TELEVISION AND ITS APPLICATIONS TO EDUCATION

WITH SPECIAL REFERENCE TO

INDUSTRIAL ARTS

APPROVED:

[Signatures]

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TELEVISION AND ITS APPLICATIONS TO EDUCATION
WITH SPECIAL REFERENCE TO
INDUSTRIAL ARTS

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# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>I. INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Purpose of Study</td>
<td></td>
</tr>
<tr>
<td>Delimitations</td>
<td></td>
</tr>
<tr>
<td>Sources of Data</td>
<td></td>
</tr>
<tr>
<td>Methods of Obtaining Data</td>
<td></td>
</tr>
<tr>
<td>Definition of Terms</td>
<td></td>
</tr>
<tr>
<td>Recent and Related Studies</td>
<td></td>
</tr>
<tr>
<td>Organization of the Study</td>
<td></td>
</tr>
<tr>
<td>II. HISTORY AND DEVELOPMENT OF TELEVISION</td>
<td>15</td>
</tr>
<tr>
<td>III. TELEVISION AS AN INSTRUCTIONAL AID IN PROGRAMS OF EDUCATION</td>
<td>24</td>
</tr>
<tr>
<td>IV. THE USE OF TELEVISION AS AN INSTRUCTIONAL AID IN THE TEACHING OF INDUSTRIAL ARTS</td>
<td>78</td>
</tr>
<tr>
<td>V. SUMMARY, FINDINGS, AND RECOMMENDATIONS</td>
<td>89</td>
</tr>
<tr>
<td>BIBLIOGRAPHY</td>
<td>95</td>
</tr>
</tbody>
</table>
CHAPTER I

INTRODUCTION

We who live in this era, harassed though one may be by the swift social change and bitter international strife, are nevertheless fortunate in witnessing the birth and growth of television as a vast new social and educational instrument. Educators do not possess the choice of whether or not this giant of electronics miracles shall enter into the field of education; they may only choose to what extent they may presently make use of it. Radio has contributed to education as a source of information and as an aid to learning. Many schools have taken advantage of the many educational programs available to them from both educational and commercial radio stations. Some schools have made arrangements with local radio stations for free program time for the broadcast of school activities, including remote broadcasts of unrehearsed classroom teaching situations, and some of the schools own and operate their own non-commercial frequency modulated broadcast stations for educational purposes. Some colleges and universities own and operate commercial amplitude or frequency modulated broadcast stations for educational purposes, depending primarily upon the income from commercial advertising for financial support.
During 1953 a most significant development in American communications and education took place: the first two non-commercial educational television stations in the country, at Houston, Texas, and at Los Angeles, California, went on the air. Nearly fifty applications to build stations have been filed with the Federal Communications Commission, Washington, D.C., and twenty-eight permits have already been granted. Eventually, almost the entire nation can be served by stations operated for educational purposes because the Federal Communications Commission has reserved twenty-five television channels exclusively for education.²

The progress that has been made in television for educational purposes in less than two years shows that Americans are working hard to take advantage of an opportunity that can leave its mark on many generations to come. Television can help to provide education and understanding that are essential if we are to fulfill our obligations as citizens.³

The power of television can be a force for good or a force for evil. Whatever it does, television will not leave us, as individuals, or our nation unchanged. It is fitting that educators throughout the country take up the subject of the future of television for examination and discussion. The

²Ibid.
question is one of immediate concern since statistics show that children are at present spending more time before television receivers than they do in school, and since the reading of newspapers, magazines and books falls off sharply in homes with television service.

Purpose of the Study

It is the purpose of this study to determine if there are any ways and means by which television may be used effectively as an instructional aid in programs of education, and special attention will be given to ways and means of using television in the teaching of industrial arts. In order to understand the rapidity with which television has developed, particularly in the past decade, a study of the development of television will be made and consideration will be given to the following aspects of the problem. Is television compatible with the accepted principles of learning, and if television is compatible with the accepted principles of learning and the objectives of general education, what are some of the advantages television can offer, and what are some ways and means of making television available for use in programs of education?

Delimitations

In this study no consideration will be given to the scientific and technical aspects of television except when such references are considered necessary for a better understanding of the history and development of television, or
when it is necessary to show more adequately the advantages or limitations of television as an educational medium. Consideration will be given to the psychological aspects of education only to the extent considered necessary to show the compatibility of television with modern educational concepts. This study is not concerned with an evaluation of present educational programs produced by commercial television stations nor with educational programs produced by non-commercial television systems, except when they exemplify or relate to, a means of using television in programs of education and in industrial arts which is a phase of general education.

Sources of Data

Data and information for this study were secured from professional and technical literature in the fields of electronics, radio, television, education, psychology, and industrial arts. Data were also secured from television manufacturing companies, network television broadcasting companies, government bureaus, radio and television societies, educational organizations, publishing companies, television stations, and from personal interviews with television engineering and administrative personnel and representatives of the Federal Communications Commission.

Methods of Obtaining Data

Data and information pertaining to the historical and technical aspects of television and the accepted principles
of learning and accepted objectives of general education were secured from the Dallas Public Library, Dallas, Texas; the Library of Southern Methodist University, Dallas, Texas; and the Library of North Texas State College, Denton, Texas. In order to secure information pertaining to the educational aspects of television, seventeen personal interviews were arranged with personnel of the Federal Communications Commission, personnel of television stations, and personnel of educational institutions. Although most of the personnel were interviewed in Dallas, Texas, some of the television engineers and administrators were interviewed in Wichita Falls, Texas; Wichita, Kansas; Jackson, Mississippi; Shreveport, Louisiana; and Baton Rouge, Louisiana. Twelve personal letters were written to personnel of government agencies, and to publishing companies, equipment manufacturers, educational institutions, and educational and television societies. Of the sixty persons and organizations to whom letters were addressed, fifty-three of these responded either enclosing or offering data and information, or making reference to other possible sources of information relating to the uses of television in programs of education.

Definition of Terms

In order to clarify the meaning of certain terms used in this study, the following terms are defined as follows:
"Television broadcast station" is a station in the television broadcast band of frequencies that transmits simultaneous visual and aural signals intended to be received by the general public.  

"Visual," or "video," refers to the picture portions of a television transmission.  

"Audio," or "aural," means the sound portions of a television transmission.  

The expression, "television transmitter," refers to the transmitter, or transmitters, used in the transmission of both the visual and aural signals.  

"Television channel" is the term used to designate a band of frequencies six megacycles wide in the television band for use of one television transmitter.  

The term, "amplitude modulation," refers to a system of modulation in which the envelope of the transmitted wave contains a component similar to the wave form of the signal to be transmitted.  

"Frequency modulation" is a system of modulation in which the instantaneous radio frequency varies in proportion to the instantaneous amplitude of the modulating signal.  

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4 Federal Communications Commission Standards of Good Engineering Practice Concerning Television Broadcast Stations, p. 5.  
5 Ibid.  6 Ibid.  7 Ibid.  8 Ibid.  9 Ibid.  
10 Ibid., p. 6.
"Closed circuit television" is a general usage term which refers to the transmission of television signals through the medium of wire, and reception is not available to the general public.

"Cooperative educational television" is the term used to refer to the use of commercial television facilities by an educational institution by the purchase of program time or by special arrangement with the licensee of the station.

The term "education" refers to the social process by which people are subjected to the influence of a selected and controlled environment so that they may attain social competence and optimum individual development.\(^{11}\)

"Industrial arts" is that phase of general education that concerns itself with the materials, processes, and products of manufacturing, and with the contributions of those engaged in industry. The learnings come through the pupil's experiences with tools and materials and through his study of resulting conditions of life.\(^{12}\)

An "instructional aid" is any device that assists an instructor to transmit to a learner facts, skills, attitudes,


\(^{12}\) Louis V. Newkirk, *Organizing and Teaching the General Shop*, p. 15.
knowledge, understanding, and appreciation.

A "visual aid" is any instructional device that can be seen but not heard. By the term, "audio aid," is meant any instructional device that can be heard but not seen. An "audio-visual" aid is any instructional device that can be heard as well as seen.

The term, "educational television station," refers to a television station owned and operated by one or more educational institutions.

Recent and Related Studies

A study concerning the applicability of television to the field of music was made by Hattie Lucille Phillips in 1951. Phillips' study was primarily based upon current literature regarding the use of television, and she concluded as follows: "The use of television in the schools is inevitable; it is the next logical step in the progress and improvement of education."

13 Kenneth B. Haas and Harry Q. Packer, Preparation and Use of Audio-Visual Aids, p. 11.
14 Ibid.
15 Ibid.
16 Ibid.
A study of the implications of television to education was made by the teaching personnel of New Jersey State Teacher's College, Montclair, New Jersey. Eight programs of lesson material were prepared by public school teachers for use in their own classes. The eight lessons were transmitted by television to receivers in thirteen public schools in Bloomfield, New Jersey, and Montclair, New Jersey. A study of the results of the televised lessons resulted in the following conclusions:

Television can make a valuable contribution to classroom teaching.

The television program brings to the classroom experiences, materials, or demonstrations that are not readily available to the classroom teacher.

The teacher, demonstrator, guide, or other resource person who appears on the screen must possess enthusiasm, a knowledge of the principles of teaching, and special qualities of voice and manner, if the lesson is to succeed.

A television center and community schools can cooperate effectively to produce good educational results.

Programs should not include too much material. The purpose is not to overwhelm the students, as with a dramatic spectacle, but to teach something distinctive enough to be remembered.

Preparation before classroom reception is desirable. Those lessons are received best which do not interrupt the continuity of school, but which augment and supplement what is being taught.

Television has great value in vitalizing subject matter, in stimulating student interest and activity.

The twenty to thirty minute program fits into most school schedules and leaves sufficient discussion time before the end of the class period.
Production of effective educational programs is practical by workshop groups made up of college students.

Television teaching should have a salutary effect on teaching generally. 18

The Special Devices Center of the Navy prepared a project in which from 100 to 120 men were taught by television, the same number by television recording, and the same number by local instruction. The following aspects of the project were evaluated:

1. Television instruction versus local instruction
2. Television instruction versus television recordings
3. Television recordings versus local instruction.

Eighty per cent of the comparisons showed television instruction to be as good as, or better than, local instruction; 84 per cent of the comparisons showed television recordings to be as good as television instruction; 75 per cent of the comparisons showed television recordings to be as good as, or better than, local instruction. 18

A study of the difference between good and poor television instruction showed that direct narration is more effective than local instruction; animated films were effective; and the combination of dramatic action and narration was not effective. The naval advisory

group recommended that better visual aids be used in television lessons; there should be a better selection of instructors; the sessions should be shorter; and that it would be preferable to use closed-circuit networks instead of public broadcasts. In the study it was also found that the writers and directors must be specialists in the field of education and not just in television, and that psycho-educational experts are needed to plan the television lessons based on sound educational practices.

A study of the use of television in education was conducted by the United States Navy Special Devices Center, Port Washington, Long Island, New York, to test the use of television in teaching army reservists. A special television network was set up including ten stations. A series of eight telecasts were made. The results of the experiment were analyzed by each individual who participated in the project. All grades of officers and enlisted men were higher on test scores than before the use of television. It was found that training would be given to both officers and enlisted men at the same time and with good results. (It was also found that the lessons taught by the use of television were retained over a period of six months by 85 per cent of the officers and 65 per cent of the enlisted men.) An analysis of the test results in relation

to the type of program treatment showed that the learning came in the following order:

1. Narration plus meaningful film
2. Narration combined with drama
3. Narration alone
4. Narration plus atmospheric film
5. Drama alone.

It was found that only those topics which were dealt with explicitly produced much learning; that the best teaching was clear and direct; that charts, maps, films, and dramatic sequence aided in the learning process; and that atmospheric or "filler" material was worthless. The conclusions of the study are:

1. Television instruction is effective.
2. Television instruction is remembered.
3. Television instruction was liked by the students.
4. The method of teaching used on television is important.

From the preceding summaries of related studies it appears that the use of television in education is inevitable and that television can make valuable contributions to education. Television was found to be effective, liked, and remembered.

Organization of the Study

In order to study the many implications set forth in the purpose of the study, the study has been organized as follows:

Chapter I will present an introduction to the study, the purpose of the study, the delimitations, the sources of data and information, the methods of securing data, the definition of terms, recent and related studies, and the organization of the study.

An historical treatment of the development of television from its beginning to its present state will be discussed in Chapter II. The purpose of the chapter is to present information showing the rapidity with which television has developed, the universality of the contributions to television's development, and the increasing momentum at which new developments in television are progressing.

Chapter III will present information for the purpose of ascertaining if the use of television is compatible with the accepted educational principles and objectives. An attempt will be made to show how television can contribute to education, and how television is at present being used by educational institutions as an instructional aid to learning.

Data and information showing how television is compatible with the accepted objectives of industrial arts, and how it can be used in the teaching of industrial arts will be presented in Chapter IV.
A summary of the treatment of the problem, the findings of the study, recommendations based upon the findings of the study for the use of television in the field of general education and in the field of industrial arts will be given in Chapter V.
CHAPTER II

HISTORY AND DEVELOPMENT OF TELEVISION

Television as an idea dates back over a century to the early experiments of Alexander Bain of London, England. Bain, in 1842, arranged metal letters on a conducting plate at a sending station and attached a chemically prepared paper on a similar plate at the receiving end. Narrow conducting brushes, mounted side by side on an insulated strip, were moved slowly over their respective plates. The brushes at corresponding positions at the two stations were connected by individual wires so that when contact was made with the metal letters, current passed through the paper, and produced a discoloration in the form of letters at the receiving station.

The above system required far too many wires even for simple intelligence. Five years later, F. C. Bakewell, of England, used two metal cylinders driven at synchronous speeds, and was able to transmit a graph drawn with an insulating ink of shellac on one drum for interrupting the current flow to a chemically treated paper attached to the other drum. A single brush in contact with its rotating drum was given a slow longitudinal motion, causing it to trace a spiral on the drum, and thereby transversing the entire area of the graph. Since only one wire was necessary between the sending and receiving
stations, this experiment was a decided improvement over the accomplishment of Bain. We are indebted to Bakewell for two fundamental ideas, the use of rotating cylinders and the longitudinal motion of the exploring element, which are still widely used in photo-radio and facsimile.

Television as a practical idea dates back to Alexander Graham Bell's invention of the telephone, in 1876, which created a stir in the scientific world. This event was followed almost immediately by the publication of numerous theories for the transmission of sight by electricity. Most of these theories, strangely enough, were, in the main, identical in conception with the most important fundamental principles upon which television operates today.

A man named May, an operator in the Atlantic cable station at Valencia, Ireland, observed by accident that light shining through a window on some experimental selenium resistors unbalanced his Wheatstone bridge circuit. A few years later, an experimenter named Willoughby Smith was annoyed by variations in the selenium resistors with which he was working. By investigation he noted that the resistance of selenium varied inversely with the intensity of the light which fell upon it. This quality of the material made it

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1 Orrin E. Dunlap, Understanding Television, p. 3.
2 Ibid., p. 5.
3 Ibid., p. 7.
adaptable for use by many of the pioneer experimenters in picture transmission. It was Philip Reis of Germany, who advanced the theory that light falling upon selenium liberates electrons and reinforces the conducting current. Two other German experimenters, Elster and Geitel, discovered that selenium was not alone in its conducting phenomena. They found similar qualities in thalium, strontium, lithium, sodium, potassium, rubidium, and caesium. Stoletow, in 1890, produced the first photo-electric cell, which used zinc as its cathode and platinum as its anode. From this crude, but workable cell, the modern multi-use photo-electric cell emerged.

Handicapped as he was by the lack of present-day ideas and devices, W. S. Amstutz, an American, in 1890, transmitted the first successful half-tone picture over a distance of twenty-five miles in a record time of eight minutes. Amstutz used wire as the medium of transmission. Two years later, Arthur Korn, a German, wrapped a photographic negative around an insulating cylinder which was rotated and at the same time moved along its axis in order that light from a pin-point source traversed its entire surface. The amount of light from the minute source varied with the density of the photograph negative and produced variations in the current through a selenium cell. These current variations were transmitted

Ibid., p. 8.
to a distant receiving station through a medium of wire, and in one experiment Korn transmitted the picture of President Fallieres of France from Berlin to Paris in twelve minutes.

All of these early experiments used wire as the media of transmission. Henrich Hertz of Karlsruhe, Germany, confirmed Clerk Maxwell's theory of ether waves in 1886 by originating and detecting electro-magnetic waves. Hertz also discovered in his experiments, that ultra-violet light waves falling upon a spark-gap permitted a discharge to take place more readily than when the gap was in darkness. A similar effect was discovered the next year by Wilhelm Hallswach, a German physicist. He noted that a well-charged and insulated body would lose its charge when exposed to the ultra-violet light waves. These findings were highly important theoretical beginnings in the evolution of television.

It is one thing, however, to postulate a theory and quite another to produce an actual working mechanism. Bell's telephone had been anticipated in theory, as were Edison's phonograph and Marconi's wireless experiments; yet many years had to elapse before the theory of television reached practical accomplishment. The man who succeeded in this vital accomplishment was John Logie Baird, of England, whose success came almost thirty years after the experiments of the early theorists.

\[\text{Ibid.}, \ p. \ 9.\]
In April, 1925, Baird, with the crudest of apparatus, transmitted the outlines of simple objects by wireless. C. F. Jenkins, a leading American television experimenter, also transmitted silhouettes in July, 1925. On January 27, 1926, Baird gave a demonstration to forty members of the Royal Institution in London, England. He showed them the transmission of real images between one room and another by television. For the purpose of the demonstration, the head of a ventriloquist’s doll was manipulated as the image to be transmitted. The image of a human being was also transmitted by television. Although the results of the television transmission were far from perfect, the audience saw the images in proper light gradation. The movement of a person’s head, mouth, and facial muscles was plainly discernible.

The next noteworthy step in the progress of television took place on December 30, 1926, when Baird demonstrated the vision of objects in total darkness by applying the infra-red rays to television. It was noted at the time that Baird’s invention might be applied to warfare in locating objects apparently in the dark when an area was flooded by infra-red rays.

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In April, 1927, the American Telephone and Telegraph Company staged a demonstration of television, the first to be given outside of England. At this demonstration images were sent between New York and Washington, and the experiment was staged with great publicity. The demonstration occupied the services of 1000 engineers. The American Telephone and Telegraph Company's demonstration was followed by Baird transmitting images between London and Glasgow over the ordinary service telephone lines. Baird accomplished this with the aid of only two operators, and the receiver consisted of very simple apparatus placed in the sitting-room of the Central Station Hotel, Glasgow. On this apparatus Baird and others were seen and recognized by leading scientists and city officials of Glasgow. 9

On February 9, 1928, the public learned that the Atlantic had been spanned by vision. Using a short-wave station, situated at Coulsdon, England, Baird succeeded in transmitting images to Hartsdale, New York, a suburb of New York City. The transmission across the Atlantic was followed almost immediately by the transmission to the Berengaria, a ship in mid-ocean, where the chief wireless operator of the ship was able to see his fiancee in Long Acre, London, England. Daylight television was accomplished in the Baird laboratories

9 Ibid., p. 11.
in June, 1928, and was followed shortly with television in natural colors. Shortly afterwards, experiments were made with television wherein the picture was accompanied by sound.

After a year of bitter controversy between the Baird Company and the British Broadcasting Corporation as to the commercial practicability of television, Baird gave a demonstration of television through Station 2 LO in London, England, to the representatives of the British Post Office, the British Broadcasting Corporation, and Members of Parliament. Television was received on portable receivers at the British Post Office and at Savoy Hill. The transmission used only the channel normally assigned for speech broadcasts and proved beyond a doubt the commercial practicability of television. On September 30, 1929, the negotiations between the British Broadcasting Corporation and Baird were brought to a successful conclusion and experimental television service through 2 LO was inaugurated.

Television developed at a rapid rate in the United States, Great Britain, and Germany during the years 1930 to 1938, and would have been available to the general public by 1940, had it not been for the beginning of the war in Europe. The principles of television were quickly applied to war needs and radar was invented. As in television, the British took

the lead in the development of radar, although simultaneous research was taking place in the United States. Many of the discoveries made in war-research are now applied to modern television. It was not until after World War II that television was given a real opportunity to develop. Equipment was easily converted for domestic use from war surplus, factories were geared for high production, and industry found a ready market for television.

The Federal Communications Commission, on September 30, 1948, issued an order which prohibited the issuing of any more television station construction permits. This order was the result of serious interference between stations caused by topospheric propagation; the Commission discovered that the television stations operating under the 1945 allocation plan had too little separation between the co-channels and adjacent channels. 12

Television has developed rapidly after the order that banned the construction of new television stations was lifted in 1953. On February 1, 1954, there were 359 television stations already on the air with well over 1000 applications for new television stations on file with the Federal Communications Commission. Only three of the stations already on the

11 Moseley and Chapple, op. cit., pp. 5-16.

air are non-commercial educational stations. On February 15, 1954, a newscast from WBAP-TV announced that over 57 percent of American families now have television in their homes.

13 Ibid., (February 1, 1954), p. 86.
CHAPTER III

TELEVISION AS AN INSTRUCTIONAL AID IN
PROGRAMS OF EDUCATION

In this chapter consideration will be given to three major aspects, namely, the compatibility of television with accepted educational principles and objectives, the advantages offered to education by television, and the ways and means of using television in programs of education. In the study of the compatibility of television with accepted educational principles, consideration will be given to the accepted theories of learning and to the accepted objectives of education. In the study of the advantages offered to education through the use of television, consideration will be given television as a special kind of audio-visual aid, to its value to education as a communications medium, and to the advantages afforded to education by the combination of its audio-visual and communications values. In the study of the ways and means of using television in programs of education consideration will be given to the ways in which television can be made available to programs of education.
The Compatibility of Television with Accepted Educational Principles

Many theories have been postulated concerning the nature of learning and the ways by which learning may be achieved. One purpose of this study is to show what some of these accepted theories of learning are in order to determine whether television, as a tool for learning, is compatible with any, or all, of these theories. It is not a purpose of this study to attempt to evaluate any of the theories of learning.

Thorndike's theory of learning.--For over half a century the theories of learning postulated by Edward L. Thorndike have dominated all other theories of learning. Edward C. Tolman stated that the psychology of learning has been and still is a matter of agreeing, or disagreeing with Thorndike.

The basis of learning accepted by Thorndike is association between sense impressions and impulses to action. This association became known to psychologists as a "bond" or "connection." Thorndike's theory became known as "bond" psychology or "connectionism," since these bonds became stronger or weaker in the making or breaking of habits. According to Thorndike's classification, the most characteristic form of learning is "trial-and-error learning." This

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classification is sometimes referred to as selecting and connecting. Thorndike believed that man's learning is primarily the action of the laws of readiness, exercise, and effect. The three circumstances presented in the law of readiness are as follows:

1. When a conduction unit is ready to conduct, conduction by it is satisfying, nothing being done to alter its action.

2. For a conduction unit ready to conduct not to conduct is annoying, and provokes whatever response nature provides in connection with that particular annoying lack.

3. When a conduction unit unready for conduction is forced to conduct, conduction by it is annoying.

Readiness then means a preparation for action. When an action tendency is aroused through preparatory adjustments, sets and attitudes, fulfillment of the tendency to act is satisfying; not to act is annoying.

The law of exercise refers to the strengthening of connections with practice, and the weakening of the connections with disuse. To strengthen the connections means to increase the probability that the response will be made when the situation occurs. The probability may be either a greater likelihood of occurrence if the situation is repeated at once, or an equal likelihood of occurrence after a long period of time.

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2 Ibid., p. 22.
3 Ibid., pp. 24-25.
The law of effect refers to the strengthening or weakening of connections as a result of consequences. When a connection is made and results are satisfying, the connection is strengthened. If a connection is made and is accompanied by annoying state of affairs the connection is weakened.

The theories of Thorndike contain five subsidiary laws, namely, multiple response, set or attitude, prepotency of elements, response by analogy, and associative shifting. Regarding multiple response, Thorndike stated that in order for a response to be rewarded, it must occur. The learner tries many different things by trial and error. When the appropriate behavior is stumbled upon, success then follows, and learning is achieved. If the organism is unable to vary its responses, the proper solution may never be reached.

Thorndike used "set" or attitude to describe the type of responses determined by enduring adjustments characteristic of individuals raised in a given culture. The "set" of the individual determines what the individual will do, and what will satisfy or annoy him. The "set," then, is a determining factor in the level of aspiration possessed by an individual.

By prepotency of elements Thorndike meant that the individual is able to react to individual elements in a

situation. A human individual can choose a single item in a situation and react to it, while neglecting other features of the situation which might confuse a lower animal in a similar situation.  

The fourth principle of learning, according to Thorndike, is that of response by analogy or assimilation. The individual reacts to new situations as he would to a similar situation, or he may respond to some element in the new situation to which he has already acquired a response. Responses can always be explained in the light of old acquisitions and the original tendencies to respond.

Associative shifting is the name applied to the fifth of Thorndike's subsidiary laws, which means that if a response can be kept intact through a series of changes in the stimulating situation it may eventually be given to a completely new stimulus. Thus, a stimulating situation can be changed first by addition, then by subtraction, until no part of the original situation remains. The individual may give any response of which he is capable associated with any situation to which he is sensitive.

Thorndike theorized that transfer of learning depends upon the presence of identical elements in the original learning which it facilitates. The new learning may be

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either substance or procedure. Thorndike stated that learning is always specific, never general. If learning appears to be general it is because the new situations have much of the old situations in them.

According to the theories of Thorndike the learning capacity depends upon the number of bonds and their availability. Repetition of connections results in a negligible increase in strength, unless the connections are rewarded and practice has merit only as it affords a greater opportunity for rewards to act upon connections. Rewards act directly on neighboring connections by strengthening them and punishment has no direct weakening effect on the bonds, but may cause the learner to do something else in seeking rewards. Connections may be strengthened without awareness. Understanding grows out of earlier habits which build a body of appropriate connections. When situations are understood immediately it is because of assimilation. There are enough elements in common with old situations to permit old habits to act acceptably.

Guthrie's theory of learning.--Edwin R. Guthrie's theories are somewhat similar to those of Thorndike. Where Thorndike accepts two kinds of learning, the law of effect, and associative shifting, Guthrie had a conception similar

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10 Ibid., pp. 29-30. 11 Ibid., pp. 46-50.
to associative shifting, the foundation of his belief.

Guthrie stated that, "a combination of stimuli which has accompanied a movement will go on its recurrence tend to be followed by that movement." He further explained that a stimulus pattern gains its full associative strength on the occasion of its first pairing with a response. It appears that any response that the organism can make can become associated with any stimulus to which he has a response. This generalization is somewhat similar to what Thorndike said about associative shifting. Practice assimilates and alienates cues until a whole family of stimulus combinations comes to evoke a whole family of responses which lead to the outcome usually described as successful performance. Since skill represents a group of habits, learning appears to accumulate with repetition, although each individual habit is learned completely in one single repetition.

Motivation affects learning indirectly through what it causes the individual to do. Guthrie regarded "reward" as a secondary principle, not a primary one as in Thorndike's theory. Reward works simply because it removes the individual from the stimulating situation in which the correct response has been made, according to Guthrie. It does not strengthen the correct response, but prevents its weakening because no

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12 Ibid., p. 57.  
13 Ibid., p. 70.
new response can become attached to the cues which lead to the correct response. Regarding punishment, Guthrie stated that the learner does what he did last time as a consequence of punishment.\textsuperscript{14}

Guthrie, like Thorndike, minimized such concepts as "insight."\textsuperscript{15} He tended to emphasize the stupid, mechanical nature of all learning. Such learning with intention and foresight is explained on the basis of conditioned anticipatory or readiness reactions, based upon past experience and therefore not contradictory to association principles. Guthrie takes a position similar to that of Thorndike regarding the transfer of learning. Learning transfers to new situations because of common elements within the old and new situations. Stress is laid on the identity being carried by way of common responses evoked, the stimuli to evoke common conditioned responses. The emphasis upon movement-produced stimuli thus represents Guthrie's supplementation to Thorndike's theories. Because of Guthrie's principle of responses being conditioned to all adventitious adjoining stimuli, he indicated that there was very little transfer of learning. The only way to be sure to get desired behavior in a new situation is to practice in the new situation, according to Guthrie. Therefore, to be able to perform a variety of different situations, the variety

\begin{itemize}
\item \textsuperscript{14} \textit{Ibid.}, p. 71.
\item \textsuperscript{15} \textit{Ibid.}, p. 71.
\end{itemize}
of situations must all be practiced. By contrast with Thorndike, Guthrie is an avowed behaviorist, and he has attempted to clear his theories of subjective terms. For example, he referred to inner speech rather than to thinking.

Hull's theory of learning.--Clark L. Hull, who was greatly impressed by the appearance of the translation of Pavlov's "Conditioned Reflexes," began a series of theoretical and experimental studies which are models of system-making. Hull's theory is strictly one of behaviorism. It is mechanical and avoids reference to consciousness. According to Hull, more contiguous repetition does nothing except to produce a reactive inhibition. All improvement depends upon reinforcement. Hull is in this respect in agreement with Thorndike and opposed to Guthrie. Need-reduction was used by Hull to explain the reinforcing effect of rewards, and it was also used to explain the reinforcing effects of punishment. This it does by making escape from punishment essential if punishment is to be reinforcing. Hull accepts assimilation of punishment to reward and uses need-reduction to explain the reinforcing effects of both reward and punishment. Complicated relationships involving anxiety and expectation are derived from simple principles of reinforcement. Drive is related to learning and

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serves in reinforcement, in terminating habit strength in performance, and providing internal stimuli. Regarding understanding, Hull stated that the individual's own responses furnish stimuli which are the surrogates for ideas. Responses which provide such stimuli are called "pure stimulus acts" because their function is that of furnishing stimuli. These responses are often in the nature of fractional anticipatory goal responses, and the stimuli from them help to produce the habits appropriate to the problematic situation. There are two general principles which depend upon the presence of fractional anticipatory responses and discriminations among the stimuli which these responses arouse, so stated Hull. These are the principle of the goal gradient and the principle of the habit-family hierarchy.

There are two aspects, according to the theories of Hull, concerning stimulus-response situations. These are the equivalence of stimuli and the equivalence of responses. Hull explains equivalence of stimuli either on the basis of generalization or by intermediate reactions. Alternative responses are explained on the basis of the habit-family hierarchy, so that if a favored response fails, another response, lower in the hierarchy, is called forth. All responses in the hierarchy have in the past led to the same goal. Forgetting is postulated by Hull as occurring according to a kind of law

\[18\] \textit{Ibid.}, p. 104.
of disuse. Hull's theories introduce very few new conceptions not found in the theories of Thorndike and Guthrie. His original contribution consists rather in a systematic and quantitative approach to problems.

B. F. Skinner, an avowed behaviorist, has proposed a system of behavior coordinated with animal performance experiments which he invented. Skinner's theories insist upon lawfulness rather than laws in his system, therefore, differences in learning capacities are not of central importance. There is no suggestion that at higher capacity levels the laws are essentially any different. Verbal behavior in man is said to conform to the general principles of operant behavior. Skinner referred to two types of conditioning, namely, type S conditioning, and type R conditioning. Something similar to a simple law of exercise is accepted for type S conditioning, while type R conditioning depends upon repeated reinforcement. The laws of extinction are also laws of exercise, but exercise in this case is the absence of reinforcement. Regarding motivation, Skinner agreed with Thorndike in that reward is believed to increase reflex strength, while punishment has no corresponding weakening influence. Skinner was more complete in the treatment of punishment than Guthrie and Hull. Skinner stated that one effect of punishment is to

19 Ibid., p. 105.  
20 Ibid., p. 105.
create a state called emotion, which reduces the rate of responding without weakening the reflex reserve. He treated drive and emotion as states of the organism, not as stimuli or as responses. Skinner's theories leave the problem of understanding irrelevant. Most behavior which would ordinarily be called voluntary is characterized under the discriminated operant. Skinner used the term induction for what is commonly called generalization in conditioning literature. It is induction that appears to be the basis for the transfer of learning. Skinner has not suggested any special theory of forgetting, although the distinction between extinction and true forgetting is maintained. It appears that both conditioning and extinction are long remembered.

The field psychologists and their theory of learning.— During the first quarter of the century in America the quarrels within academic psychology lay chiefly inside the framework of association psychology. Structuralism, functionalism, and behaviorism were all members of the association family. These inter-family quarrels were disturbed by the new gestalt doctrine which had been developing in Germany since it was first announced by Max Wertheimer in 1912. This new doctrine had an important effect upon the theories of learning in America because of criticism of trial-and-error learning as conceived by Thorndike. This attack came

when Thorndike's theory was at its height of popularity. Gestalt psychology had its start and has achieved its greatest success in the field of perception. When gestalt psychologists later turned to the problems of learning, the equipment brought to the study of learning was that which had succeeded in the field of perception, and the arguments previously used against the sensation were turned against reflex.

The gestalt psychologists find a distorted emphasis in the conventional treatments of learning because they believe learning requires differentiation and reconstruction of fields and the higher forms of learning depend very much upon natural capacities for reacting in these ways. Poor methods of instruction, however, may be responsible for some inability to face new situations. Apparent "blindness" due to poor instruction might be confused with stupidity. Changes go within repetition, but not as a result of repetition. In the gestalt theory, repetitions are considered as successive exposures affording relationships to enter into restructurization. To Koffka, they also make possible the consolation of trace systems. This is probably as near as any gestalt psychologist comes to stating that responses become fixed by repetition. According to the psychologists, goals represent

\[\text{Ibid., p. 177.} \quad \text{Ibid., p. 204.} \quad \text{Ibid., p. 205.}\]
end-situations, and as such modify learning through the principle of closure. The processes leading to the successes or failures get transformed by their consequences. The empirical law of effect is accepted, but Thorndike's interpretation of the blind action of effect is denied. The perceiving of relationships, awareness of the relationships between parts and whole, of means to consequences, are emphasized by gestalt psychologists. Problems are to be solved sensibly, structurally, organically, rather than mechanically, stupidly, or by the running off of prior habits. The gestalt concept most comparable to the transfer of learning is transposition. A pattern of relationships discovered or understood in one situation may be applicable to another. There is something in common between the earlier learning and the situation in which transfer is found, but what exists in common is not identical piece-meal elements, but common patterns, configurations, or relationships. Learning by understanding is transposable to a wider range of situations, and less often leads to erroneous applications of old learning. Forgetting is related to a course of changes in the trace. Traces may disappear either through decay, through assimilation to new traces or processes, or through destruction because of being part of a chaotic or ill-structured field. Traces that continue to exist may at a given time be unavailable. There are instances of forgetting in which a process fails to communicate with an
otherwise available trace. This is an ego problem, and the forgetting of an intention would probably exemplify this.

Kurt Lewin was a member of the German gestalt group, and made special studies of motivation. Only a fraction of his own work and that of his students was devoted to the problems of learning. While most of his formulations are not presented as theories of learning, they are relevant to such theories. According to Lewin, the life space of an adult is more highly differentiated than that of a child. Similarly, the life space of an intelligent person is structured more highly than that of a less intelligent person. There are also differences in fluidity or rigidity, and learning may take place with repetition because the change in cognitive structure or in motivation may require repetition.

There is, however, no exact ratio between the number of trials and the changes which constitute learning. The differences between reward and punishment are represented in topological diagrams which point out the difference in the amount of policing required in the two situations. Lewin believed it preferable to speak about success and failure rather than about reward and punishment. The concepts of ego-involvement and level of aspiration become important. Cognitive structure is activated and changed by aroused needs and tensions. Motivation is of great importance to the theory of Lewin. Because

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25 Ibid., pp. 204-207.  
26 Ibid., p. 209.
one of the chief characterizations of learning is a change in cognitive structure, knowledge and understanding are the center of learning. It appears that the gestalt concept of transposition is acceptable to Lewin. Motivated forgetting is important. The dynamics are rather complicated, with interruption in an ego-involved talk leading usually to better retention and to attempts at resumption when the opportunity affords itself. Lewin accepts something like repression in the forgetting of too difficult tasks.

Raymond H. Wheeler has given more discussion to the problems of learning than any other gestalt psychologist. In keeping with the scientific outlook of gestalt psychologists, Wheeler promotes a new conception of nature. The laws of learning are merely specifications within the laws of dynamics which apply not only within perception, emotion, and the other fields of psychology, but within all of natural science. The laws, according to Wheeler, are briefly stated as follows:

1. The law of field properties. 'A whole is more than the sum of its parts.'

2. The law of derived properties. 'Parts derive their properties from wholes.'

3. The law of determined action. 'The whole determines the activities of its parts.'

27 Ibid., pp. 229-231. 28 Ibid., p. 234.
4. The law of individuation. 'Parts of wholes come into existence through an emergence process called individuation, or structurization, or differentiation.'

5. The law of reciprocal change. 'Parts structured very much alike in the same whole behave in a manner very much unlike one another; whereas, when the parts become specialized in their structure and function they cooperate in the execution of a single act.'

6. The law of least action. 'Units of energy multiplied by units of time, are, for a given set of conditions, a minimum.'

7. The law of maximum work. 'First,... any influence affecting a system of energy affects it throughout....Second, in an energy system a maximum amount of energy, for any given set of conditions, will be expended in the course of maintaining balance.'

8. The law of configuration. 'A system of energy always functions as a unit, and always adjusts itself to a multitude of disturbing influences.'

According to Wheeler, capacities for learning are the result of maturation, but maturation is itself induced by stimulation. Within repetitions there is stimulation to maturation. Once a process is started, it keeps going unless something stops it; therefore, habits persist because of inertia. Growth may take place between repetitions. All learning is goal-seeking, thus, if rewards are to be effective, they must be identified with the goal. Feelings are not to be interpreted as motives; they are symptoms. Thus, pleasure and annoyance should be used as signs as to how the learning process is going, not as a method of promoting

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29 Ibid., p. 240.
learning. All learning is meaningful, insightful. Since insight has an expanding character, insightful learning leads to further insightful learning. Since transfer of learning requires making the same response in a new situation which was made in an older situation, transfer can take place only when the two tasks are so similar that the learner can apprehend them in the same whole, that is, perceive that the responses learned in the first task fit the second. When transfer occurs, it is the whole system conditioning the activities of its parts. Wheeler proposes this principle to oppose the principle of identical elements. Forgetting is described as an active learning process, an effort to continue learning under adverse conditions. This would mean an attempt to learn in the absence of sufficient cues.  

In his sign-gestalt theory Edward C. Tolman has achieved a combination of many trends within systematic psychology. His system of psychology is genuine behaviorism. When he makes reference to consciousness, to inventive ideation, and the like, he is referring to interpretations of observed behavior.

Tolman's theory of sign-learning contends that the learner follows signs to a goal; that he learns his way about. He is learning meanings, not movements. Tolman believes in gradients of learning capacity. He accepts the law of exercise

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30 Ibid., pp. 257-259.  
31 Ibid., pp. 261-262.
in the sense of the frequency with which the sign, the significate, and the behavioral relation between the two have been presented. Exercise is not the cause of the initial selection of the right response. Mere frequency does not establish a connection. After a response has been learned, over-exercise tends to fix it, making it unduly resistant to change. 32

Rewards and punishment tend to regulate performance. The law of effect in its usual sense is not accepted by Tolman. Cognitive processes are the essence of molar behavior and learning; therefore, Tolman accepts learning by creative inference and inventive ideation. Learning is sensible, reasonable adjustments according to the requirement of the situation. Stupid learning occurs as a limiting case when the problem is unsuited to the learner's capacities or is set up in inaccessible form, according to Tolman. Insightful learning is not limited to the primates alone, but may be found in lower animals. 33

Nowhere in the preceding studies of the accepted theories of learning was anything found that is contrary to the use of visual aids, audio aids, or any type of instructional aids. In the study of gestalt psychology reference was made to apparent "blindness" on the part of the learner being due to

32 Ibid., pp. 288-289.
33 Ibid., pp. 288-289.
poor instruction. Gestalt psychologists emphasize the perception of relationships and the awareness of relationships between parts and wholes as essential to learning. According to the gestalt psychologists' teaching, then, must include ways and means of making the relationships between parts and wholes a part of all learning situations.

The use of visual instruction as a teaching aid may be traced back through the educational history of the human race. In primitive times boys were taught to hunt and fish and girls to cook through imitation, observation, and participation, along with spoken explanation. Early records were picture records, and cave men drew pictures to warn and to inform. The Greeks utilized the school journey, the sand as a blackboard, and real objects in their instructional processes. Such famous educational pioneers as Comenius, Rousseau, and Pestalozzi emphasized visual instruction.

John Dewey has been one of the most ardent exponents of the idea that learning will be facilitated if people form the correct mental images. He recognized the image as a great instrument of education and stated that what a child gets out of any subject presented to him is simply the images which he himself forms with regard to it. He believed that if 90 per

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34 Hilgard, op. cit., p. 204.

cent of the energy being directed towards making a child learn certain things were spent in seeing that the child was forming proper images, the work of instruction would be greatly facilitated. Dewey has stated that, "...Much of the time and attention now given to the preparation and presentation of lessons might be more wisely and profitably expended in training the child's power of imagery and in seeing to it that he was continually forming definite, vivid and growing images of the various subjects with which he comes in contact in his experience." 36

Weaver and Bollinger stated that the total effect of the visual aid was the important factor in the teaching situation. They stated that some of the specific ways in which visual aids influence the learner are as follows:

1. They attract and hold attention.
2. The aid retention of information and visual images.
3. They assist in forming correct images.
4. They assist in understanding proper relationships of component parts. 37

There have been numerous experiments in the field of visual instruction in the past quarter century. Daniel C. Knowlton and J. Warren Tilton conducted an experiment with


the use of the "Chronicles of America Photoplays" in Troup Junior High School, New Haven, Connecticut. Ten of the photoplays were used with the experimental group and the results obtained were contrasted with those secured with regular class instruction. Among the more significant results were the following:

1. The ten photoplays made a large contribution to the teaching of an enriched course of study, increasing the pupil's learning by about 19 per cent.

2. This contribution was of such magnitude that average children with the aid of the photoplays learned as much as bright children did without them.

3. The photoplays were most effective in teaching a knowledge of inter-relationships involving the interaction of events and of forces. They increased the pupil's learning of this sort 35 per cent, or about twice as much as they increased the gaining of all kinds of historic knowledge.

4. The next largest increase of learning of this sort attributable to the photoplays was the teaching of historic personages. This increase was 23 per cent.

5. The contribution to the teaching of historical geography was 19 per cent.

6. In the part of the experiment in which there was no review between teaching and re-test for retention, the contribution to retention was greater than, or at least equal to, the contribution to learning. This was the contribution of four photoplays to the teaching of the Revolution. The pupils learned 25 per cent more by the use of the photoplays and remembered 27 per cent more after three months.

7. The contribution to the retention of knowledge of historical relationships other than those of time was greater than the contribution to gaining this knowledge.

38 Dent, op. cit., p. 20.
Of such relationships, pupils learned 35 per cent more, and remembered 43 per cent more.

8. The increase in the total number of pupil participations attributable to the use of the photoplays was 10 per cent. This increase is equivalent to forty-six more participations in a year by each pupil, or about 1600 more in a thirty-five pupil section.

9. Seeing the photoplays caused the pupils to read voluntarily more supplementary history material under controlled classroom conditions. 39

It appears from the opinions and information presented concerning visual-aids, that the use of visual aids greatly contributes to the learning process. Television is one of the newest of the audio-visual aids to teaching, and it combines all of the advantages of the sound motion picture with the added aspect of reality.

The Compatibility of Television with the Objectives of General Education

The Harvard Committee that was concerned with the objectives of general education defined the term "general education" as "that part of a student's whole education which looks first of all to his life as a responsible human being and citizen." 40 The committee also stated that "general education is distinguished from special education, not by subject matter, but in terms of method and outlook, no matter what the field." 41

41 Ibid., p. 56.
B. Lamar Johnson defined general education as follows:

1. General education is intended for everyone—not merely for the select few who become scholars or who enter the professions. No longer will preparation for college entrance dominate the curriculum of the high school which is committed to the objectives of general education. The program of such a school will be planned to meet the varied needs of all young people of the community which it serves.

2. General education is concerned with the total personality—not merely with the intellect, but with emotions, habits, attitudes. General education regards the student as a single unified being rather than a compartment of knowledge, one of feelings and another of beliefs. This means that specific general education programs must be defined in terms of what the learner is, or does, rather than in terms of course content or a body of knowledge.

3. General education is concerned primarily with the individual's non-specialized activities. It consists of preparation for efficient living, no matter what one's vocation. This does not at all imply a lack of concern for vocational training. Since two of the responsibilities of every person are a contribution to society and earning of his own living, general education should include the choosing of a vocation in relation to both one's own aptitudes and interests and to the needs of society.

Wilber defined general education in terms of its implied basic purposes which he stated are as follows:

1. To transmit a way of life
2. To improve and reconstruct that way of life
3. To meet the needs of individuals.

Although briefly stated, it appears that Wilber's definition of general education is in agreement with the definition given by B. Lamar Johnson.

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43Gordon O. Wilber, Industrial Arts in General Education, p. 3.
From a study of the definitions of various authors and committees regarding general education it appears that there is agreement as to the nature of general education. The opinion of several authors and committees regarding the objectives of general education will be listed in order to select a representative group of objectives for the purpose of determining television's compatibility with these objectives.

In 1861, Herbert Spencer classified human activities as the basis for grouping educational objectives. The five major areas of human endeavor were listed by Spencer as follows:

1. Self-preservation
2. Securing the necessities of life
3. Rearing and discipline of offspring
4. Maintenance of proper social and political relations
5. Activities which make the leisure part of life, devoted to the gratification of the tastes and feelings.

For many years these objectives were accepted by teachers and programs of education.

In 1890, the Committee of Ten outlined the aims and principles for education. They are as follows:

1. Worthy home membership
2. Command of fundamental processes
3. Health
4. Vocation
5. Citizenship

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Herbert Spencer, *Education*, p. 32.
6. Worthy use of leisure time
7. Ethical character. 45

In 1933, the North Central Association of Colleges and Secondary Schools listed the following as the objectives of education:

1. To maintain health and physical fitness
2. Exploration of vocations and vocational efficiency
3. Successful social relationships, civic, domestic, community
4. Right use of leisure. 46

The preceding objectives appear to be in agreement with the objectives listed by the Committee of Ten.

The following objectives of education were formulated in 1937, by Harl Douglass for the American Youth Commission:

1. Citizenship in local, national, world-wide civic, recreational, economic, and religious groups
2. Home membership--domestic compatibility, rearing of children, purchasing and consumption of goods and services
3. Enjoyment of life--recreational and other leisure occupations, appreciation and enjoyment of environment in general
4. Physical and mental health--sound physical and mental conditions and healthy personality
5. Vocational effectiveness--ability to contribute to the economic assets of society and to market contributions
6. Continued learning--interests and abilities to read, to think, and to study most effectively. 47

47 Harl R. Douglass, op. cit., p. 31.
In 1938, the Educational Policies Commission listed the following as the objectives of education:

1. Self-realization
2. Human relationship
3. Economic efficiency
4. Civic responsibilities

The objectives of education may be grouped according to the needs of all youth. From the report of the Educational Policies Commission of the National Education Association, published in 1944, it is evident that youth have certain specific needs in common, and that society makes certain demands of all youth. The Educational Policies Commission grouped these into what is known as the imperative educational needs of all youth. They are as follows:

1. All youth need to develop salable skills and those understandings and attitudes that make the worker an intelligent and productive participant in life. To this end, most need supervised work experience as well as education in the skills and knowledge of their occupations.

2. All youth need to develop and maintain good health and physical fitness.

3. All youth need to understand the rights and duties of the citizen of a democratic society, and to be diligent and competent in the performance of their obligations as members of the community and citizens of the state and nation.

4. All youth need to understand the significance of the family for the individual and society, and the conditions conducive to successful family life.

5. All youth need to know how to purchase and use goods and services intelligently, understanding both the values received by the consumer and the economic consequences of their acts.

48 Educational Policies Commission, The Purpose of Education in American Democracy, p. 47.
6. All youth need to understand the methods of science, the influence of science on human life, and the main scientific facts concerning the nature of the world and of man.

7. All youth need opportunities to develop their capacities to appreciate beauty in literature, art, music, and nature.

8. All youth need to be able to use their leisure time well and budget it wisely, balancing activities that yield satisfaction to the individual with those that are socially useful.

9. All youth need to develop respect for other persons, to grow in their insight into ethical values and principles, and to be able to live and work cooperatively with others.

10. All youth need to grow in their ability to think rationally, to express their thoughts clearly, and to read and listen with understanding. \(^{49}\)

From the foregoing opinions of authors and committees the following objectives of general education which are representative of all of the groups of objectives heretofore listed have been set up for the purpose of this study:

1. Physical and mental health
2. Citizenship
3. Proper use of leisure time
4. Vocational exploration
5. Consumer knowledge
6. Social relationships
7. Continued learning.

Television is both an instructional aid and a source of information for learning. Dale stated that television is one

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of the strongest influences in education today. He further stated, "Television is personal, concrete, real." Levenson and Stasheff stated that television's compatibility with the objectives of general education is evidenced by television's present contributions to education.

In the area of physical and mental health, the use of television has been demonstrated by Station WPIX-TV, New York City. In September, 1949, the City of New York found itself facing a growing incidence of infantile paralysis. All media, from placards on telephone poles to newsreels were mobilized to alert the public to the menace and yet to avoid panic. A series of programs on WPIX-TV stressed simple rules of cleanliness, but reassured viewers by showing the latest polio therapy, and reminded them that immediate treatment might well prevent lasting effects of the disease. In December of the same year, WPIX-TV contributed to the areas of health and citizenship during an acute water shortage. WPIX-TV camera men made a special documentary film showing close-up aerial views of the depleted reservoirs, and brief object lessons of tightening water taps, simpler methods of dish-washing, health habits, and other aids to conserve community resources. The personnel of the University of

50 William B. Levenson and Edward Stasheff, Teaching Through Radio and Television, p. 5.

51 Ibid., p. 5.
Southern California prepared and presented an effective series of health programs through the facilities of Station KFI-TV, Los Angeles, California. Health topics were made entertaining on such telecasts as "Hygiene Can Be Fun," "Exercise for Adults," "Care for the Mouth and Gums," "Effects of Drugs on the Heart," "Food Antibiotics," "Soap," "Safety—Holiday Traffic," "Shoes," "Why Medical Education Costs so Much," and several on "Therapy for the Polio Convalescent," which included iron-lung demonstrations. Also, in the field of health, Station WPBR of Baltimore, Maryland, telecast "Keeping Well," a program of reliable content presented in a framework of enjoyable drama.

Television can be utilized as: a vast source of information in the teaching of citizenship; an aid in the development of a well-rounded and socially adjusted personality which is an attribute of good citizenship; a source of information concerning community government and community affairs; an aid in building the store of personal values that can contribute to family, community, and country. Television can afford the pupil a front seat at sessions of the United Nations and provide a window to view the happenings in Congress and transport the viewer to other communities, however distant, for the purpose of seeing events or divergent ways of life. Through the viewing of forums for the discussion of community

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Ibid., p. 12.
affairs, pupils acquire a sense of participation that contributes to the acceptance of the responsibilities of citizenship. 53

Television itself is a medium of entertainment for leisure viewing. It can afford an inexpensive but instructive means of utilizing free hours and provide information regarding other leisure activities. 54 Levenson and Stasheff stated that the attractiveness of television for leisure viewing was indicated by the fact that studies show that school children who have television in their homes spend an average of two hours more per week viewing television than they spend in school. 55

Television can be used as a timely aid in the field of vocational exploration. Vocational guidance can have but limited value if it is not closely related to the changing needs of the community and the current demands of industry. It is often difficult for teachers who are somewhat removed from industrial activity to keep informed of continuous changes. Here television can be used to good effect. Television programs can present interviews with personnel managers and employment counselors as well as with men on the job. Station KOTV, Tulsa, Oklahoma, telecasts a program

53 John Homsy, personal interview.
54 Marion E. Apple, personal interview.
55 Levenson and Stasheff, op. cit., p. 6.
called "Career Opportunities," which is designed to help young people find their proper niches in business, industry, trades, service, or the professions.56

Television can be used as a means of increasing consumer knowledge. It can bring to the viewer the many different products of industry and in this manner consumer education can be achieved in a more realistic fashion. In some high schools commercial programs are designed for the purpose of presenting new products and the values of the products offered or described are discussed in classes the following day. 57

Television can be a useful aid in the development of proper attitudes in social relationships and responsibilities. In one particular program school pupils and a guest expert discuss manners and social problems on "How's Your Social I.Q.?" This program is telecast alternately by commercial television stations located in Philadelphia, Pennsylvania. Short dramatic sequences depict the right and wrong procedures in a restaurant, on the dance floor, at a concert, and in making introductions. Commercial television has demonstrated dramatically the possibilities of television's use as means of teaching social studies by presentation of programs discussing personal, community, national and international

57 Jennie Waugh Callahan, Television in School, College, and Community, p. 141.
social problems. The telecasting of the Kefauver investigations held vast social significance.

Television can be a means for continued learning. It can bring training into the home to people who wish to improve their skills and earning power; it can provide forums for the discussion of community affairs that are self-improving; and it can offer formal courses leading to high school and college credits and degrees. Syracuse University, Syracuse, New York, offers graduate-level college courses leading to a master’s degree through the facilities of Station WSyr-TV. The University of California, Berkeley, California, allows credit for televised college courses. The University of Houston, Houston, Texas, offers many televised courses for college credit.

In this study, nothing was found to indicate that television is incompatible with the accepted objectives of education. It was found, however, that television is compatible with the accepted educational objectives presented in this study, and that television is presently being used to a certain extent in the meeting of these objectives.

58 Ibid., p. 149.


61 Ibid., pp. 34-35.
The Advantages Afforded Education by Television

Television broadcasts appear to be very timely. Television presents and interprets events while they are still current and before they become history, whereas, textbooks and even weekly magazines cannot do that. When pupils can listen to and view selected news telecasts and discussions of important issues, they become increasingly aware of the many complex problems they will meet as citizens. Timeliness is considered an essential in programs of education. Vocational guidance is limited in value if it is not closely related to the changing needs of the community and the current demands of industry. In fostering a spirit of national unity, in launching various community drives, in alerting citizens to a great variety of emergencies from polio epidemics to impending floods, the timeliness of television enables it to make significant contributions to the education of youth enrolled in the schools of America.

Television conquers space. Air travel has changed and is still changing former concepts of geography and brings all parts of the world within sixty hours of one's home. Television is the communication equivalent of air travel, and presents the classroom with opportunities to view the world.

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63 Ibid., p. 8.
It provides a means of bringing to the classroom many different areas of opinion and culture. Television affords a means of bringing the world's diverse locations, the different races of people, and events to the pupil for study and observation.

Television can give pupils a sense of participation. It affords the pupil a source of direct experiences because when a child views the opening of Congress he has a sense of participation in the event, and history as such becomes a living experience to him. Television's presentation of such events as party conventions, the dedication of the United Nations, the President's inauguration, and the explosion of atom bombs create a sense of being present when history is being made. The sound and sight values of television coupled with actuality afford the pupil a greater sense of participation than can be achieved through either radio or motion pictures.

Television can be used in the creation of desirable attitudes. Not only in safety and health, but in the whole process of democratic living, attitudes, not facts, are paramount in the vital matter of promoting harmonious interracial relations. (DuBois made the following statement:

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64Ibid., p. 9.
65Statement by John Henry, personal interview.
66Levenson and Stasheff, op. cit., p. 10.
67Ibid., p. 10.
When working in the area of racial and cultural conflicts one should remember that people do not change their attitudes about other groups of people by merely acquiring facts. People do not act according to what they know but according to how they feel about what they know. 68

The conveyance of information is a comparatively simple phase of teaching, but far more difficult, is the development of desirable attitudes. Even in the days before Goebbels, psychologists knew that attitudes did not result from reasoning alone. Emotional drives have a powerful influence. Here is where television can be of a great help to the teacher, for television uses both drama and music which are two important forces in the creation of emotional impact. The crucial matter of race relations was treated in a compelling fashion by Station WHAG, Chicago, Illinois, with a series of programs called "Destination Freedom." Station KNJ of Los Angeles, California, delivered a powerful message on behalf of safety with a program called "And Sudden Death." 69

Television can add authority. Few teachers, however conscientious they may be, can hope to be experts in every phase of the subject matter they teach. The mass of available information is constantly multiplying. The search for the best sources and the lack of time make it difficult for the already burdened classroom teacher to exploit all the possibilities. Here, the services of television can be

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can be enlisted. The occasional appearance of an authority whose material is planned to relate to the interest, needs, and capacities of pupils can be of invaluable assistance to the teacher. As the leaders of contemporary life deliver their political, scientific, industrial, and educational messages, they become members of the teaching staff. Darrow stated that by using television one can "substitute first-hand enthusiasm and mastery for second-hand interest and half-digested information." 70

Television can correlate the learners' experiences. The correlation of the child's activities in school with those he undergoes after school has become increasingly difficult. Another aspect of correlation which the teacher faces is the coordination of the knowledge obtained in various classrooms. The meanings acquired in the mathematics class relate to those of the physics laboratory. Music and art are based on fundamental principles common to both. Geography, history, and economics are likewise interrelated and the same can be said of practically all subjects. The synthesis of newly acquired meanings is an essential step in the learning process and yet it is at that point where much of the classroom teaching is ineffective. Many reasons, such as the pressure of time, a narrow course of study, and the teacher's specialization are given as reasons for the lack of correlating the

many learning activities, and the fact remains that the "wholeness" of knowledge is seldom achieved. In this respect television can be of help. The University of Wisconsin series of programs entitled "Let's Draw," has, for several years, demonstrated how a skilful teacher can use one art form to motivate creation in another field. A series of programs called "Let the Artist Speak," and presented by Station WBEZ, pointed out the effects of life in Latin America upon resultant art forms. Many other programs of this nature have shown how television can contribute to a mass of information that the child may consider as unrelated knowledge.

Television can challenge dogmatic teaching. Passive learning and dogmatic teaching are accepted as common in many classrooms. Very few children will question the wisdom of the teacher's point of view, evaluate the presence of bias in a textbook, and analyze the prevailing beliefs in his community. When the child views a television program in which a belief which he has hitherto accepted is questioned by authorities who provide supporting evidence to the contrary, he then learns the real meaning of suspended judgment. When the child views a forum program in which even the experts disagree, he comes to understand that at times it is hard to arrive at the real truth.

\[ \text{Ibid.}, \text{pp. 12-13.} \quad \text{Ibid.}, \text{pp. 13-14.} \]
Television can aid in the development of discrimination. The development of good taste and the ability to make intelligent choices are important aspects in the education of children. These aspects of the child's growth are vital, but unfortunately as educational aims, they have been slighted in many schools. Dale observed that people can be divided roughly into two groups, namely, the sponge-minded and the critically-minded. The people referred to as sponge-minded absorb with equal gullibility what they see at the movies, what they read in the newspapers, and what they hear over the radio. These people are fair game for advertisers and spend millions of dollars each year for patented medicines and useless devices. The critically-minded people are active, not passive, in their reception of the printed and spoken word or the motion picture. They hunt out hidden assumptions, unwarranted inferences, and false analogies. It has been demonstrated by Favcette, Biddle, and others that with continued selective exposure and follow-up analysis it is possible to shift students from the passive group to the active group. Skillful teachers can use television to attain such goals. By first determining the present tastes of their pupils, then by evaluating with them the program elements that make for

74 Ibid., p. 16.  
75 Ibid., p. 16.
quality, and finally by suggesting superior programs for home viewing, teachers can help students to become selective in their viewing and critical of what they hear and see. In the not too distant past good music and drama could be had only in the big cities. Today the children of farmers and others residing many miles from cultural centers can hear and see the best of the fine arts by the use of television.

Television can be used in continuous curriculum revision. No worthwhile curriculum can remain static while a changing society makes new demands upon its members. Constant and continuous curriculum revision is an accepted ideal in modern education, but its attainment is quite another matter. Inertia is sometimes great and, too, change is not always welcomed. Committees which have labored conscientiously in revising courses of study often find that months after the materials have been prepared and issued, the classroom practices in some schools remain unchanged. Sometimes lack of acceptance of curriculum revisions are the result of the teacher's attitude toward change. It has been found that, by the use of television and adequate teacher guides, curricular revision can be attained. As the teacher and

76 Ibid., pp. 15-16. 77 Ibid., p. 16. 78 Ibid., p. 16.
the class view and utilize programs which introduce new topics or change the emphasis placed upon old material, curriculum revision means something to them. In evaluating the programs, she and her colleagues contribute democratically to this reorganization. Music's place in the curriculum was the topic of a series telecast by the Alabama State College for Women. The story of transportation was presented to intermediate grades by Station WTD, Toledo, Ohio. In Newark, New Jersey, the director of elementary education for the public schools used Station WBGO to present the new arithmetic curriculum to 1500 teachers. 79

Television can be used to help up-grade teaching skills. Television can be used to provide in-service teacher training. Every well selected educational program affects the teacher indirectly, and thus contributes to her growth and teaching proficiency. Several school television programs have recreated classroom situations in an attempt to present subject matter attractively and to show the community what is going on in the schools. While a class conducted before the cameras is scarcely typical, nevertheless the techniques of a really expert teacher can be shared with other colleagues in this way. Columbia University's Teachers College has installed television receivers in special viewing rooms, chiefly to keep interested students abreast of video developments. Such

79 Ibid., p. 17.
a set-up, however, could be used for observation of superior teaching. Although television as a teacher preparation medium has not been used on a large scale, its contributions have already proved effective.

Television can be used to interpret the schools to the community. Advertisers know that television sells merchandise and can and does publicize institutional services as well. In the past, some educators generally have been reluctant to engage in public relations activities, but that point of view is changing. The need for acquainting the citizen with the school product he is receiving for his tax dollar is greater than ever before, and the public wants to be shown what the modern schools are accomplishing and why heavy tax support is necessary. The schools have an obligation to provide the answer to such problems, and in doing so television can be a worthwhile medium. Station WBBZ, Chicago, Illinois, presents its program, "A View to Education," which provides a cross section of educational activities on all levels and in many subject matter areas.

Television can be of service to handicapped children. In every community there are shut-in children who because of illness or injury cannot attend school. For them, a television program is both interesting and informative and can be of

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80 Ibid., p. 18. 81 Ibid., p. 19.
immense value educationally and perhaps therapeutically as well. A survey of 500 homebound high school students in New York City revealed that 82 per cent had television sets in their homes. As a result, Station WPIX, through cooperation with the school system, presented a series of programs called "The Living Blackboard." Shortly afterward, communities in both New Jersey and Connecticut began using teledcasts for their homebound pupils.*

Television can be used to teach skills. Television's great advantage has been emphasized by Franklin Dunham of the United States Office of Education. He stated as follows: "Television has a greater potentiality for education than it has for entertainment. In its very essence it can do what we have long hoped we could accomplish with radio--it can teach skills." This factor has been utilized in adult education and in several commercial programs. Surgical operations, sometimes in color, have been scanned by a camera immediately over the operating table. Thus, the operations have been seen by groups of doctors in viewing rooms far more clearly and in greater detail than the same operations could be seen in the front row of the operating room. On one occasion, such an operation was televised on a special circuit to a large audience of physicians who were gathered in a

*Ibid., p. 21.
convention hall. Two years later, an operation was seen by
doctors from coast to coast through the use of coaxial cable
and microwave relay. Commercial programs dealing with cook-
ing, interior decorating, dress-making, and knitting have
proved quite popular. The carving of the family turkey is
a perennial Thanksgiving Day telecast on many television
stations in many cities. Jon Gnagy's program, "You
Are an Artist," was one of the first how-to-do-it programs
to win general acceptance, as well as one of the first to
combine instruction in the principles of art and art appreci-
ation with actual practice in pencil sketching. Such pro-
grms have served to demonstrate television's use to teach
skills, and to do so to millions of people simultaneously."

Ways and Means of Using Television in
Programs of Education

There are a number of ways by which educators can be
afforded the use of television facilities for educational
purposes. One such way is school ownership of an educational
television station. The Federal Communications Commission
has reserved 242 locally assignable frequencies for educa-
tional television stations. Construction permits are

83
Ibid., pp. 21-22.

84
Federal Security Agency Bulletin, No. 16, Television
in Our Schools, 1952, pp. 4-7.
presently being issued, and two such stations are already on the air.

Station KUHF, Houston, Texas, was the nation's first educational television station. Its first program tests started on May 25, 1953, and it was formally dedicated on June 8, 1953, with Federal Communications Commissioner Frieda Hennock delivering the principal address. Station KUHF has extended its program schedule to forty hours per week at present. The station is licensed to the University of Houston and the Houston Independent School District. The University of Houston has been designated as the operating agent for the station and John C. Schwarzwalder has been named general manager. Station KUHF operates on VHF channel eight, has a video power of 15,000 watts, and its service area includes an area whose population is over 1,000,000 persons. The approximate cost of getting on the air was $325,000, of which nearly all was spent on equipment. The University of Houston had a very complete radio station, Station KUHF-FM, and some of the radio facilities were remodeled in order to serve the new television station. All of the funds for the station and all of the funds for the operation of the station are furnished from the operating

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funds of the University of Houston with the exception of a $10,000 contribution by the Emerson Radio Company.

The personnel of station KUHT believes that the programs should follow three general patterns. One of the purposes of the station is the presentation of formal instruction showing the University's complete instructional program and its relationship to the community needs and interests. It is believed that if some 15,000 students come to the campus of the University for this instruction that at least 100,000 persons who can not, or will not come to the campus might also be interested in formal instruction.

Also, the personnel of Station KUHT believes that the community desires access to the complete cultural resources of the University. These cultural resources include musical programs, classical drama, discussions of public affairs by noted authorities, forums on international problems, news service, and programs devoted to fine arts and the humanities. Finally, the personnel of Station KUHT believes that it can be useful to the university and to the community as a public relations medium, especially in the furtherance of the work of philanthropic and charitable organizations.

86 University of Houston, KUHT, p. 1.

87 Ibid., p. 5.
There are twenty-eight persons on the payroll of Station KUHT, nine of whom are part-time employees. Of the full-time employees, all but eight teach one or more classes in the radio and television department. This serves a double purpose in correlating the work of the station with teaching in the radio-television department and also providing students in the department with first-class professional instruction. Station personnel includes a manager, four producer-directors, one chief engineer, six engineers, one traffic manager, one art director, one film director, two writers, two secretaries, and nine assistants. A great amount of volunteer work is performed by students in the department.

The most successful programs telecast by Station KUHT thus far have been "Beginning Psychology" and the "University Forum" -- a program devoted exclusively to international affairs, and making use of members of the university's staff and any foreign diplomats in the area. Such controversial subjects have aroused wide interest and a very considerable response. The least effective programs have been reported as those in which an attempt was made to use the formats of commercial television. The personnel of the university is convinced that its financial resources do not permit

Ibid., pp. 5-6.
it to compete with commercial television, and they further believe that this is not the function of educational television.

Another way that programs of education can be afforded use of television is by the closed-circuit system. By this system is meant the operation of a complete television station by a school system but utilizing wire as the medium of transmission rather than transmitting the programs through space. Since no radiation occurs, licensing of the station is not required. Programs may be telecast to different rooms or to different buildings as may be desired. All of these programs may be preserved by adding to the closed-circuit equipment a kinescope recorder and a processor. In this way the programs become sixteen millimeter films. The closed-circuit plan has been proved as an ideal one for teacher preparation institutions by Kansas State College, Manhattan, Kansas. It has also been proved as an excellent medium for the teaching of medicine in color by the University of Kansas, Lawrence, Kansas. The State of Wisconsin chose to start its television activity with twelve channels occupied by closed-circuit stations. One such station is located at the University of Wisconsin in Madison, Wisconsin.

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89 Ibid., p. 6.  
90 Ibid., p. 6.  
Television can be made available for use in programs of education by school ownership of a commercial television station. The Iowa State College at Ames, Iowa, owns and operates Station WOI-TV, a commercial station, and the only station operated by an educational institution during the "freeze" on new television stations. This station has developed educational programs in the areas of home economics, agriculture, safety education, and information of general interest to the school and non-school population of central Iowa. This station has selected the best educational programs from all four of the commercial networks to supplement live and film programs which originate with the station. One important type of program used by Station WOI-TV consisted of public forums originating in local communities. Some of these forums were hour-long programs of school board and community meetings where controversial questions, such as district consolidation, were discussed and debated. These non-fictional programs involving direct reporting were presented without professional actors and created considerable interest. Another series of programs consisted of film reports from the state institutions of Iowa, including hospitals and correctional institutions.

The personnel of Station WOI-TV have taken advantage of an unique opportunity to render public service and to experiment with educational type programs with the aid of
community and educational groups. This station has also performed a great service in making its facilities available to the Joint Committee on Educational Television and the National Association of Educational Broadcasters for a training workshop for educational television personnel from all parts of the country. This workshop gave participants valuable first-hand experience in the program and management aspects of educational television. Homsy stated that future ownership of commercial television stations by educational groups will be difficult to achieve because of the fact that competition from commercial groups will be intense and since channels have been made available to educational groups for non-commercial stations.

Programs of education can be afforded the use of television facilities through cooperation with the licensees of commercial television stations. In some instances the educational group purchases television time at the regular commercial rate or at a reduced educational rate. In other instances the licensees of television stations donate program time to educational groups for educational programming. The State University of Iowa at Iowa City, Iowa, conducted a


93 John Homsy, personal interview.
project in educational television over a commercial television station located in Davenport, Iowa. This was a panel presentation which created a great deal of interest. The cost was approximately $50.00 per half-hour when most of the work was performed by unpaid students and faculty personnel.

Western Reserve University, Cleveland, Ohio, presents courses over television Station WEWS on the subjects of "Economics of American Enterprises" and "Introduction to Music." College credit is given in these courses by examination at the end of the course. The television scholar must come to the university to take the examinations. Those taking the course for credit pay a $5.00 registration fee, $4.00 to $8.00 for textbooks and $48.00 for tuition. These students who receive college credit are privileged to have their questions answered by mail. The group which does not receive credit may also pay the registration fee and get the syllabus for the course. A very large group merely televiiew the course with no formal enrollment. Station WEWS donates the time for this program at a calculated value of $1,162 per week. The university pays the cost of putting the programs on. The university obtained a $2,700 guarantee from industries which it has never had to use because of the

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\(^9\) Joint Committee of the U.S. Office of Education and the Radio-Television Manufacturers Association, op. cit., p. 34.
large enrollment. One of the greatest gains reported was the vast improvement in the teachers' technique after they had appeared on television.

The University of California at Berkeley, California, and the University of Michigan at Ann Arbor, Michigan, offer courses carrying college credit through cooperation with commercial television stations. Syracuse University, Syracuse, New York, has owned and operated its own completely equipped television studio since April, 1950, releasing university sponsored programs over the transmitting facilities of Station WSYR-TV. In September, 1950, the university inaugurated its graduate training program in television, which provides a "professional fifth year" to college graduates wishing intensive practical training in all phases of television, and which leads to the Degree of Master of Science in Radio-Television. The Syracuse University Radio and Television Center has two functions with regard to television, namely, the preparation and telecasting of superior educational programs, and the training of graduate students in professional television. In its two and a half years on the air, Syracuse University has originated over 2,000 live programs from its studios, of which number approximately one third have been university-produced educational programs, primarily in the field of adult education. The remainder have been a regular schedule of commercial programs produced by Station WSYR-TV,
which leases the university's facilities for that purpose. The graduate television students at the Radio-Television Center form the entire operating crew for all of these programs, both educational and commercial. 95

R. C. Stinson, supervisor of television station WBAP-TV, Fort Worth, Texas, stated that television stations are definitely interested in acquiring programs of an educational nature for telecasting. He stated further that although Station WBAP-TV makes no charges to educational groups, there have been very few applicants for free time. Some city schools and colleges have produced programs on a very limited scale for presentation over the television station's facilities. 96

Roy M. Flynn, manager of Station KRLD-TV, Dallas Texas, also stated that his station is anxious to cooperate with all educational groups in the preparation of, and presentation of educational programs. He stated that in his opinion, non-commercial educational television stations are far too expensive in both equipment and in operation for most educational institutions to own and operate. Flynn further stated that the lack of educational programs on his station is caused by the inability of the schools and educational groups to prepare such programs. He stated that this condition is due primarily to inexperienced teaching personnel and also to

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95 Ibid., p. 35.

96 R. C. Stinson, personal interview.
the lack of time on the part of teachers who are already over-burdened with school work. 97

It appears that maximum use can be made of television as an instructional aid by school ownership of television stations, but such ownership is quite expensive. Also, commercial station ownership is not probable. The most logical use of television by programs of education is by the closed-circuit system or by cooperation with existing commercial stations.

97 Roy M. Flynn, personal interview.
CHAPTER IV

THE USE OF TELEVISION AS AN INSTRUCTIONAL AID IN THE TEACHING OF INDUSTRIAL ARTS

In order to determine the compatibility of television with programs of industrial arts, it was necessary to first determine what the objectives of industrial arts are. No single rule can be applied concerning the specific objectives of industrial arts any more than can be applied to any other subject, because individual situations are not the same. Each teacher and each school community must develop specific objectives to fit the individual situation. It is the purpose of this chapter, however, to give the opinions of authorities in the field of industrial arts in order that a representative set of objectives may be selected.

Objectives of Industrial Arts

Selvidge, a member of the Manual Arts Conference Committee, referred to the objectives of industrial arts as ideals or standards which the teacher should strive to attain. The group of objectives that the committee agreed should be the basic objectives of industrial arts are as follows:

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1. To develop an active interest in industrial life and in methods of production and distribution.
2. To develop the ability to select, care for, and use properly the things he buys and uses.
3. To develop an appreciation of good workmanship and design.
4. To develop an attitude of pride or interest in his ability to do useful things.
5. To develop in each pupil a feeling of self-reliance and confidence in his ability to deal with people and to care for himself in an unusual and unfamiliar situation.
6. To develop that habit of an orderly method of procedure in the performing of any task.
7. To develop the habit of self-discipline which requires one to do a thing when it should be done, whether it is a pleasant task or not.
8. To develop the habit of careful, thoughtful work without loitering or wasting time.
9. To develop an attitude of readiness to assist others when they need help and to join in group undertakings.
10. To develop a thoughtful attitude in the matter of making things easy and pleasant for others.
11. To develop a knowledge and understanding of mechanical drawing, the interpretation of the conventions used in drawings and working diagrams, and the ability to express his ideas by means of drawings.
12. To develop elementary skills in the use of the more common tools and machines, and a knowledge of the methods of procedures, in tasks frequently encountered by the average man, together with a knowledge of the working qualities and characteristics of some of our most used materials.

Richardson accepted the aforementioned objectives of industrial arts, but added one more, as follows: "To develop the ability to use the mathematics required in various trades."

2 Ibid., pp. 33-34.

3 Charles F. Richardson, "A Reinterpretation of Industrial Arts Objectives," Industrial Arts and Vocational Education, XXXIII (February, 1944), pp. 55-56.
In stating the objectives of industrial arts as a phase of general education, Wilber formulated eight objectives which are as follows:

1. To explore industry and American industrial civilization in terms of its organization, raw materials, processes, operations, products and occupations

2. To develop recreational and avocational activities in the area of construction work

3. To increase an appreciation for good craftsmanship and design, both in the products of modern industry and in the artificrafts from the material cultures of the past

4. To increase consumer knowledge to the point where students can select, buy, use, and maintain the products of industry intelligently

5. To provide information about, and insofar as possible, experience in, the basic processes of many industries, in order that students may be more competent to choose a future vocation

6. To encourage creative expressions in terms of industrial materials

7. To develop desirable social relationships, such as cooperation, tolerance, leadership and fellowship, and tact

8. To develop a certain amount of skill in number of basic industrial processes.

Hippka has listed the following group as the objectives of industrial arts in 1942. They are as follows:

1. To provide opportunities for the development of fundamental shop skills and appreciations which will serve as a basis for further vocational training and advancement.

2. To acquaint youth with conditions in industry both from the standpoint of the employer and the employee in order that they may appreciate and better understand their problems

3. To familiarize the students with the products of industry in order that they may be more intelligent consumers

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4. To provide opportunity for purposeful exploration and experimentation, especially in the junior high level in order that the boy may further discover his aptitudes and interests

5. To develop intelligent fellowship as well as leadership through various shop activities, including the shop personnel organization plan

6. To promote proper habits of safety and health, particularly as they relate to shop activities and conditions

7. To articulate industrial arts with mathematics, science, design and other school subjects, especially from the standpoint of application in order that it may be a vital part of the student's general education

8. To provide opportunities for growth where the learning and the skills required are commensurate with the capacity of the student and where he really experiences the satisfaction that comes from success and the completion of a worthwhile task

9. To provide opportunities for the development of desirable habits for thinking through learning, analysis, planning, application, and performance in the shop

10. To help develop well-rounded individuals capable of using their hands and their heads whether it be in the pursuit of wholesome leisure-time activities, or in the more serious business of earning a living. 5

Newkirk and Johnson stated that the objectives of industrial arts were as follows:

1. Develop ability to plan and complete projects, use a variety of tools and construction materials in a workmanlike manner

2. Give experience that will increase understanding of modern industry and that will lay the foundation for and help determine vocational interests

3. Develop the ability to read and make working drawings, charts, and graphs

4. Develop the ability to recognize quality and design in the products of industry

5. Develop the ability to maintain and service in a safe and efficient manner the common products of industry

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6. Provide an objective medium for expression in mathematics, science, language, art, and social science
7. Develop an interest in crafts as a valuable medium for creative expression in leisure time
8. Give experience that will develop social understanding and the ability to work effectively with others either as a leader, or as a member of the group.

In the preceding paragraphs the opinions of a number of authors and committees concerning the objectives of industrial arts have been presented. The following group of objectives, common to most of the aforementioned groups of objectives, and representative of all of the groups, have been selected for the purpose of this study:

1. To develop an interest toward industry and in the methods of production and distribution
2. To develop skills in the use of a number of common tools and machines used in industry and in the household
3. To develop an appreciation for, and respect for labor, good workmanship, and design
4. To develop good safety and health habits in relation to shop conditions and activities
5. To develop consumer knowledge in order that the student can select, buy, use, and maintain the products of industry more intelligently
6. To provide information concerning the various industrial occupations in order that the student may more intelligently choose a vocation
7. To develop a careful, thoughtful, and purposeful procedure in performing any task
8. To develop desirable social relationships such as cooperation, fellowship, leadership, and tact
9. To develop an interest in industrial arts as an area for recreational and avocational activities

It appears that there is little or no disagreement between the various authors considered in this study.

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concerning the objectives of industrial arts. Although the objectives listed by each of the authors as heretofore presented are stated differently in most cases, and in some cases they may be considered as overlapping, it appears that the group of objectives selected for the purpose of this study is in general agreement with the meanings expressed in all of the groups.

Ways and Means of Using Television in the Teaching of Industrial Arts

Industrial arts is that phase of general education that concerns itself with the materials, processes, and products of manufacturing, and with the contributions of those engaged in industry. It was shown in Chapter III that television as an audio-visual aid and source of instructional materials was compatible with the objectives of general education. Then, since industrial arts is a phase of general education, television, as an audio-visual aid and source of instructional material, is compatible with the objectives of industrial arts. Also, the advantages that television afforded general education and the ways and means that television could be made available to programs of education, were shown in Chapter III. Television, then, can afford advantages to industrial arts programs and can be made

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7 Louis V. Newkirk, Organizing and Teaching the General Shop, p. 14.
available to such programs of education in the same manner as to education in general.

Television can be used to aid in the realization of the objectives of industrial arts. Industrial arts is not limited to classroom activities, but is concerned with the whole of industry. It is concerned with the metal industries, the aircraft industries, the wood manufacturing and processing industries, the electrical industries, the glass industries, the plastic industries, and many others. It is concerned also with labor and its problems. Television can be used to bring information concerning all of the various industries and the problems of labor to the classroom.

The presentation of programs concerning the development of various industries and the methods of production and distribution could be designed and used to help to develop the pupils' interest and appreciation of industry. Programs depicting labor, good workmanship and good design help to develop the pupils' appreciation for and respect for labor. Through the use of television programs pupils can increase their knowledge and skill in the use of common tools and machines used in industry. Television programs concerning industry can help develop good safety and health habits in relation to shop conditions and activities by presenting safety and health rules and showing the observance of such rules under actual working conditions. Television can be a
source of information concerning the many and varied products of industry that will help the pupils in the intelligent selection, buying, use, and maintenance of the products of industry. Television has many possibilities as an effective audio-visual aid and a vast source of instructional material.

A series of live television programs called "Your Money" have been produced by the personnel of the University of Rochester, Rochester, New York, in cooperation with Station WHAM-TV. The purpose of the series of programs is to improve public understanding of business and industry. The personnel of Consolidated University, Chapel Hill, North Carolina, has produced a program showing new techniques used in the textile industry and new methods of solving old difficulties in production. The program, called "Textile Techniques," is tentatively scheduled for programming over Station WUNG, Chapel Hill, North Carolina. Another program, named "Everybody's Business," is a weekly feature depicting conditions in North Carolina and the nation. This same program is to be telecast by Station WUNG. "Wheels of Industry" is the name of a program produced by the Detroit Educational Television Foundation, Detroit, Michigan. This will combine film, remote pick-up, and studio presentation in a documentary account of one of Detroit's major industries.

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each week and will actually be a series of programs. Television
cameras will be taken into factories where the production of
products will be shown from the raw materials to the finished
products. A series of twenty-one television programs called
"Partners in Progress" were produced and presented by the Bay
Area Public School System, San Francisco, California, in
cooperation with Station KFIC, San Francisco, California.
These weekly telecasts had the threefold purpose of showing
how students learn about business, commerce, and industry in
school; demonstrating the interrelations between business and
education; and illustrating the contributions made by educa-
tion and industry to the growth and development of the State
of California. Both students and industry representatives
participated in the panel discussions.

Station WTTW, Chicago, Illinois, will go on the air late
in 1954 with a series of programs presenting educational tours
of America's great industries. The name of this television
series will be "America's Workshop." "The Bell Heard 'Round
the World" and "The Magic Wheel" are films produced for edu-
cational telecasting by the National Cash Register Company,

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9 National Citizens Committee for Educational Television,


Dayton, Ohio. These films present the various phases in the construction of machines, merchandising, scientific research, and practical approaches to employee relations relations

problems.

Apparently television can be used to good advantage in studying the problems related to labor-management. The personnel of the Radio-Television Center of Syracuse University, Syracuse, New York, produces and presents a series of programs called "Partners in Production." This series of programs uses the courtroom technique with the witnesses representing labor being cross-examined by an attorney representing management on one side, and management being questioned by an attorney representing labor on the other side. In this way the views of both labor and management are impartially expressed.

Several programs entitled "Industry and Labor," "Labor Relations," "The Nation's Manpower Problems," and "What Can European Trade Unions Learn from America?" are presented by the personnel of the Department of Industrial Relations, University of Buffalo, Buffalo, New York.

Television can be a valuable aid for use in vocational guidance. "Career Opportunities" is a television program

12 Ibid., p. 2.

13 Ibid., p. 8.
designed to help young people find their proper places in business, industry, trades, service, and the professions. As a part of this television production, students quiz a panel of men and women from industry, business, and the professions on career opportunities and requirements. This series of programs was planned by the National Association of Manufacturers, New York, New York, and was programmed and presented over television Station KOTV, Tulsa, Oklahoma. A television series entitled "Careers Calling," has been telecast by Station WDEL-TV, Wilmington, Delaware, for the past four years. This series consists of panel discussions during which students question representatives of community organizations and industry.

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14 Ibid., p. 9.
CHAPTER V

SUMMARY, FINDINGS, AND RECOMMENDATIONS

Summary

Chapter I of this study presented an introduction to the study, the purpose of the study, the delimitations, the sources of data and information, the definition of terms used in the study, recent and related studies pertaining to this study, and the organization of the study.

In Chapter II the history and development of television from its beginning to its present state were presented. The information set forth showed that television has had a very rapid development and that it is still making progressive strides.

In Chapter III information concerning the compatibility of visual and audio aids with accepted theories of learning and accepted educational objectives were presented. A study of the various theories of learning was made which included the theories of learning postulated by Thorndike, Guthrie, Hull, Skinner, Lewin, Wheeler, and Tolman. Literature in the field of education was reviewed and statements by Comenius, Rousseau, Pestalozzi, and John Dewey concerning the use of visual instruction were considered. Statements
were presented by Weaver and Bollinger concerning what they believed were the use of visual aids in teaching situations. Summaries of studies made by personnel of the United States Navy Special Devices Center, Port Washington, Long Island, New York, were given.

The opinions of several authors and committees in the field of education concerning the objectives of general education were also presented. From these groups of objectives, the following group of objectives was selected for the purpose of this study:

1. Physical and mental health
2. Citizenship
3. Proper use of leisure time
4. Vocational exploration
5. Consumer knowledge
6. Social relationships
7. Continued learning.

Information was presented regarding the compatibility of television as an instructional aid with the group of selected objectives. Information was also presented relative to the present use of television in each of the areas represented by the group of objectives.

Data and information were given showing the advantages that education may derive from the use of television as an instructional aid and as a source of instructional materials.
Information was presented showing how television can be used, and is presently being used, for educational purposes. The opinions of authorities in the field of education regarding groups of objectives of industrial arts and a representative group of objectives was selected and presented in Chapter IV. The objectives chosen are as follows:

1. To develop an interest toward industry and in the methods of production and distribution

2. To develop skills in the use of a number of common tools and machines used in industry and in the household

3. To develop an appreciation for, and respect for labor, good workmanship, and design

4. To develop good safety and health habits in relation to shop conditions and activities

5. To develop consumer knowledge in order that the student can select, buy, use, and maintain the products of industry more intelligently

6. To provide information concerning the various industrial occupations in order that the student may more intelligently choose a vocation

7. To develop a careful, thoughtful, and purposeful procedure in performing any task

8. To develop desirable social relationships such as cooperation, fellowship, leadership, and tact

9. To develop an interest in industrial arts as an area for recreational and avocational activities.
Information was presented concerning the compatibility of television with the objectives of industrial arts and concerning the present use of television as an instructional aid and source of information in meeting these objectives.

Chapter V presents a summary of the study, the findings of the study, and recommendations based upon these findings.

Findings

From the data and information presented in this study, television, as an instructional aid and source of instructional material, was found to be compatible with the accepted theories of learning and compatible with the accepted objectives of general education and with industrial arts as a phase of general education.

It was found that television offers certain advantages to programs of education. These advantages are as follows:

1. Television broadcasts are timely.
2. Television conquers space.
3. Television can give pupils a sense of participation.
4. Television can be an emotional force in the creation of desirable attitudes.
5. Television can add authority.
6. Television can integrate the learner's experiences.
7. Television can challenge dogmatic teaching.
8. Television can aid in the development of discrimination.
9. Television can help in continuous curriculum revision.
10. Television can up-grade teaching skills.
11. Television can interpret the school to the community.
12. Television can be of service to handicapped children.
13. Television can teach skills.

It was found that television can be used, and is presently being used, for educational purposes. It was indicated that there are four major ways in which television may be made available to programs of education. These are as follows:

1. By school ownership of an educational television station
2. By school ownership and operation of a closed-circuit television system
3. By school ownership of a commercial television station
4. By school cooperation with commercial television stations.

It was found that television as an instructional aid and a source of instructional information is compatible with the objectives of industrial arts. It was further found that television can be used, and is presently being used, in meeting these objectives.

Recommendations

As a result of this study it is recommended that educators investigate the opportunities afforded them by television as an instructional aid and as a source of
instructional material for use in programs in education. It is further recommended that television facilities in each community be studied for possible use in each local school community.
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Radio and Television Department, University of Houston, *KUHT*, Houston, Texas, 1953.

**Articles**


**Unpublished Material**


**Individuals Employed in the Field of Television Who Were Interviewed**

John Homsey, Engineer in Charge
Federal Communications Commission, Dallas, Texas

R. C. Stinson, Supervisor, WBAP-TV, Fort Worth, Texas

Roy M. Flynn, Manager, KRLD-TV, Dallas, Texas

John Adams, Chief Engineer, KFDE-TV, Wichita Falls, Texas

R. L. Osborne, Director of Television, Wichita Technical Institute, Wichita, Kansas
D. W. Tucker, Chief Electronics Engineer, Federal Communications Commission, City of Dallas, Dallas, Texas

Marion E. Apple, Radio and Television Engineer, Federal Communications Commission, Dallas, Texas

Morris Barton, Television Engineer, Shreveport, Louisiana

Bill F. Lindsay, Electronics Engineer, Collins Radio Company, Dallas, Texas


C. L. Dodd, Chief Communications Engineer, Federal Civil Defense Administration, Dallas, Texas


J. R. Whitworth, Chief Engineer, WJTV-TV, Jackson, Mississippi

D. K. Allan, Chief Engineer, WAFB-TV, Baton Rouge, Louisiana

John A. Green, Electronics Engineer, Dallas, Texas

C. A. Russell, Electronics Research Technician, Atlantic Refining Company, Dallas, Texas

C. F. Crandall, Electrical Engineer, Bell Telephone Company, Dallas, Texas