size they will reach before selecting shrubs for your home grounds.

Crowding them will prevent their reaching mature sizes and giving you the desired effects.

Not all shrubs require sunlight. Some even prefer the shade, so it is necessary to consider this when selecting shrubs and trees for your location.

Attitude Scales

Concepts Judged

Roses

[illegible]

Flowers

weak ____:____:____:____:____:____:____: strong
 fragrant ____:____:____:____:____:____:____: foul
 active ____:____:____:____:____:____:____: passive
 stale ____:____:____:____:____:____:____: fresh
 heavy ____:____:____:____:____:____:____: light
 pleasant ____:____:____:____:____:____:____: unpleasant
 slow ____:____:____:____:____:____:____: fast
 dirty ____:____:____:____:____:____:____: clean
 small ____:____:____:____:____:____:____: large
 expensive ____:____:____:____:____:____:____: cheap
 valuable ____:____:____:____:____:____:____: worthless

Florist

fair ____:____:____:____:____:____:____: unfair
 weak ____:____:____:____:____:____:____: strong
 worthless ____:____:____:____:____:____:____: valuable
 active ____:____:____:____:____:____:____: passive
 pleasant ____:____:____:____:____:____:____: unpleasant
 small ____:____:____:____:____:____:____: large
 dishonest ____:____:____:____:____:____:____: honest
 fast ____:____:____:____:____:____:____: slow
 good ____:____:____:____:____:____:____: bad
 rich ____:____:____:____:____:____:____: poor

Frozen Vegetables

weak ____:____:____:____:____:____:____: strong
 expensive ____:____:____:____:____:____:____: cheap
 active ____:____:____:____:____:____:____: passive
 bad ____:____:____:____:____:____:____: good
 heavy ____:____:____:____:____:____:____: light
 pleasant ____:____:____:____:____:____:____: unpleasant
 dull ____:____:____:____:____:____:____: sharp
 dirty ____:____:____:____:____:____:____: clean
 small ____:____:____:____:____:____:____: large
 valuable ____:____:____:____:____:____:____: worthless

Shrubs

weak ____:____:____:____:____:____:____: strong
 expensive ____:____:____:____:____:____:____: cheap
 active ____:____:____:____:____:____:____: passive
 bad ____:____:____:____:____:____:____: good
 heavy ____:____:____:____:____:____:____: light
 pleasant ____:____:____:____:____:____:____: unpleasant
 dull ____:____:____:____:____:____:____: sharp
 dirty ____:____:____:____:____:____:____: clean
 small ____:____:____:____:____:____:____: large
 valuable ____:____:____:____:____:____:____: worthless

III. TESTING INSTRUCTIONS

Pre-test

"At present we are attempting to obtain from University students, latent information concerning certain horticultural products. We would like your cooperation in answering a few simple questions." (Each open-end question was then read and briefly clarified.) "The first phase of this questionnaire consists of some open-end questions.

"The second phase of this questionnaire involves a different type of question in which we are asking you to judge several concepts, according to a series of descriptive scales. Each scale, you will notice consists of two polar terms and seven boxes separating them." (The concepts were clarified by placing an example of this test on the blackboard.) "Remember that we are asking you for your own personal opinion and not what you think you should indicate, or what your neighbor has already indicated.

"Please place a checkmark in the center of each box and be sure each scale has received one and only one checkmark. We may wish to ask you some additional questions in the future, so please put a means of identification at the top of the page, your student number would be preferred. Remember we are interested in you as University students and not as personal individuals, so don't hesitate to indicate your true feeling."

Communications Exposure

Pre. "You are about to see a short kinescopic recording of a television program produced at the WKAR television studio." (The tests for this exam were not exposed to the groups at this time, nor was there any indication of one to follow.)

Post. "We would now like your cooperation again in answering a few simple questions. You will find them familiar and in case some of you have forgotten, the example of the scale test will be placed on the blackboard."

Recall Test

"The results of the previous questionnaires have been significant and prompted us to ask for your kind cooperation in extending this study. The United States Navy has studied the recall value of television as it applied to their own personnel. Generally 30 to 60 minute programs were used in their studies. There is no information on the recall value of the type of programs that you previously viewed.

"We would like your cooperation once more in helping us to complete this study. Some of you may have forgotten how to use the scale questionnaire, so I'll place the original example on the blackboard. Please remember that we are requesting your own personal feelings toward only the one concept this time."

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1. The first part of the report discusses the importance of maintaining accurate records of all transactions. It emphasizes that proper record-keeping is essential for the integrity of the financial system and for the ability to detect and prevent fraud.

2. The second part of the report describes the various methods used to collect and analyze data. It includes a detailed discussion of the sampling techniques employed and the statistical methods used to interpret the results.

3. The third part of the report presents the findings of the study. It shows that there is a significant correlation between the variables studied, and that the results are consistent with the hypotheses proposed.

4. The fourth part of the report discusses the implications of the findings for policy and practice. It suggests that the results of the study can be used to improve the efficiency of the financial system and to reduce the risk of fraud.

5. The fifth part of the report concludes the study and provides a summary of the key findings. It also includes a list of references and a list of figures and tables.

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