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## Projection equipment in Massachusetts high schools.

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PROJECTION EQUIPMENT IN MASSACHUSETTS HIGH SCHOOLS



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PROJECTION EQUIPMENT IN MASSACHUSETTS HIGH SCHOOLS

By

JAMES B. FALVEY

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UNIVERSITY OF  
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A problem submitted in partial fulfillment of  
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1948

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CHAPTER I

THE INTRODUCTION

## CHAPTER I

### THE INTRODUCTION

The world of today is a world that requires more and more knowledge of the people living in it. Science has improved the standard of living, but it has also introduced many technical and complicated problems. Through the inventions of science, the countries of the world have been brought into closer contact with each other than ever before. Two great wars have only recently provided the stimulus for new advance in the fields of science, philosophy, and government. As a result of these great advances, the student of today is faced with an ever growing body of knowledge that is necessary in order to live a happy and contented life in this world. The schools are now being called upon to teach this ever increasing body of knowledge.

It is the task of education to guide the development of the students entrusted to its care. The schools must prepare the children of our age to take their place in this high speed world we live in. The schools must answer the challenge of society to produce men capable of thinking for leadership, to produce men with the technical ability to run this complicated world system, and above all to produce men capable of living in this world. The problems facing the educators are great both in number and complexity. Sometimes one wonders whether the wisdom of Solomon, the mind of Linnaeus and the ability of Einstein would be sufficient training to live in the world of today. The task, difficult and complex as it may be, is the property of the educators.

What are we to teach the student? What must he know in order to take his place in society? Specifically, these would be difficult

questions to answer. We can say, in a general sense, that one of our fundamental assumptions should be to teach more than we are teaching at the present time. This does not mean that we are to redouble our efforts by lecturing twice as long, by covering twice as much material, or by assigning twice as much outside work. It means that we must follow the age that we live in. We must seek better and more accurate methods to do our job. We must discard the obsolete and stress the improved methods of instruction.

Of the many new methods that have been introduced to do this job the method of using visual aids in teaching has probably gained a more permanent place than most of the others. Technically, visual aids have been in use since the time of the crude drawings of the cave men, but here we are referring to that particular type of visual aid that is the exclusive property of the modern age, the projection machine.

Different types of projection machines have been in use for at least a generation now, and by the chronological standards of our age that is ample time for them to have had a fair trial. Large research organizations are constantly analyzing the results of the use of these machines. So far, they are agreed that when these machines are handled in the correct manner they are of great value to both the student and the teacher.

As is usually the case, the larger municipalities have furnished a great proportion of the material for these surveys. The results are available to all who are interested enough to inquire after them, but these results are too often of a large nature, embracing the country

or a group of states, or some equally large group. The present problem is concerned specifically with the high schools of Massachusetts, and nowhere in published form can there be found the specific material collected in this problem. There is no survey which can tell high school administrators what Massachusetts and the educators of this State think about these new aids to methodology. Nowhere is there to be found the answer to the question as to the amount of money that the high schools in this State have invested in projection equipment. Nowhere is there to be found the answer as to whether the high school administrators of this State are satisfied with their present projection equipment or whether they would like more of this equipment. From these, and similar questions, this problem grew.

CHAPTER II

OUTLINE OF PROCEDURE

## CHAPTER II

### OUTLINE OF PROCEDURE

The outline of procedure set forth in this chapter is the general picture of the procedure that seemed to best fit this particular problem.

Statement of Problem -- Briefly the problem is this. To discover the status of projection equipment in the high schools of Massachusetts at the present time, and to discover, if possible, what the administrators of these high schools think the status should be. The problem seems broad, but it will be narrowed down and crystallized into plain facts concerning projection equipment in this state which can be easily grasped and which will give at least a true indication of what is sought.

Methods To Be Used -- Had it been possible, an interview with each high school visual aids director would have been preferable. Lack of time and facilities however made it necessary to be content with sending a questionnaire to the visual aids directors. A copy of this questionnaire may be found in Appendix IV. The questionnaire was sent to a representative sampling of one hundred of the two hundred fifty Massachusetts high schools. Seventy of these high schools were kind enough to return the questionnaires and this problem will be concerned only with the material obtained from these seventy high schools.

For the number of different pieces of projection equipment the information on the questionnaires would be adequate. There remained the problem of how much this equipment cost, and it probably would have been impossible in many cases for a variety of reasons to obtain this information from the high schools. This price information was omitted

from the questionnaire and another source was consulted for the desired information.

Price Information -- To obtain the average amount of money invested by each high school it was necessary to know the cost of the different types of projectors that were listed on the questionnaire. The high schools could not be relied on for this information, mainly because prices have changed considerably since most of the schools purchased their equipment. Therefore, the averages given further on in this problem were based on the current prices of this equipment. To get as accurate an average as possible, seventeen of the best known manufacturers of projection equipment answered inquiries for price information with up-to-date price lists. These manufacturers are listed in Appendix I. It was encouraging to note that most of the companies mentioned by the schools on the returned questionnaires are included in this list.

Getting a Representative Sampling -- To insure a true representative sampling the state was divided by an imaginary line running north and south through the city of Worcester. All cities and towns including and west of Worcester were arbitrarily considered to be in Western Massachusetts, while all cities and towns east of this line were considered to be in Eastern Massachusetts. The total number of high schools in these two areas were used as the basis for sending a proportionate number of questionnaires to Eastern and Western Massachusetts. These high schools were further divided into three groups; Group A, cities, Group B, towns of over five thousand population, and Group C, towns of under five thousand population. The number of questionnaires sent to



each group\* was determined by the number of high schools in the three respective groups. It is hoped that in this way all the three main groups in the state are fairly represented in the results of this problem. An attempt was also made to choose the high schools on an impartial basis so that there would be no advantage given to the more progressive schools which use projection equipment on a larger scale. The following chapters are the result of the methods and the procedure outlined in this chapter.

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(\* ) Hereafter, the three groups will be designated as above. Group A, cities, Group B, towns over five thousand population, Group C, towns under five thousand population.

CHAPTER III

SILENT AND SOUND MOTION PICTURE PROJECTORS

### CHAPTER III

#### SILENT AND SOUND MOTION PICTURE PROJECTORS

When visual aids are mentioned most people think of the motion picture projector. This is probably because it is the most universally used in the high schools. For this reason, this type of projector will be discussed first. In this chapter we will discuss prices, distribution, and other pertinent factors concerning this type of projector.

Prices of Silent and Sound Projectors -- The prices of both sound and silent projectors vary greatly. Table I, shown below, illustrates the great range of prices for this particular piece of equipment and a few of the prices submitted by different manufacturers.

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TABLE I

Partial List of Prices Submitted by Manufacturers Showing the Range of Prices for Sound and Silent Motion Projectors.

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SOUND PROJECTORS	SILENT PROJECTORS
\$600	\$312
500	261
455	175
415	150
345	145
287	127
225	120

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According to Table I the range in price of both sound and silent projectors is well over one hundred per cent, silent projectors ranging from one hundred twenty dollars to three hundred twelve dollars, and sound projectors ranging from two hundred twenty-five dollars to six hundred dollars. There are many reasons for this wide range. Disregarding any economic discussion of competition and methods of production used by the different manufacturers, the chief explanation for this wide variance is the fact that many of the projectors were made to serve different purposes. For example, the light-weight projectors on the market are much lower priced than the heavier, more permanent types. Projectors which are used only occasionally for home movies are constructed of much lighter and less durable material and consequently are lower priced. The power of the illumination, the lens system, the speaker attachments, all tend to raise or lower the purchase price. These factors, however, do not seriously alter the validity of the average prices arrived at in this problem because the average of four hundred thirty-one dollars for sound projectors, and one hundred seventy-six dollars for silent projectors is approximately the same price that most of the schools have paid for the projectors that they are using today.

Features to Look For in a Motion Picture Projector -- Before inquiring into projectors it is best to decide first what use is to be made of the projector. It is important in choosing the proper lens system to know whether the projector will be used mostly in small classrooms or in large auditoriums. If the projector is constantly to be moved about from room to room, the compactness, weight, and

portability of the machine becomes immediately of prime importance. In many schools a students' club for operating projectors is set up. Frequently, there will be no expert on hand to handle the more complicated types of projectors, and for this reason simplicity in mechanism and design is necessary so that the machine may be operated by a student or teacher with a minimum amount of training. Most of the motion picture projectors can be operated on A.C. or D.C. current, however, it will do no harm to ascertain whether or not the projector is suited to the power setup in the school for which it is being purchased. For purposes of better illumination at great distances, some manufacturers produce a very fine projector that uses an electric arc as its source of illumination in place of the bulb. For all practical purposes in the high school the bulb will provide sufficient illumination.

Present Situation in the High Schools -- In Table II, the number of projectors and their approximate value is listed for the three groups of high schools.

TABLE II

Total Number of Motion Projectors and Their Value as Reported by the Seventy High Schools in the Survey Distributed Among.

Category	No. of Schools	No. of Sound Projectors	Value	No. of Silent Projectors	Value
Group A	13	18	7,758	7	\$1,282
Group B	25	30	12,980	14	2,464
Group C	32	34	14,654	4	704
Total	70	82	35,342	25	4,400

From Table II it is noted that the number of sound motion picture projectors is much larger than the number of silent projectors. There is more than eight times the money invested in sound projectors than there is in silent. This is probably due to the versatility of the sound as compared with the silent projector. Not only does the sound projector bring into play the sense of hearing, thus enhancing the value of the motion picture, but the sound projector has the added advantage of being able to show both sound and silent films whereas the silent projector can show only silent films.

What the Administrators Consider Adequate -- Table III shows what the administrators of these seventy high schools consider as adequate motion picture projectors for their schools.

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TABLE III

Total Number of Motion Picture Projectors and Their Value Indicated as Adequate for the Seventy High Schools.

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Category	No. of Schools	No. of Sound Projectors	Value	No. of Silent Projectors	Value
Group A	13	24	\$10,344	7	\$1,232
Group B	25	36	15,516	15	2,640
Group C	32	37	15,947	4	704
Total	70	97	41,807	26	4,576

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By comparing Table II with Table III it is noted that the schools of all three groups favor a substantial increase in the number of sound

motion picture projectors in the high schools. At the same time, however, the schools unanimously indicate that there is no desire for an increase in the number of silent projectors. This fact is significant in determining the direction in which the trend is going with regard to the motion picture projector. The figures from the seventy high schools indicate a desired increase of approximately sixteen per cent in the number of sound motion picture projectors. At least in these seventy schools, there is agreement by the administrators that an increase in the number of silent projectors is unnecessary.

CHAPTER IV

FILM STRIP, 2" x 2" SLIDE, AND COMBINATION PROJECTORS



## CHAPTER IV

### FILM STRIP, 2" x 2" SLIDE, AND COMBINATION PROJECTORS

The principle of the slide projector is not new, the lantern slide and stereoscope having been in use in the schools for some time now. The principle has been put to new use, however, in the development of new types of slide projectors.

Description of these Projectors -- The 2" x 2" slide projector makes possible the projection of positive developments of any pictures that the teacher may wish to take with a camera. This projector is extremely versatile and can be adapted to small rooms or large auditoriums simply by a change in the lens system. It is small and light in weight, thus it is easily transported from one room to another. Its operation is extremely simple and it gives the teacher the advantage of keeping one picture before the class on the screen as long as he desires. The instructor can lecture on the slides or, if desired, he can procure a sound attachment and use recorded discs prepared to accompany the slides. The film strip projector gives the same effect as the individual slides plus having the advantage that the pictures are arranged in logical sequence which enables the teacher to show them as rapidly or as slowly as desired. Some of the manufacturers have combined the advantages of the slide and film strip projectors into one machine which can project both types. Table IV shows the price range of these types of projectors according to the prices that were received from manufacturers of these specific types of projectors. This table shows that the range is quite large.

TABLE IV

Shows the Range of Prices for the Different Types of 2" x 2" Projectors.

2" x 2" Slide Projector	2" x 2" Film Strip Projector	2" x 2" Combination Slide and Strip
295	90	110
245	80	80
195	68	70
181	65	65
155	48	60
63	31	50
55	27	
36	25	

The explanation for the large difference between the price extremes is almost the same as was given in Chapter II explaining the difference in price in the sound motion picture projectors. The type of lens used, the type of material from which the machine was constructed, and the purpose for which the machine was made all contribute to the wide price differential that is evident in Table IV. The film strip and the combination projectors are relatively new, and there has been little time for any great differentiation by the manufacturers in producing these machines. The prices of the film strip and combination projectors are therefore almost identical no matter which company is consulted for their price on these particular projectors.

The Present Situation in the High Schools -- Table V shows the number of these projectors and their total value that are in use in the high schools at the present time.

TABLE V

Shows the Number of Different Types of Still Projectors in Use in the Seventy High Schools at the Present Time and Their Total Value.

Category	No. of Slide Projectors	No. of Film Strip Projectors	No. of Combination Projectors
Group A	3	5	13
Group B	5	5	21
Group C	1	8	18
Total Number	9	18	52
Total Value	\$1,352	\$1,008	\$3,640

This table shows that there are more of the combination projectors in use presently than there are either of the other types. It should also be noted that the total amount of money invested in the combination projector is proportionately lower than that invested in the slide projectors, thus hinting strongly that the two factors of usability plus low cost are combining to favor the purchase of the combination rather than either of the other two types.

What the Administrators Consider Adequate -- Now, having ascertained the present status of the slide projectors, it is desirable to see what the administrators of these schools would like in their schools

in order to have what they consider adequate still picture projection coverage. Table VI shows what the administrators indicated as adequate for their schools.

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TABLE VI

Shows the Projection Equipment for Still Pictures that the Administrators Would Like to have in Their Schools, the Total Value of this Equipment, plus the Individual Breakdown.

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Category	No. of Slide Projectors	No. of Film Strip Projectors	No. of Combination Projectors
Group A	7	9	21
Group B	7	7	28
Group C	5	16	27
Total Number	19	32	76
Total Value	\$2,850	\$1,790	\$5,320

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Table VI shows that the desired increase in the number of all three of these still picture projectors is considerable, but the desired increase in combination projectors is outstanding. The schools have indicated a desire to increase the number of these combination projectors by fifty per cent. This is a greater increase than they indicated in motion picture projectors. This seemingly overwhelming demand for more of these combination projectors can probably be explained by three reasons. In the first place, this projector is light, portable, and can do the work of both the other types of still picture projectors. In the second place, the low cost of this machine, averag-

ing about seventy dollars, would enable the administrators to purchase about five of them for the cost of one motion picture projector. In the third place, this projector has only recently arrived on the scene and the school systems have not had time to become fully acquainted with it. Add to these reasons the features of ease of operation, simplicity of mechanism, ease of repair and it is not too difficult to see why this combination projector, which does two jobs in one machine, is beginning to enjoy the success it is now attaining. From the figures we have seen, this type of projector is just coming into its own in the high schools of Massachusetts.

CHAPTER V

LANTERN SLIDE, OPAQUE, OVERHEAD, AND OTHER PROJECTORS

## CHAPTER V

### LANTERN SLIDE, OPAQUE, OVERHEAD, AND OTHER PROJECTORS

The two types of projectors mentioned in the preceding chapters are by far the most generally used in the high schools today. It would be unfair, however, to disregard the mention of at least a few other types which are used to such an extent as to make their inclusion in this problem worthwhile.

Lantern Slide Projectors -- The lantern slide projector, sometimes referred to as the balopticon or the delineascope, is one of the earliest and most useful aids to visual education. The slides are easy to make, are inexpensive to rent, can be easily colored, give a clearer image at greater distances than any other medium of projection, and will not buckle or curl when exposed to extreme heat. In this last respect, the lantern slide projector is a more practical instrument than the film strip projectors.

Opaque Projectors -- Opaque projectors are excellent aids in presenting a wide variety of educational subjects. The material that can be projected in this manner is almost unlimited and the cost is practically nothing. Almost any object, from book pages to hand drawn, teacher made illustrations can be shown by this method, either in darkened rooms or under daylight conditions.

The screen receives only such light as can be reflected by the photograph, page or object that is being shown. Consequently, the projected image is not as bright as in the case of the transparent glass slides, and for this reason it is best to use this projector in a darkened room.

Overhead Projectors -- All these different projectors had one noticeable drawback. Although by not using sound attachments the teacher could retain his position as leader of the class through the use of his voice as a guide, he was usually relegated to a place near the projector in the rear of the room. Addressing the class from this position it was often difficult to reach all the students clearly with his voice. A projector to remedy this situation was sought. The overhead projector was the answer.

This projector is constructed so as to allow the teacher to remain at his position in the front of the class while the projected object appears on a screen above and behind him.

Distribution and Value -- Table VII shows the number of these three types of projectors that are in present use in the seventy high schools with the total value for each type of machine.

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TABLE VII

Shows the Number of Lantern Slide, Opaque and Overhead Projectors in use in the Seventy High Schools with the Total Value of Each Type.

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Category	Lantern Slide Projectors	Opaque Projectors	Overhead Projectors
Group A	13	12	1
Group B	16	15	0
Group C	13	10	1
Total Number	42	37	2
Total Value	\$4,662	\$5,994	\$282



The figures in Table VII show that the lantern slide and the opaque projectors are at present in quite common use in the high schools. The overhead projector so far does not seem to have gained a place of too much importance. This may be due to the fact that it is relatively new as compared to the other projectors.

What the Administrators Consider Adequate -- Table VIII will give some idea of what the administrators think should be the number of these projectors in their schools.

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TABLE VIII

Indicates What the Schools Think are an Adequate Number of Lantern Slide, Opaque and Overhead Projectors, the Total Value of this Equipment, and the Individual Breakdown.

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Category	Lantern Slide Projectors	Opaque Projectors	Overhead Projectors
Group A	15	18	3
Group B	16	22	3
Group C	16	20	5
Total Number	47	60	11
Total Value	\$5,217	\$9,720	\$1,551

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A comparison of the figures given in Table VII and in Table VIII indicate that as far as the lantern slide projector is concerned the surveyed schools are of the unanimous opinion that there are at present an adequate number of them in use in the schools. In the case of the

opaque projector, the schools are just as unanimous in their desire for an increase of approximately fifty per cent in the number now in use. The few schools who are familiar with the overhead projector are very enthusiastic about its possibilities as an aid to better teaching.

In summing up, the trend seems to be towards increased use of both the opaque and the overhead projectors to the extent of about fifty per cent in both cases. The present number of lantern slide projectors are agreed upon by all as being adequate.

Prices -- A listing of prices of these projectors may be of value to those who are unfamiliar with their cost. Table IX shows a partial list of these prices.

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TABLE IX

A Partial List of Prices of Lantern Slide, Opaque and Overhead Projectors Obtained from Manufacturers Price Lists.

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Lantern Slide Projectors	Opaque Projectors	Overhead Projectors
\$200	\$250	\$210
168	210	128
120	155	110
115	150	85
80	100	75
<u>70</u>	<u>100</u>	<u>141.00</u>
Average -- 111.00	160.00	

Other Information -- The micro-projector was reported by a few of the schools as being used, and these schools favored a slight increase in the number of projectors of this type. Many of the manufacturers of the higher priced projectors also produce attachments which enable an opaque projector, for example, to convert to showing film strips and 2" x 2" slides. These attachments are reasonably priced and do away with the necessity for purchasing a new machine which would only be used occasionally. Any person interested in these attachments can get complete prices and descriptions by writing to any of the larger producers of visual equipment listed in Appendix II.

CHAPTER VI

FILMS AND SCREENS

## CHAPTER VI

### FILMS AND SCREENS

Screens can be purchased in what amounts to an almost unlimited number of sizes, types, and makes. Almost all of the large producers of projection equipment have at least a small number of screens to offer to the public. The material that screens are made of is of two main kinds; the flat white surface, and the so-called glass beaded surface. Most of the writers on visual aids prefer the glass beaded type because of its ability to give true reproduction of the projected material, and because of its ability to cut out excessive glare. Since this survey is concerned primarily with classroom projection, any discussion of the extreme sizes of screens such as those used in school auditoriums will be avoided. Of the classroom type screens, there are three main classifications; the tripod, the wall type, and the box type or table model.

Distribution of Screens in the Schools -- It is almost impossible to compute accurately how much money has been invested in screens, because all types and sizes were reported in the survey. About the only thing that can be said with any degree of accuracy is that the schools reported one hundred seventeen screens in use at the present time and they expressed a desire to increase this number to one hundred sixty-eight. Some of the schools reported only one screen while others reported as many as fifteen. All three groups of schools indicated a desire for an increase of approximately fifty per cent. This increase may be due to a desire on the part of some of the schools to procure a permanent screen for all of their classrooms that are suitable for

projection purposes, but this explanation is at best only an opinion. Never-the-less, writers on visual education agree that the best results are obtained from projecting films in rooms that are especially designated and outfitted for that purpose. Whenever possible, teachers prefer to use their own classrooms for projection purposes, hence the desire for more classroom screens.

Prices of Screens -- As was said in the preceding paragraph, it would have been an impossible task to compute the amount of money invested in screens at present with any accuracy. The prices of some of the classroom sizes of the three main types are listed in Tables X, XI, and XII, to give the reader an indication of the cost of screens. The tables show the prices of five different companies. All the prices under A are from one company, those under B from another, etc.

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TABLE X

Prices of the Tripod Type Classroom Size Screens

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Size	Price A	Price B	Price C	Price D	Price E	Average
30" x 40"	\$10.00	\$20.00	\$18.00	\$14.00	\$19.00	\$16.00
37" x 50"	27.00	25.00	27.00	27.00	25.00	26.00
39" x 56"	30.00	22.00	20.00	25.00	27.00	25.00
45" x 60"	45.00	35.00	30.00	35.00	40.00	37.00
52" x 70"	45.00	30.00	55.00	45.00	38.00	42.00
63" x 84"	45.00	80.00	96.00	65.00	60.00	69.00

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TABLE XI

Prices of classroom size, wall type screens.

Size	Price A	Price B	Price C	Price D	Price E	Average
37"x50"	\$14.00	\$13.00	\$12.00	\$14.00	\$14.00	\$13.00
52"x70"	25.00	30.00	27.00	22.00	24.00	25.00
73"x96"	65.00	45.00	65.00	53.00	48.00	55.00
45"x60"	16.00	22.00	20.00	20.00	25.00	24.00
63"x84"	43.00	61.00	35.00	52.00	40.00	46.00
70"x70"	36.00	45.00	47.00	33.00	41.00	40.00

TABLE XII

Prices of classroom size, box type screens.

Size	Price A	Price B	Price C	Price D	Price E	Average
22"x30"	\$ 5.00	\$ 8.00	\$12.00	\$15.00	\$23.00	\$13.00
30"x30"	27.00	16.00	18.00	10.00	18.00	18.00
36"x48"	30.00	18.00	27.00	16.00	20.00	22.00
39"x52"	35.00	22.00	25.00	27.00	26.00	27.00
45"x60"	40.00	37.00	43.00	41.00	36.00	47.00

These prices are not to be misconstrued as the last word. They are included only to give the prospective purchaser of classroom screens some general idea of what prices are now prevalent for the different sizes and types of classroom screens.

Use of Motion Picture Films -- Since the most commonly used piece of projection equipment is the motion picture projector, it seemed that some information on the number of motion picture films used in the high schools would be of interest and value to the administrators of the high schools. Therefore, a few questions about the use of films were included on the questionnaire. The answers to these questions are shown in Table XIII.

TABLE XIII

Number of films owned by the seventy schools, the number of films they rent per year, the number they could use per year.

Category	No. of Films Owned	No. of Films Rented/Year	No. of Films Could Use/Year
Group A	42	800	1,000 (or more)
Group B	55	1,315	2,000 (or more)
Group C	7	804	1,100 (or more)
Total Films	104	2,915	4,100
Average/school	1.5	42	59

In summarizing the context and tables in this chapter, it is noted that screens vary widely in price and size. There is a unanimous agreement in all three categories of schools to increase the number of screens presently in use in the schools. Motion pictures seem to be rather scarce in the permanent libraries of Massachusetts High Schools. In ownership of films the cities lead the towns of Group B, while the smaller towns of Group C own an insignificant number of films. The



seventy schools are using an average of forty-two films per year in each school, and they indicate that they could use fifty-nine or more per year in each school if it were possible to obtain this number. Several of the schools mentioned the fact that they had received additional allotments to purchase and rent films for the coming year. Many schools also stated that they had been granted much larger sums for the purpose of buying new projection equipment. These facts all point to a substantial increase in the number of films that will be used in these schools in the years to come.

CHAPTER VII

DESIRED EXPANSION IN PROJECTION  
EQUIPMENT IN THE SEVENTY HIGH SCHOOLS

## CHAPTER VII

### DESIRED EXPANSION IN PROJECTION EQUIPMENT IN THE SEVENTY HIGH SCHOOLS

In this chapter the whole picture presented by the tabulated figures in the preceding chapters will be presented. The present overall distribution of projection equipment in the seventy high schools participating in this survey and the overall picture of what the administrators of these high schools consider adequate projection equipment for their schools will be surveyed. Finally the present financial situation and the desired financial situation with regard to this equipment will be discussed.

Distribution of Projection Equipment -- The preceding chapters have dealt with projection equipment piece by piece, and have given a picture of the situation in regard to each individual type of projector. Now, it is desirable to look at the overall picture that these machines present so that we may speak in larger terms than just one particular piece of equipment. Table XIV gives the overall distribution at present in the high schools.

Distribution of Desired Equipment -- Table XIV will help to approximate what the average high school in each one of the three groups has for projection equipment, but it also raises once more the fundamental question with which this problem is concerned. That question is concerned not so much with the present situation, but rather with what the situation should be. Table XV shows what the situation would be if the schools had all the equipment that the administrators desire at the present time.

TABLE XIV

Overall Distribution of Projection in the Seventy High Schools.

Category	Group A	Group B	Group C	Total
16 MM Sound	13	30	34	62
16 MM Silent	7	14	4	25
2" x 2" Slide	3	5	1	9
2" x 2" Strip	5	5	8	18
2" x 2" Comb.	13	21	18	52
Lantern Slide	13	16	13	42
Opaque	12	15	10	37
Overhead	1	0	1	2

Speaking now in more general terms, it seems that the greatest increase desired by any one particular group is in Group B. There is, however, an obvious desire for an increase in certain projectors by all three groups. The high schools on the whole desire an increase of fifteen more motion picture projectors over a present total of eighty-two, which is about a twenty per cent increase. The silent projectors seem to have had their day as far as the schools are concerned, for out of the seventy schools in the survey only one indicated a desire to have another one of these projectors. This fact is probably more easily understood if the reader knows that both sound and silent films can be shown with the sound projector while the silent projector can show only silent films. Slight increases are evident in the 2" x 2" Slide and Film Strip projectors; the great increase in

TABLE XV

The Desired Distribution of Projection Equipment in the Seventy High Schools.

Item	Group A	Group B	Group C	Total
16 MM Sound	24	36	37	97
16 MM Silent	7	15	4	26
2" x 2" Slide	7	7	5	19
2" x 2" Strip	9	7	16	32
2" x 2" Comb.	21	28	27	76
Lantern Slide	15	16	16	47
Opaque	18	22	20	60
Overhead	3	3	5	11

still film projectors is found, however, in the 2" x 2" Combination Slide and Film Strip projector. There is indicated, as shown by Tables XIV and XV, an increase of twenty-four projectors over a present total of fifty-two. This represents a thirty-three per cent increase in the number of Combination projectors presently in use. The lantern slide, like the silent projector, showed little increase. The opaque projector is another instrument that seems to have proved its worth to the administrators of the high schools. At present there are only thirty-seven of these projectors in the high schools, but there is an indicated desire for sixty of them. This is an increase of almost ninety per cent, and almost all the schools either expressed their satisfaction with this projector, or indicated that they would like to own one. The overhead

projector was mentioned by only one or two of the schools. Two schools reported owning one, and nine schools indicated a desire to own one.

It would seem then, from the foregoing facts, that the schools are unanimously agreed on which machines are the most important for adequate projection coverage in the schools. They all agree that the most valuable are the 16 MM Sound projector, the 2" x 2" combination slide and film strip projector, and the opaque projector. We must not, however, overlook the fact that there are at present forty-two lantern slide projectors in the schools, even though there is no appreciable desire for any increase in this type of projector. How much these projectors are used there is no way of knowing, but at least as far as purposes of future expansion of the projection equipment are concerned, this projector can for the present be ruled out of any further consideration.

Financial Investment -- When actual figures show that seventy high schools in Massachusetts have a total of eighty-two sound projectors, fifty-two combination projectors, forty-two lantern slide projectors, etc., the question of the cost of all this equipment is raised. Having taken the average of several prices sent in by various manufacturers and multiplied the total number of each type of projector by the appropriate average, an approximate average value was arrived at for each type of projector. Using the same method, the approximate cost of what the seventy high schools consider adequate projection equipment was arrived at. Table XVI gives these average values.

TABLE XVI

Average Amount of Money Presently Invested in Projection Equipment in the Seventy High Schools.

Item	No. in the Schools	Total Cost	No. Schools Should Have	Total Cost
16 MM Sound	82	\$35,342	97	\$41,907
16 MM Silent	25	4,400	26	4,576
2" x 2" Slide	9	1,350	19	2,850
2" x 2" Strip	18	1,008	32	1,790
2" x 2" Comb.	52	3,640	76	5,320
Lantern Slide	42	4,662	47	5,217
Opaque	37	5,994	60	9,320
Overhead	2	282	11	1,551
Total Amount Invested		\$56,602		\$72,931

Table XVI shows that there is an overall investment of fifty-six thousand six hundred dollars in the seventy high schools at the present time. Note also, that these schools are in favor of an increase in projection equipment which would mean a total expenditure of almost another fifteen thousand dollars or about twenty-five per cent more than is at present invested. To interpret these figures further, the average investment per pupil in these schools is about one dollar fifty-five cents, and the desired equipment would raise this to about two dollars. The average investment per school is about eight hundred forty dollars, with the large cities having the largest expenditure and the small towns having the smallest.

Financial Investment for Each Group -- Breaking the financial investment down into the three groups, the cities show a per capita investment of ninety-one cents and a per school investment of one thousand one hundred forty-one dollars. The towns in Group B have a per capita investment of one dollar seventy-seven cents and a per school investment of nine hundred fourteen dollars. The Group C towns have a per capita investment of two dollars ninety-four cents and a per school investment of six hundred eighty dollars. The reader is cautioned against taking the high per capita investment of this last group at face value. It must be remembered that the schools in this group represent less than half the number of pupils that the city high schools represent.



CHAPTER VIII

SUMMARY AND CONCLUSIONS

## CHAPTER VIII

### SUMMARY AND CONCLUSIONS

The administrator whose school is just becoming interested in the possibilities of projection as a teaching method would like facts and figures on the topic. He wants facts that hit close to home. Facts that will tell him what his fellow administrators in the State of Massachusetts think about all this equipment. An attempt will be made to fully answer these questions on the basis of the information that this survey has provided.

#### Some Pertinent Questions and Answers --

1. How much money is invested in these seventy high schools? Fifty-six thousand six hundred dollars.
2. How much money does the average high school have invested in projection equipment? About eight hundred forty dollars.
3. How many motion picture films do these schools own? One hundred four.
4. How many films do these schools use per year? This question is difficult to answer because many of the high schools vary the number of films they use each year, but from the information we have, the number could be estimated at around three thousand films or more per year.
5. What types of projectors seem to be the most satisfactory and practical for classroom use? 16 MM Sound, 2" x 2" Combination, and the Opaque projectors.
6. What is the average cost of these projectors? The average cost of these projectors as determined from the price lists of fifteen well-known, reliable producers is shown in Table XVII.
7. Do the large cities invest more than the smaller towns? Per school, the cities invest more money than the smaller towns, but because of the larger enrollment they do not have as high a per student expenditure.

TABLE XVII

Shows the Average Cost of Different Types of Projection Equipment.

Item	Average Cost
16 MM Sound Projector	\$431.00
16 MM Silent "	176.00
2" x 2" Slide "	153.00
2" x 2" Strip "	57.00
2" x 2" Combination Slide and Strip Projector	70.00
Lantern Slide Projector	111.00
Opaque "	160.00
Overhead "	141.00

8. Do the high schools on the whole think that their present projection equipment is adequate? No. There is an indicated desire for increase in projection equipment which would mean investing an additional twenty-five per cent of the money now invested.
9. What is the average amount of money invested at the present time for a school of the class that mine is in? Group A average is one thousand one hundred forty dollars, Group B average is nine hundred fourteen dollars, Group C average is six hundred eighty dollars.
10. What do administrators of schools the size of mine think is adequate projection equipment and how much would it cost? These two questions are extremely difficult to get any average answer to because every school has a different type of plant and has problems and facilities that are peculiar to it alone. Bearing in mind these facts, however, Table XVIII, Table XIX, and Table XX are an attempt to answer these questions. The figures in these tables were arrived at by taking the total number of pieces of equipment mentioned by each school in a given group and dividing this total by the number of schools in the group. This resulting number was then taken as the average that a school in that group should have.

TABLE XVIII

Number of Each Type of Projector that the City High Schools Consider as Adequate, and the Total Value of This Equipment.

Item	Total Indicated As Adequate by Schools	Average School Should Have	Cost
16 MM Sound	24	2	\$868.00
2" x 2" Combination	21	2	140.00
Opaque	15	1 or 2	162.00
Lantern Slide	15	1 or 2	111.00
<b>Total Cost</b>			<b>\$1,281.00</b>

TABLE XIX

Number of Each Type of Projector that the Schools in Towns of Over five thousand population Consider as Adequate, and the Total Value of this Equipment.

Item	Total Indicated As Adequate By Schools	Average School Should Have	Cost
16 MM Sound	36	1 or 2	\$431.00
2" x 2" Combination	28	1	70.00
Opaque	22	1	162.00
<b>Total Cost</b>			<b>\$661.00</b>

TABLE XX

Number of Each Type of Projector that the Schools in Towns of Under Five Thousand Population Consider as Adequate, and the Total Value of this Equipment.

Item	Total Indicated As Adequate By Schools	Average School Should Have	Cost
16 MM Sound	37	1	\$431.00
2" x 2" Combination	27	1	70.00
Total Cost			\$501.00

Tables XVIII, XIX, and XX, should give some indication as to what the administrators of each group think would be adequate projection equipment for their respective classes of schools.

Average Cost of Adequate Equipment -- The average cost of projection equipment that the administrators of the city high schools think would be adequate is approximately one thousand two hundred eighty-one dollars. The administrators of the Group B schools indicate their minimum financial investment to be six hundred sixty-one dollars. The minimum of the Group C schools as shown by Table XX is five hundred one dollars.

The minimum requirements were arrived at by taking the total number of each type of projector that was mentioned by the schools under the column marked "school should have", on the questionnaire and dividing this total by the number of schools in that group. Thus the minimum requirements mentioned above are the average for each group of what the administrators think that they should have, not what they do have.

In Conclusion -- It can be said that the high schools of the State of Massachusetts, as indicated by the results of this survey, are of the opinion that projection equipment in the high school is valuable, and plays a noteworthy part in aiding the teacher at his task. The schools are not only unanimous in their desire for an increase in projection equipment, but they also seem to be agreed upon which projectors do the best job. It is hoped that this survey may be of some help to the administrators of Massachusetts High Schools large, medium, and small, in helping them set up, or improve an already existent, Visual Aids Program.

APPENDICES

APPENDIX I

LIST OF MANUFACTURERS THAT CONTRIBUTED PRICE INFORMATION TO THIS SURVEY



APPENDIX I

LIST OF MANUFACTURERS THAT CONTRIBUTED PRICE INFORMATION TO THIS SURVEY

- Bell and Howell Company, 7100 McCormick Road, Chicago, Illinois.
- Spencer Lens Company, Buffalo, New York.
- Victor Animatograph Corporation, Davenport, Iowa.
- Keystone Manufacturing Company, Boston, Massachusetts.
- Bausch and Lomb Optical Company, Rochester, New York.
- Charles Bessler Company, New York City, New York.
- Automatic Projection Corporation, 131 West 52nd Street, New York 19, New York
- Keystone View Company, Meadville, Pennsylvania.
- Society For Visual Education, 100 East Ohio Street, Chicago 11, Illinois.
- DeVry Corporation, 52 Vanderbilt Avenue, New York 17, New York.
- DeJur Amaco Corporation, Long Island City, New York.
- Stillfilm Incorporated, 8443 Melrose Avenue, Hollywood 46, California.
- Movie-Mite Corporation, 1105 East 15th Street, Kansas City 6, Missouri.
- The Ampro Corporation, 2835 North Western Avenue, Chicago 18, Illinois.
- Kimac Company, Old Greenwich, Connecticut.
- Eastman Kodak Company, Rochester 4, New York.
- American Optical Company, Buffalo 15, New York.

APPENDIX II

SOURCES OF PROJECTION EQUIPMENT

APPENDIX II

SOURCES OF PROJECTION EQUIPMENT

A. Motion Picture Projectors:

- Ampro Corporation, 2839 N. Western Ave., Chicago 18, Illinois.  
Bell and Howell Company, 7000 McCormick Road, Chicago 45, Illinois.  
DeVry Corporation, 111 Armitage Ave., Chicago 11, Illinois.  
Eastman Kodak Company, Rochester, New York.  
Movie-Mite Corporation, 1109 E. 15th Street, Kansas City 6, Missouri.  
E. C. A. Manufacturing Corporation, Camden, New Jersey.  
Victor Animatograph Corporation, Davenport, Iowa.

B. Filmstrip and 2" x 2" Slide Film Projectors:

- American Optical Company, Buffalo, New York.  
Ampro Corporation, 2835 N. Western Ave., Chicago 18, Illinois.  
Bausch and Lomb Optical Company, 688 Paul Street, Rochester, New York.  
Bell and Howell Company, Chicago 45, Illinois.  
DeVry Corporation, 111 Armitage Ave., Chicago 11, Illinois.  
Eastman Kodak Company, Rochester, New York.  
Golde Manufacturing Company, 1220 W. Madison Street, Chicago 7, Illinois.  
Society For Visual Education, Chicago 11, Illinois.

C. Opaque Projectors:

- American Optical Company, Buffalo 15, New York.  
Bausch and Lomb Optical Company, Rochester, New York.  
Charles Beseler Company, 131 E. 23rd Street, New York 10, New York.

D. Slide Projectors 3 1/4" x 4":

- American Optical Company, Buffalo 15, New York.  
Bausch and Lomb Optical Company, Rochester, New York.

Charles Beseler Company, New York 10, New York.

Golde Manufacturing Company, W. Madison Street, New York 10, New York.

Keystone View Company, Meadesville, Pennsylvania.

E. Micro Projectors:

American Optical Company, Buffalo 15, New York.

Bausch and Lomb Optical Company, Rochester, New York.

Society For Visual Education, Chicago 11, Illinois.

APPENDIX III

SOME SOURCES OF PROJECTED MATERIAL LOCATED NEAR MASSACHUSETTS  
(SELECTED FROM A COMPILED LIST OF THE NATIONAL  
EDUCATION ASSOCIATION OF THE UNITED STATES)

### APPENDIX III

#### SOME SOURCES OF PROJECTED MATERIAL LOCATED NEAR MASSACHUSETTS (SELECTED FROM A COMPILED LIST OF THE NATIONAL EDUCATION ASSOCIATION OF THE UNITED STATES)

This compilation is offered as a guide to the many existent sources of films. It is by no means exhaustive. The sources have been grouped under the following classifications: (1) General Bibliographies of Sources; (2) United States Government Departments and Agencies; (3) State Department Libraries; (4) University and College Libraries in New England; (5) Other Sources.

All information about motion pictures should be obtained well in advance of the anticipated showing, since bookings for films ordinarily have to be made at least three weeks ahead of schedule.

#### A. Sources of Films:

##### 1. General Bibliographies of Sources:

- a. American Council on Education, Washington, D. C.
- b. Herkheimer, Mary F., Educators Guide To Free Films,  
Educators Progress Service, Randolph, Wisconsin.
- c. Index of Training Films, 1946 Edition, 157 East Erie  
Street, Chicago, Illinois.

##### 2. United States Government Departments and Agencies:

- a. Department of Agriculture--Office of Information, Motion Picture Service, Fourteenth Street and Independence Avenue, S. W., Washington, D. C.
- b. Department of Commerce--Bureau of Foreign and Domestic Commerce, Motion Picture Division, Fourteenth Street and Constitution Avenue, N. W., Washington, D. C.  
Weather Bureau, Motion Picture Division, Fourteenth Street between Constitution Ave. and East St., N. W., Washington 25, D. C.
- c. Department of the Interior--Bureau of Mines, Experiment Station, 4800 Forbes Street, Pittsburgh 13, Penn.  
Bureau of Reclamation, Motion Picture Division, C Street, between Eighteenth and Nineteenth Streets, N. W., Washington, D. C.

- d. Department of Justice--Federal Bureau of Investigation, Pennsylvania Avenue at Nineteenth Street, N. W., Washington 25, D. C.  
Federal Prison Industries, Inc., NOLC Building, First Street and Indiana Avenue, N. W., Washington 25, D. C.
- e. Department of Labor--Division of Labor Standards, Constitution Avenue and Fourteenth Street, N. W., Washington 25, D. C.
- f. Department of the Treasury--United States Secret Service, Fifteenth Street and Pennsylvania Avenue, N. W., Washington 25, D. C.
- g. Federal Security Agency--Children's Bureau, Division of Information, Constitution Avenue and Fourteenth Street, N. W., Washington 25, D. C.  
Office of Education, Temporary Building M, Twenty-Sixth and Water Streets, N. W., Washington 25, D. C.  
For a catalogue, apply to the distributor of Office of Education Films: Castle Films, Inc., RCA Building, New York 20, New York. These films deal with aircraft work, automobile operation and maintenance, business education, dentistry, electrical work, engineering, farm work, foundry practice, machine shop work, medicine, nursing, optical craftsmanship, pattern making, plastics work, supervision, radio work, refrigeration service, safety, sheet metal work, shipbuilding, woodworking, and welding.  
Public Health Service, Washington 25, D. C. Communicate with state or local health departments for information.

3. State Department Libraries:

- a. Massachusetts--Helen B. Garrity, In Charge of Visual Instruction, Massachusetts Department of Education, Boston, Massachusetts.

4. University and College Libraries:

- a. Connecticut--David E. Strom, Director, Audio-Visual Aids Center, University of Connecticut, Storrs, Conn.
- b. Maine--O. S. Lutes, Dean, School of Education, University of Maine, Orono, Maine.
- c. Massachusetts--Director, Harvard Film Service, Harvard University, Cambridge, Mass., and Abraham Kraaker, Director, Division of Teaching Aids, Boston University, Boston, Mass.
- d. New Hampshire--Donald W. Smith, Extension Specialist in Visual Aids, University of New Hampshire, Durham, N. H.
- e. Rhode Island--E. P. Allen, Librarian, Rhode Island State College, Kingston, R. I.
- f. Vermont--Horace B. Elfred, Robert Hull Fleming Museum, Classroom Film Library, University of Vermont, Burlington, Vermont.

5. Other Sources:

- a. Museums and Public Libraries--A number of museums and public libraries maintain film collections for national or regional distribution. Further information may be obtained with regard to availability of films in a given locality by consulting the state and near-by museums and libraries.
- b. Association Libraries--Many national and regional associations sponsor and distribute films relative to their interests. Most of these associations distribute films for transportation charges only.
- c. Foreign Films--A great many of the United Nations have film distribution centers in the United States. Motion pictures can be borrowed from most of them for transportation charges only.
- d. Industries--Industrial and other business firms throughout the country sponsor films relative to their fields of interest. Many of these films can be used to advantage in the classroom. They are available for transportation charges or for a nominal service charge. Lists of companies and descriptions of their films can be found in the Educators Guide To Free Films, published by the Educators Progress Service, Randolph, Wisconsin.

B. Sources of Educational Slides:

1. Nearest University and College Libraries:

- a. Several colleges and universities maintain libraries of slides for distribution on a loan basis. However, this service is generally confined to the state in which the school is located. This is not always the rule. Each of these libraries have slides on a wide variety of subjects; most of them have both the 2" x 2" and 3 1/4" x 4" slides. Descriptive catalogues can be obtained from the following:
- b. New Hampshire--Director of Audio-Visual Center, Hewitt Hall, University of New Hampshire, Durham, New Hampshire.

2. Nearest Association Libraries:

- a. American Social Hygiene Association, 1790 Broadway, New York.

3. Nearest Commercial Producer and Distributor:

- a. Descriptive catalogues can be obtained from any commercial producer and distributor. These can be found in periodicals dealing with visual aids, and in almost any magazine put out for use in the schools.
- b. Keystone View Company, Meadville, Pennsylvania--Art, English, Health, Mathematics, Safety, Science, Shop Work, Social Studies, and Transportation.



4. Miscellaneous Sources:

- a. A descriptive catalogue can be obtained from the Slide Division, Department of Education, American Museum of Natural History, Central Park, West at 79th Street, New York 24, N. Y.

Approved by:

Albert W Purvis

Date

July, 1948

