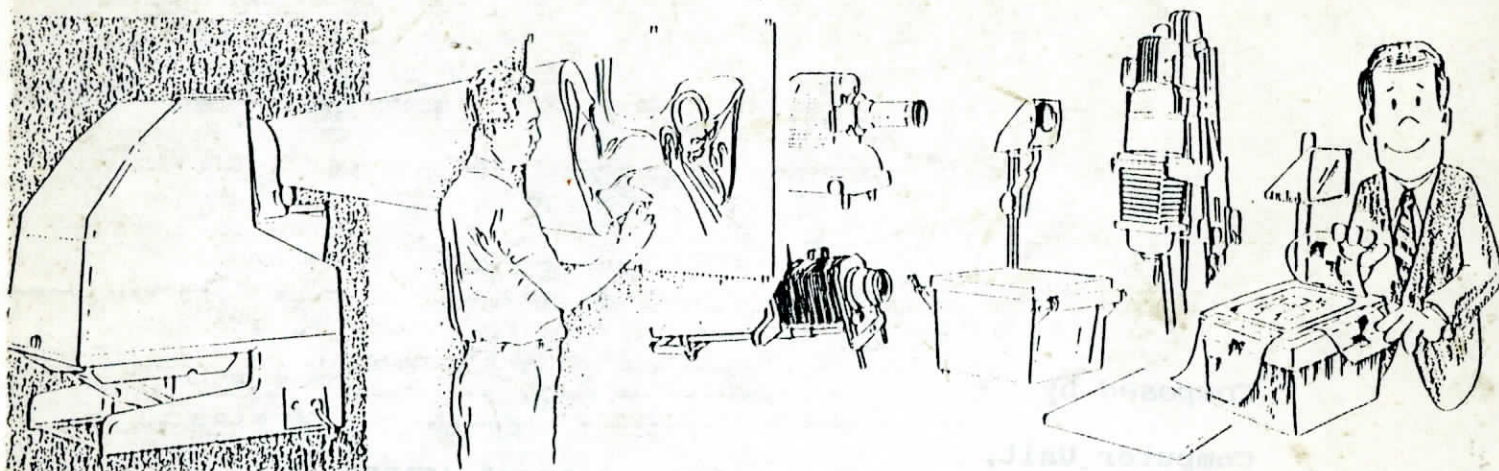


MANUAL ON AUDIO VISUAL COMMUNICATION IN TRAINING



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FOREWORD

Use of Audio-visual aids in training can significantly increase and reinforce learning. Not only do they add interest to a presentation, but by engaging more than one of the senses, they also facilitate listening and remembering. However, in order to be effective, they must be carefully designed to support a lesson and to suit to a particular audience and learning situation.

But in our part of the world, training is still now primarily based on chalk and talk method. Lack of orientation of the trainers in the planning and utilisation of various kinds of audio visual media in their training situations is one of the important reasons for such dependence on the chalk & talk method. Planning and preparation of such aids require time, thought and imagination and skills.

The Manual on 'Audio Visual Communication in Training' is an attempt in presenting a few simple and useful techniques of planning, preparing and presenting commonly used audio visual media. This manual has been brought out to help upgrading the training capability of this Academy's faculty members as a part of the 'Assistance to the Development of BARD' Project under the sponsorship of UNDP. The author Dr. D. Sen, the expatriate consultant (Training & Education) is to be congratulated on his sincere and dedicated efforts in preparing the manual.

I wish that the faculty members of BARD shall derive immense benefit out of this work. I wish the work a great success.

Dated the June 10, 1992
Comilla, Bangladesh



(Dr. K. M. Das)
Director General, BARD

10. 6. 92.

P R E F A C E

Modern training programmes are increasingly becoming dependent on the use of Audio-Visual media for communicating the information more effectively to create durable imprint in the minds of the audience. But a tendency of dependence is observed among the trainers on artists for producing the software materials to be used in training situation. A common perception among the trainers is that to produce the audio-visual materials one requires certain amount of artistic skill. But in reality, eventhough one is not an artist, with some amount of planning and imagination, it is possible to produce one's own materials.

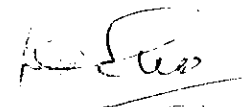
This manual's central focus is on driving home such concept among the trainers, so that they are able to overcome such dependence syndrome. The most widely used audio visual aids, both projected and non-projected used in training, have been taken into consideration while dealing with their planning, preparation and presentation. It aims at facilitating the trainer with a few simple techniques of preparing and using these aids so as to upgrade their training capability.

I express my deepest sense of gratitude to Dr. K. M. Das, Director General, BARD for his constant encouragement and kindly writing the foreword. I am also thankful to Mr. M. A. Quddus, Director (Training) and Mrs. Tahamin Banu Asst. Director (Training) of the Academy for their support. The suggestions offered by Mr. Minhajuddin Ahmed, Documentation Consultant of ADB Project for improving the presentation is also gratefully acknowledged.

I am extremely grateful to the Computer Unit and Communication Divisions for their untiring support in extending the composition and reprographic facilities. But for their able assistance, it would not have been possible for me to produce the manual.

Above all, I am thankful to UNDP for providing me the opportunity of serving as a consultant in the ADB Project, whose outcome is this manual.

Dated the June 10, 1992
Comilla, Bangladesh


(D. Sen)

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USE OF AUDIO-VISUAL AIDS IN TRAINING

The use of audio-visual aids has become important in modern training programmes. These aids can be successfully used for attracting and retaining attention. Information can be conveyed with minimum time and effort. The concepts can be made more realistic by actual demonstrations and visual charts.

All trainers must have basic information regarding the benefits of different aids. They need not be experts in maintaining or repairing equipment like projectors, tape recorders, etc. However, they must be aware of the role that these aids can play in increasing the effectiveness of the training. Many training departments are not adequately equipped and there is inadequate appreciation of the benefits that can be derived from appropriate use of the aids. In many other training departments, aids are readily available, but they are not used by the trainers.

It is important to mention that audio-visual aids do not represent a training method. We can consider role play, lecture, case study etc. as separate training methods. But audio-visual aids are tools for increasing the effectiveness of training. They can be used in all training methods.

SYSTEMS APPROACH TO AUDIO VISUAL COMMUNICATION

In order to use the different kinds of visual and audio-visual aids for bringing about maximum amount of change in the audience, one has to take into consideration his intended objective, size and nature of audience, nature of the message and

also the resources at the disposal of the trainers. In view of this, he/she should plan the use of visuals and audio-visual aids taking into consideration several factors like; objective, audience, media, resources and technique.

1. OBJECTIVE : The trainer should have clear idea in his/her mind about the kind of change intended to bring about among the audience. In getting this idea the key points in the message should be considered regarding which the audience should gather information and their appropriateness to the needs of the audience.

2. AUDIENCE : The trainers should have clear idea regarding the size of the audience, their nature in terms of needs and problems they are facing as well as their level of education and knowledge regarding the message. The stages of learning of the audience with respect to the particular idea involved in the message should also be considered.

3. MEDIA : In training situation, certain medias are well suited for certain jobs. If we want to communicate the idea of different parts of a sprayer, we may prefer to use a model or the sprayer itself as compared to photographs or slides. On the other hand to show any moving object, the use of motion picture/video would be ideal. So the decision regarding the type of media to be used is usually influenced by the nature of the message. It may be mentioned here that the use of a combination of aids is always preferable to the use of single media.

4. RESOURCES : While planning for use of visual and Audio-Visual Aids, the trainer should consider the available resources in terms of finance, equipment and facilities for preparing and using them. We may have a film projector and films but may not have electricity or a generator for film show in a particular training situation. However the lack of availability of resources should not be overemphasized. Eventhough we may not have an artist, visuals can be prepared out of cutout pictures from journals and magazines etc.

5. TECHNIQUE : The preparation of different kinds of visual aids demands specific techniques to be followed in their layout and design. While taking photographs, the use of camera is not the only technique to be followed, but the direction, distance and face of the object are also to be considered. For preparation of slides and overhead transparencies, specific proportion of sizes are to be followed in preparing artworks.

6. PREPARATION : Preparation of most of the visuals calls for a thorough understanding of the subject matter on which we are preparing our aids. Different visuals call for different treatments of our messages. We have to find a way how best the messages can be depicted for easy understanding by the audience. The important points to be considered in preparing visuals are: local interest, technical correctness, logical sequence of ideas and jotting down points on separate cards for every visual, and rehearsal before using them.

For most effective use, the Visual and Audio-Visual aids should be incorporated in the teaching plan which may be considered as an instructional prescription or a blue print which should be followed to achieve the objective with reference to a programme. It is an administrative document that dictates how the facilities, time at the disposal of the communicator should be organized in relation to the content or message, so as to develop highest degree of skill, knowledge and attitude on the part of the audience.

Elements of a teaching plan

There are many different forms of planning a teaching programme. Any of such forms may be selected to suit the needs of the audience. Nevertheless, all teaching plan, in whatever form it may be, must include the following components.

1. Title of the subject matter- The teaching plan must have the title of the subject. The selection of subject matter should be done considering the problems or needs of the audience, their ability, level of knowledge and education.
2. Specifying the subjectmatter into several topics :- Findout the different materials of the subject matter and grade them in 'must know', 'should know' and 'could know' category. Be quite firm with yourself at this classification stage. Remember that your classification depends upon your objective, the subject matter title, the group and the time available and not upon your wish to talk on the topic. First take up all the 'must know' category and then if your time permits consider 'should know' and

'could know' categories. One of the commonest error in communication is the attempt to transmit too many ideas at a time. So be ruthless in the selection of the topic.

3. Objective :- The objective must be stated in terms of terminal behaviour which are expected from the audience i.e. their knowledge and skill at the end of the teaching of a topic is over.

4. Duration of each topic in the plan :- The time allotted to each of the topics selected should be specified.

5. Presentation :- Presentation is the main component of the teaching plan. At this stage the trainer decides how the messages are to be used to communicate the topic so that the desired behaviour change takes place. From among all such medias, the best one or group of medias are selected which can be used considering the resources and time available at his disposal. At this stage the trainer usually plans about the allocation of responsibilities among his fellow workers.

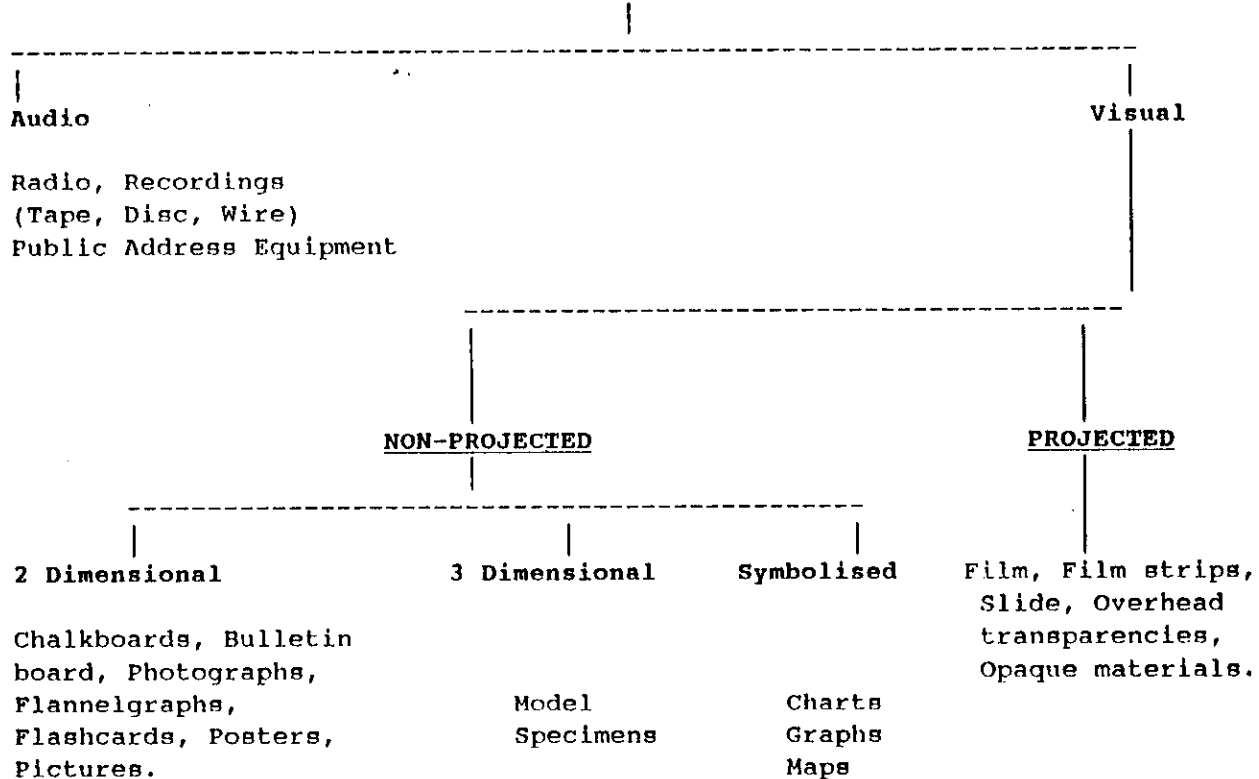
6. Evaluation :- The evaluation techniques of the medias as well as the terminal changes in the behaviour of audience should also be decided at this stage.

Thus the visual and audio visual aids should not be selected merely to use them but they are to be incorporated in the training design so as to produce most effective result in terms of participants response.

TYPES OF AUDIO-VISUAL AIDS USEFUL IN TRAINING SITUATION

There exist a wide variety of aids the trainers can use on the basis of suitability and availability. Some of the aids can be prepared by the trainer and the others can be purchased from commercial sources.

CLASSIFICATION OF AUDIO-VISUAL AIDS/MATERIALS



It may be stated at this point that for presenting some of the projected and non-projected materials, the help of some equipment is required. They are the Audio-Visual aids. It is generally found that the terms audio-visual materials and 'audio-visual aid' are often used interchangeably. This is more so because, it is difficult to maintain the distinction always as there are several audio-visual materials which themselves act as aids. The example of such materials are posters, models, specimens, flash cards, all kinds of literatures, charts, graphs,

maps etc. So for our purpose we will also use these terms interchangeably.

AUDIO- MATERIALS

1. PUBLIC ADDRESS EQUIPMENT

What - This equipment, commonly known as P.A.E. consists of a microphone, amplifier and loudspeaker. It is used to amplify and reinforce sound. The microphone converts sound waves into alternating electric currents which are fed into the amplifier. The amplifier is an electric device to amplify these electric currents. These amplified electric currents are fed into the loudspeakers where they are converted into sound waves and the magnified sound is heard.

Why - It is generally used in meetings involving large number of audience in order to make the message audible.

2. TAPE RECORDER

What - A tape recorder is a machine for recording sound on magnetic tape by electro-magnetic processes. Its purpose is to preserve original sound for later use.

Why - 1) for repeated use.
2) erased or re-recorded to remove mistakes or make changes.
3) can be very effectively used in conjunction with visual materials.

VISUAL MATERIALS

A. NON-PROJECTED

(i) 2-Dimensional

1. CHALK-BOARD

What - The chalkboard, popularly known as black board, is the most universally used visual. Properly placed and used, it is of great value in training teaching at all levels.

Why - for expressing:

Definitions,	Sketches,	Announcements,
Key words,	Maps,	Comparisons,
Outlines,	Graphs,	Summarisation,
Drawings,	Diagrams	Assignments,

2. BULLETIN BOARDS (TALK BOARD)

What, - It is a device specifically set aside for displaying many items of interest and educational value to the intended learners or audience.

Why -1) to attract attention
2) to stimulate interest
3) to deliver a message
4) to produce action.

3. FLANNEL BOARD (FELT BOARD)

What - Flannel board consists of a stiff backing covered with felt material on one side. Any graphic material may be used on a flannel board.

Why - Flannel graph is well adapted to step by step story build up. One can place interesting pieces on the board and keep the audience wondering how the story will end.

4. FLASH CARDS

What - Flash cards are brief visual message on poster board cards flashed (turned over at short intervals) before the audience to emphasize important points in a presentation.

Why - They can be made quickly.
can be made from inexpensive local materials
can be carried easily
can help speaker emphasize main point of his talk and are easy to use.

5. POSTERS

What - A poster is designed to draw attention of a large number of people towards an idea. It usually includes only a few words with an illustration.

Why - It is designed to
1) catch the attention of the passerby;
2) Impress on him a fact or an idea;
3) simulate him to support an idea;
4) make him get more information or take required action.

6. PICTURES (Non projected still pictures)

What - Pictures are one of the most versatile and effective visual aid. A common saying states 'one picture is worth a thousand words'.

Why - They 1) Arouse interest
2) Introduce new subjects.
3) Illustrate specific steps in problems.
4) Build wholesome attitudes.

- 5) Develop appreciation.
- 6) Test knowledge of the learner.

(ii) 3 - Dimensional

1. MODELS

What - Models are replica/duplicate of real objects and scaled representatives of things. Alongwith specimens and exhibits, they are often called three dimensional visuals.

Why - They

- 1) can be examined, handled and operated.
- 2) show how things look operative.
- 3) show relationships.
- 4) simplify complex working parts of mechanisms.
- 5) may enlarge small objects for group study or reduce large objects for easy manipulation.

2. SPECIMENS

What - A specimen is the real object in preserved form. It may be part of an object or one of a group or class to represent the whole group, in other words, a typical example.

Why - Specimens are especially useful because they are real and thus provide the learners with direct experience.

(iii) Symbolised

1. CHARTS

What - Charts are pictures of relationship and changes. They are graphic and pictorial representations used to tabulate a large mass of information or to show a progression. They are visual symbols helpful in explaining a subject matter. Charts are often referred to as symbolized visual.

Why - They

- 1) make facts and figures clear and interesting.
- 2) show or compare changes
- 3) show size and placement of parts.
- 4) show operational procedures.

Types of charts: While there are innumerable varieties of charts, some types in common use are:

1. Bar charts are made of a series of bars along a measured scale. They are used to compare quantities at different times or under different circumstances.
2. Pie charts are in the shape of circles, and used to show how several parts make up the whole. They may show percentages, proportions etc.

3. Tabular charts are used to bring together in compact form a mass of related data.
4. Tree charts are used for showing development or growth of a thing. The origin is shown in the form of trunk and various developments are shown as branches of a tree.
5. Flow charts are shown by lines, arrows, etc. They show organisation or structure of departments, institutions etc.
6. Pictorial charts give the viewer a vivid picture and create a rapid association with the use of graphic messages like cartoons, illustrations etc.
7. Overlay charts consist of a number of sheets which can be placed one over the other conveniently. On each individual sheet a part of the whole is drawn. This enables the viewer to see not only the different parts, but also how they appear when one is placed over the other. After the final overlay is placed, it shows the ultimate product. This type of presentation is dramatic and effective.
8. Pull charts consist of written messages on a large sheet. Messages are hidden by strips of thick paper held in position. The messages can be shown to the viewer, one after another, by pulling out the concealed strips. This provides suspense to the viewer.
9. Strip (tease) charts are similar to the pull charts. Messages, words, pictures, etc., are concealed by using strips of thin paper instead of thick paper. The ends of thin paper strips are pinned or pasted to both ends of the message on the big sheet. Whenever the message on the big sheet is to be exposed, one end of paper strip is stripped out. This has the advantage of surprise or anticipation.
10. Flip charts carry a series of ideas arranged sequentially. Individual chart are tacked or bound to some support and as the lesson progresses, are flipped by the teacher. This kind of chart exposes the audience to segments of the subject, in sequence, and holds attention remarkably well.

B. PROJECTED

1. MOTION PICTURES (Films)

What - Motion pictures are really a series of still pictures on a long strip of film. Each picture is flashed momentarily on the screen and the rapid succession of still pictures (each of which shows the subjects in a slightly different position) gives an illusion of movements. For projecting the motion picture the help of movie projector is needed.

- Why - 1) A complete process involving motion can be shown in a short time.
2) People identify themselves with those in the picture.
3) Compel attention.
4) Brings closer the reality.
5) Speed up or slow down time.
6) Enlarge or reduce actual size of objects.

2. FILM STRIPS

What - A filmstrip is a series of still photographs, diagrams, charts, lettering or drawing on a strip of 35mm film.

- Why - 1) Story can be told in steps.
2) A script can help tell the story.
3) Very light, can be easily stored in cans and carried
4) Condenses much information into a small package.
5) Low production cost.

3. SLIDES

What - A slide is a transparent picture projected by passing rays of light through it. Slide projectors are needed for projecting them.

- Why - 1) can be arranged in any sequence.
2) story can be told in steps.
3) can be easily selected from a large number.
4) allow pauses for discussion.
5) are good media for discussion.
6) can be prepared at low cost.
7) can be easily handled and transported.

4. OPAQUE PROJECTOR

What - Opaque projector projects enlarged images of small opaque non-transparent materials like, maps, pictures on to a screen.

- Why - 1) easy to handle.
2) projects wide variety of material.
3) enlarged materials, many can see and learn.

5. OVERHEAD PROJECTOR

What - Overhead Projectors are used for enlarged projection of diagrams, charts, graphs etc. drawn on transparent, acetate sheets.

- Why - 1) for projection of materials under normal day light.
2) enables the speaker to deliver his message facing the audience.
3) for replacing the use of chalk board.

DESIGNING ARTWORK FOR INSTRUCTIONAL VISUAL MEDIA

The designing of the artwork is the first step in the preparation of visual aids of all kinds. Most artwork is only an intermediary in that it is intended to go to the camera or document copier for conversion into various forms of software, or to the duplicator for reproduction, but the skills required are equally applicable to the preparation of charts, Flash cards, Flannel graphs and such types of other display materials which are ends in themselves.

It is not necessary to be a trained artist to produce effective visual aids. All that is required are a few simple materials and knowledge of the techniques involved. The following section provides some practical suggestions and guiding principles, which should be considered while designing artwork for instructional media.

Types of Artwork

Artwork can be conveniently divided into three major categories:

- * Graphic - Charts, diagrams, graphs and other similar graphic materials used to visualize statistical data, processes, relationships etc. belong to this category.

- * Lettered - These are used for titles and captions, to emphasize key words, to enumerate topics or to summarize.

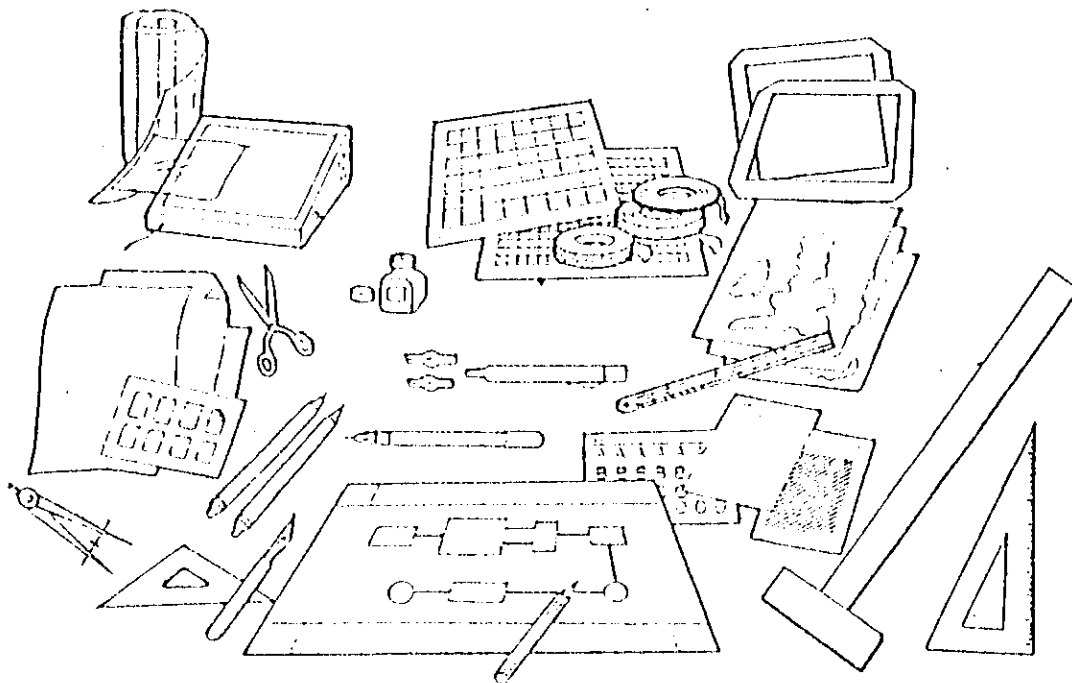
- * Pictorial - This kind of artwork ranges from simple line drawings or sketches to detailed drawings, cartoons, etc.

Combination of graphic and photographic images will often make very effective visual masters - this is a common technique when making title slides

Choosing Materials

There are many products available on the market that can aid you in designing your artwork. They include: base materials, pens and

In order to be able to work methodically and rapidly, collect all necessary materials and keep them near your work place. Care must be taken to clean and store materials after use.



Planing Artwork

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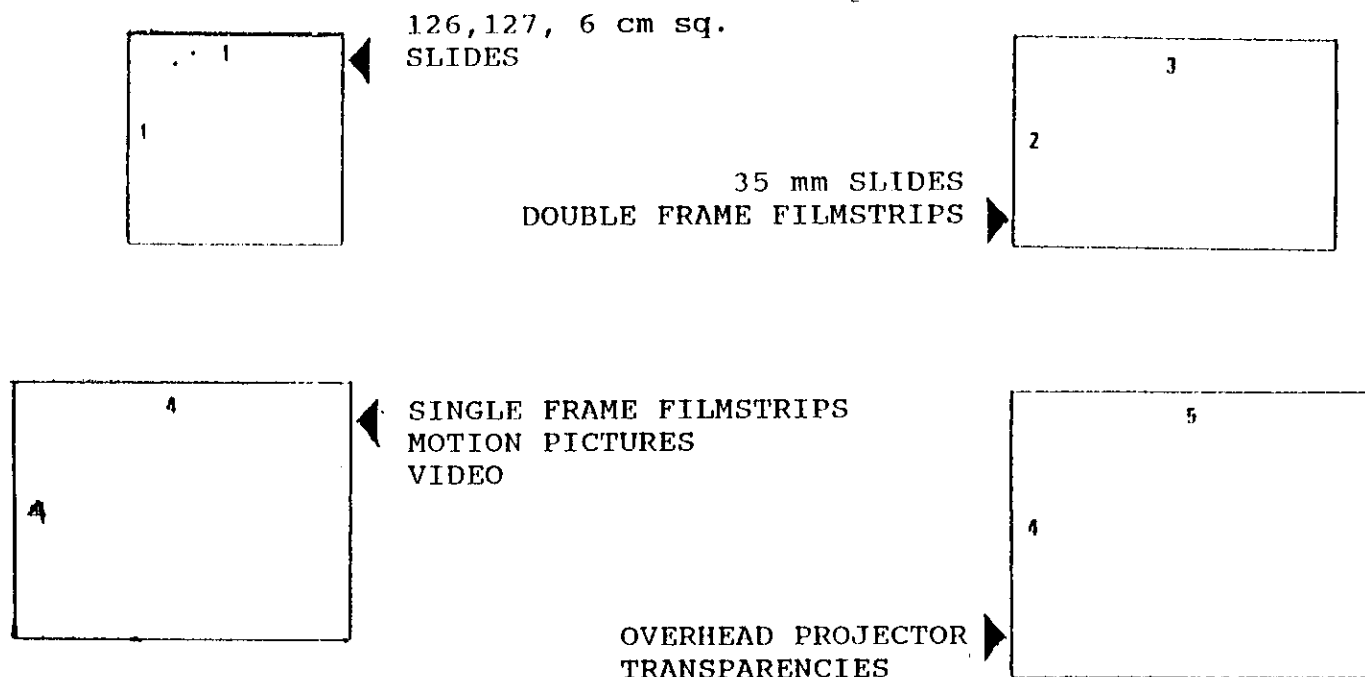
and facilities that can be employed. If more than one copy is required, then the method of reproduction must be taken into consideration.

To produce an aid for a learning situation, you must carefully follow the following steps:

- analyse the outline of your lecture and define the learning steps (the amount of information required to lead to a definite conclusion).
- examine each step and decide what has to be supported and reinforced by visual material.
- for each step, decide which aid is most suitable, whether it be an overhead transparency, a chart, flip charts, magnetic board material or flannel board symbols.
- define how long the aid will be used during your session in order to determine how detailed your image has to be.
- having decided on the different methods and materials needed for each learning step, edit the sketches of the different images to achieve a homogeneous presentation.
- start working on the following methods and have the required material at hand.

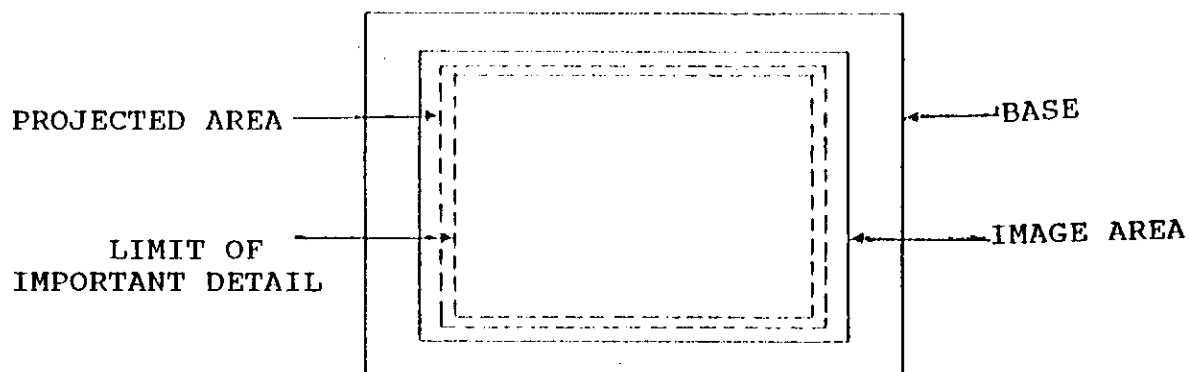
Visual formats. Although projected visuals should all be designed in horizontal format, the ratio of height to width is not the same for all media. Examples of common visual formats are shown below.

All artwork for a particular type of projection must be designed in a format which is proportionate to the projectable area of that particular medium. There are worthwhile advantages in establishing uniform sizes for artwork and making these sizes standard. The frequent changing of reproduction ratio takes time and complicates the photographer's work, increasing costs. Standardization of the format will ensure consistent results in reproductive quality and legibility. A safe margin should be left



Visual Formats for Various Projected Materials

around the edges to accommodate the tolerances required in copying. This will also facilitate handling and filing of artwork. Important elements, such as captions, text, etc. should be inside a further safety margin.



Format for Projectable Area

LAYOUT

In planning artwork, the first consideration is the layout. The primary objective of layout, or arrangement of symbols, shapes, lines and areas of colour within a given space, is to draw the viewer's attention to the centre of interest. The overall layout must be balanced in relation to colour, tone, contrast, and the spatial arrangement to give visual emphasis. Aesthetic design, however, must not obscure the teaching points.

At first, you may experience some difficulty in preparing the layout. It is advisable in such cases to try out possible alternative forms of presentation before settling on one.

- Layout is the arrangement or display of images and text within a given space.
- A good layout will contribute to the message and emphasise the most important parts of it. A poor layout will detract from the message and therefore lessen the effectiveness of the visual material.
- A good source of learning about and of comparing layouts can be found in newspaper and magazines. The advertisements, a field of visual communication designed to persuade you to do something, will give you idea about wide range of different layouts.
- It would be of great help in your future work to start an "ideas bank" by filing clippings of good advertisements. If you run out of ideas, go through your "account" and make an "inventory". You may be almost sure that a look through your files will stimulate your creativity.
- Especially valuable in this connection might be a collection of striking cartoons or comic strips.
- One should easily be able to distinguish between key ideas and less important ones. To achieve this, you can apply stronger and bolder lines, or stronger colours.
- Minimise the number of ideas to be shown at one moment. The maximum of ideas presented on a teaching chart should not be more than five, but even so you should use techniques such as the window system or flapping to discuss only one at a time.

- If the number of ideas is more than five, you should design a sequence of charts, transparencies or symbols.
- An appealing aid is a balanced one. Looking at the aid, you should have the feeling that everything is in its proper place. An aid which is not balanced gives you the impression that it is not complete, not in proportion. The balance does not always have to be symmetrical - asymmetrical designs may in some cases even be more attractive.
- Test the drawing, or have another person test it. If the drawing gives the impression that something is missing, do not add any unnecessary details. The image is surely out of balance.
- If your sketch is not satisfactory, you and your test person should try cutting it into sections and shifting them around until you are satisfied. Then you can fix the pieces in their new places with glue and start working on the original.

Artwork Preparation

Having produced a draft layout of the artwork and chosen the appropriate materials, the next stage is to prepare the artwork in final form. There are three aspects to be considered;

1. the drawing or pictorial part
2. the use of colour, and
3. lettering.

1. Drawing

Creating the image is usually the main concern while producing visual media. If one has an art background or has access to professional help, the problem is simplified. In many situations, however, one will have to resort to the use of clip-art files, pictures from magazines, or to the many other sources of ready-made pictures. Integrating these image materials into the final artwork will require a knowledge of such methods as tracing, enlarging, and reducing so that the image can be converted into usable form.

Whenever possible, only one idea at a time or a limited topic should be presented on each visual. The image should be bold, simple, and free from unnecessary detail. Clarity should be placed above most other considerations of artistic presentation.

There are basically two kinds of pictorial presentation:

- freehand drawing, which requires a certain amount of skill and training;
- "matchstick men" and simple forms, for those with little artistic skill, Charts, diagrams and other similar graphic materials often require simplification for good readability. The clever use of keys, stylized symbols, and abbreviations will all contribute to presenting the most essential information in the clearest way.

Drawing facilities:-

- All you need is a large amount of information and creativity. The lack of technical equipment should not prevent you from starting the job. The following list of materials may make your job easier and reduce the time needed for your production.
- You need space to work in. This may be the floor of your room, a table, desk, plywood or strong cardboard, and so on up to a drawing board, ideally constructed as lighttable.
- You also need a place where you can store the material that you do not use very often so that you know where to find it.
- You should also have a ruler, a T-square, set squares, a protractor. The most important thing is the ruler; the rest can be produced out of cardboard.
- If you need a right-angle to produce a template representing a set square, there should be no problem.
- When drawing the set square template, the length of the 3 sides should have the following ratio: 3:4:5, for example 15cm : 20cm : 25cm.
- Then a compass, if possible with an adapter of felt pens. But do not worry if you do not have one. A simple piece of string with a nail for the centre will do the job and if you are unable to find the string, take a piece of paper and two pencils.
- Scissors, paper cutters or a sharp knife to be able to cut the paper into pieces are also necessary.

- The next item on the list is a soft eraser, and for transparencies some spirit and cotton wool for corrections. White ink or white water-soluble paint can also be used for corrections.
- Get together an assortment of pencils, felt pens, simple fountain pens of different degrees of thickness and colours.
- You can use coloured inks, coloured chalk, water soluble wall paint or powder paint to colour your images.
- You should also have a variety of paper (plain or coloured) and cardboard.
- You will find that tracing paper, adhesive tape, paste and glue, paper clips and drawing pins are all very useful.

Again, do not wait until you have all your facilities before beginning your work. What you need most are ideas to solve your problems.

It is of course obvious that you have to keep these materials clean so that they will last longer.

Drawing techniques:-

There are various techniques of drawing illustrations which can be followed conveniently even if you are not having the artistic skill.

(1) Tracing:

- Tracing is a simple and rapid method of copying drawings. It is also a good exercise for reviving your drawing skill.
- In principle, you just cover the original with your sheet of paper, provided that your drawing paper is not too thick, to see the outlines of the underlying original.
- If possible, use the paper on which you intend to produce your visual aid, otherwise you will first have to transfer the image onto a more translucent material, such as tracing paper, and from there onto the paper on which the image is to be produced.
- The indirect transfer method, using translucent material, can be done in the following way.

- Fix the sheet of tracing paper firmly into position over the design to be copied. The original design should be fixed as well so that neither will move while you are copying.
- Start tracing the outlines with clear, bold lines, beginning in the top left-hand corner. To protect the tracing paper, slip a small sheet of paper under your hand.
- Remove the tracing paper and turn it over. Use a soft lead pencil and run over the lines on the back of the sheet.
- Turn the tracing paper over to the right side again and place it on the surfaces of the paper to be used for the aid.
- With a hard lead pencil draw over the traced outlines, exerting sufficient pressure so that the lead particles on the back of the tracing paper will be transferred onto the surface of the aid.
- Remove the tracing paper and go over the lines of the image with your chosen materials.

(2) Light source copying:

- The basic idea of this copying technique is the use of any light source to make the paper translucent. The stronger the paper, the stronger the light has to be.
- The different light sources can be:
 - A window, preferably when there is sunshine.
 - A lamp and a glass plate supported by objects such as books or bricks.
 - A plastic-covered neon lamp with a smooth surface.
 - A specially prepared light box.
 - A light-table.
 - A drawing board with a light-table.
 - An episcopes.
- Fix your original to the lit surface with the drawing paper on top of it.
- Trace the outlines in pencil and complete the design afterwards. When you become skilled in tracing, you will be able to trace the design directly from the original material.

(3) Carbon Paper Copying:

- Fix your drawing paper on a table and cover the space where the image should appear with carbon paper. Fix the carbon paper, making sure it is large enough. If it is not, use more than one sheet so that the space needed for the image is fully covered.

- Place the original to be copied on top of the paper and trace the outlines with a pencil.
- Remove the original and the carbon paper carefully and complete the drawing with the intended material.
- If you do not want to mark your original with your copying pencil, cover it with a sheet of translucent flimsy paper or cellophane.

(4) Use of Copying Machine:

- If you can find photocopying machine for reproducing your images to the size you need, use it, but remember that this process may be expensive.
- Make sure that the lines of the original are strong enough to achieve a sufficiently good print.
- If necessary, strengthen the lines of the original with a soft pencil or Indian ink.
- Complete the image with the material required
- If you want to copy only a part of the original or if you want to reduce the amount of visual information, cut out the information you want to copy and fix it on a sheet of paper.
- If you cannot cut the original, cover the unwanted information with pieces of paper before copying.

(5) Templates and Stencils:

- One way of simplifying the drawing process is to use templates and stencils
- Templates and stencils can also be used as a means of reproduction for a small number of similar aids.
- You need strong paper or cardboard. Trace the outlines of your images by applying the techniques described before.
- Cut out your image using a sharp knife, a razor blade, a paper cutter or scissors. For templates, you just cut along the outlines, but stencils are more complicated.
- To cut out stencils, you have to make sure that the stencil does not fall to pieces due to your cutting. To avoid this, and to maintain a certain stability, you have to leave a number of bridges. For instance, if you want to cut a stencil for the letter 'O', you will leave bridges to stop the middle part of the letter from falling out.
- When you have completed your device, you will place it where it should be on the aid and trace the outlines or fill in

the stencil. Remove the template or stencil and finish your image.

- This technique can also be used on any kind of board, such as a chalk board.

2. Use of Colours

- If you look at a visual aid made up of the background paper with just one more colour added for all the drawings or print, it does not seem very attractive at all. It looks flat. Just a few spots of another colour may result in a more pleasing picture and the symbols will catch your eye.
- Again, there is no general rule for the application of colours, because some colours have different meanings in different cultures.
- Perhaps the following list of colour combinations will help you in your selections:

RECOMMENDED COMBINATION OF COLOURS ON NON-PROJECTED MATERIALS

BACKGROUND

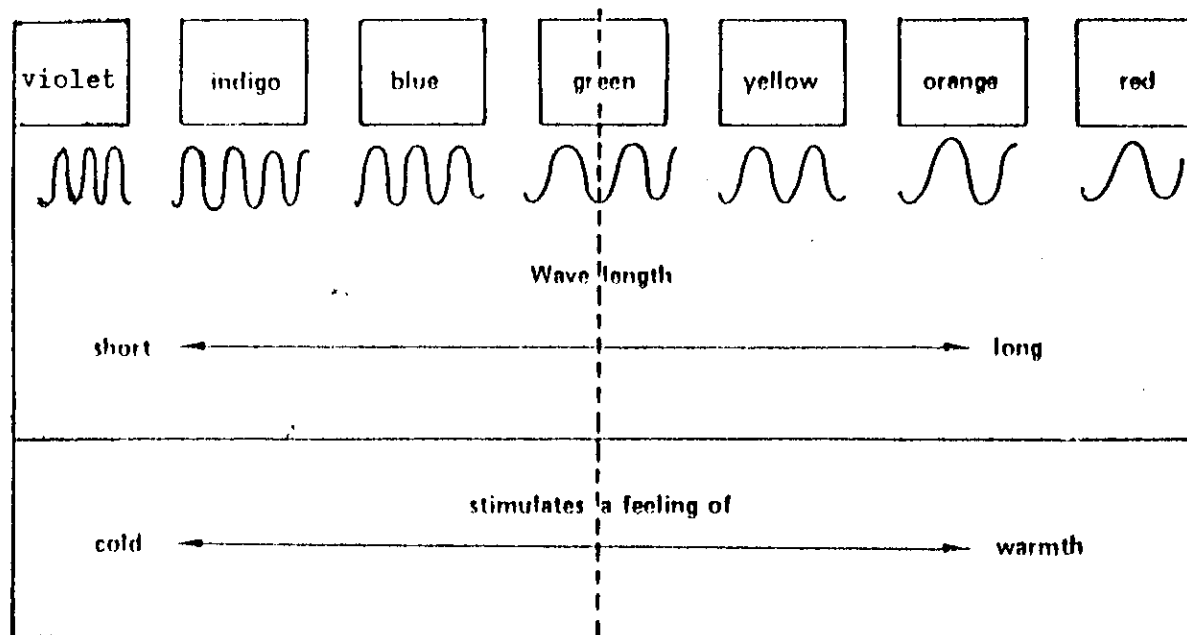
SYMBOLS

White	Red, Green, Blue, Black, Brown, Violet
Yellow	Red, Blue, Black, Brown, Green
Light Blue	Yellow, Brown, Violet, Black, Blue, Red
Dark Green	Black, White, Yellow
Pink	Green, Black, Blue
Red	Green, White, Yellow
Dark Brown	Orange, Black, White, Light Green, Green
Light Brown	Green, Blue, Red, Black
Light Grey	Blue, Gold, Red, Black
Black	Gold White, Red, Light Blue, Silver, Green
Light Green	Gold, Brown, Red, Black

Application techniques:-

For colouring your visuals the following techniques can be used:

- (1) use of coloured chalk
- (2) use of crayon, marker pens



Psychological Effect of Colours

- (3) Use Water colour or other water based colours
- (4) Use of coloured felt pens
- (5) Use of cut-outs of coloured paper
- With cut-outs of coloured paper, even pasted in different layers, you will achieve good results and the image will have more depth.
- For statistics, diagrams or for emphasis, this technique will be very useful.

3. Lettering:

With few exceptions, practically every kind of visual medium requires lettering. lettering serves to identify, level, emphasize, explain, clarify and reinforce, and often to add supplementary information. A few guidelines for lettering the visuals are:

- Minimize the amount of text in any one image.
- Bold and clear type face is preferable to ornate lettering.
- Lower-case is better than upper-case (capital letters),
- Too many variations in type face in one visual should be avoided

Lettersize:-

- We have to ensure that when an aid is presented in its final form it will be immediately legible to all viewers. Legibility cannot be overstressed. For projected materials, the minimum letter size is based on the maximum anticipated viewing distance.
- O The maximum, as a standard, is accepted as being six times the horizontal dimension of the picture on the screen (6W).
- O The maximum viewing distance for television, in terms of the screen size, is greater, being 12W. As you might expect, minimum letter size for television is therefore greater.
- O Minimum letter sizes for projected aids are recommended in the table below.

Maximum anticipated viewing distance	Artwork area 17x22.5 cm	Artwork area 22.5x30.5 cm
	Minimum letter height (mm)	
4W	2.2	3
6W	3.2	4.5
8W	4.7	6.5
10W	5.5	7.5
12W	6.7	9

- O For non-projected materials follow these recommendations:

Maximum anticipated viewing distance (metre)	Minimum letter height (cm)
2.5 m	0.62
5 m	1.25
10 m	2.5
20 m	5.0

- Available on the market today is an unlimited variety of lettering aids. No particular one is necessarily the best for any lettering job. You need to evaluate as many of them as you can - for your own needs, in respect of availability, cost, ease of use, time required for preparation, and resulting quality.

However good the picture content of visual materials, their effectiveness is enhanced by well-appearing titles and captions. Neat lettering, simple designs, attractive colours or background patterns all add a professional touch to your materials.

USE OF PHOTOGRAPHY IN DEVELOPING VISUAL AIDS

Photography has very important role to play in the process of development of different kinds of visual aids like slides, film strips, photographs, motion pictures etc. In view of this, a thorough working knowledge regarding the camera and its utilization will be helpful.

BASIC PRINCIPLES OF PHOTOGRAPHY

The Camera : How it works

To take a picture, three basic things are needed (other than a subject and photographer) LIGHT, a CAMERA and FILM.

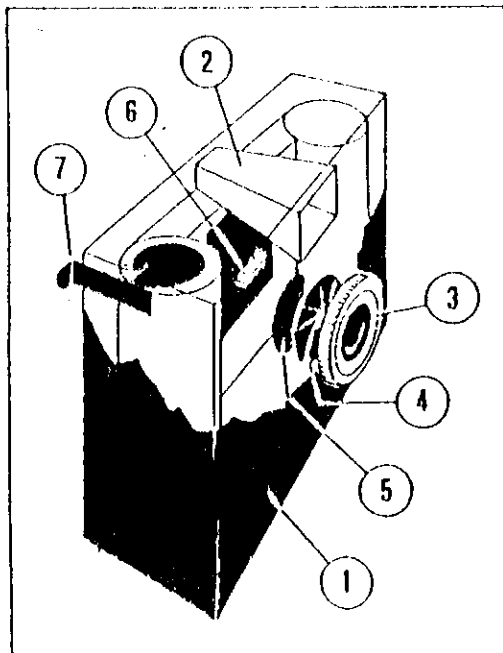
Light reflected from the subject passes through the camera lens and form a latent image (present but not visible) on the light-sensitive film. When processed, this latent image will become a visible image either in reversed tones, as in a negative, or in positive tones, as in a coloured slide.

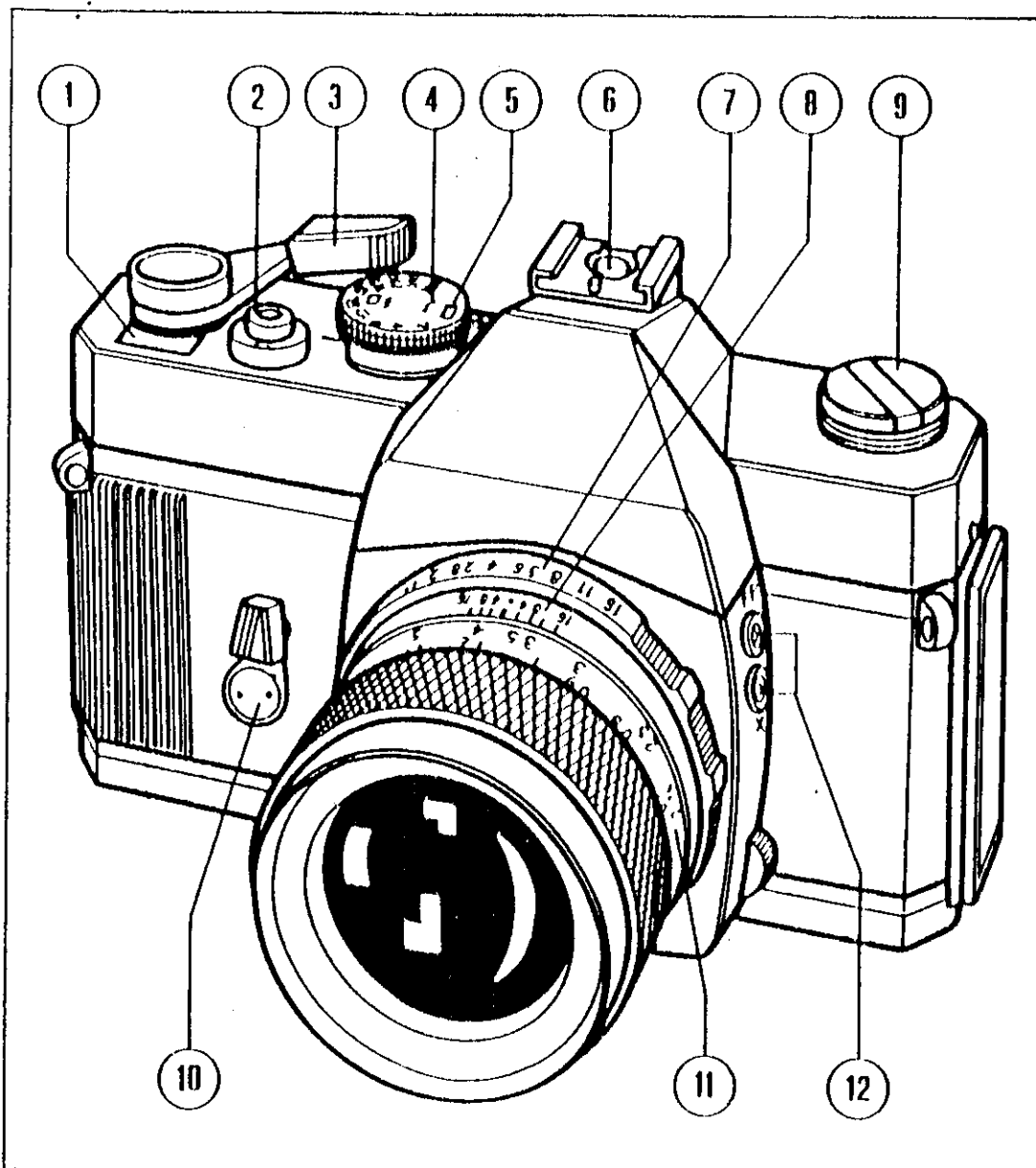
For good pictures, the film should be exposed to the proper amount of light. If too little light reaches the film, the resulting picture will be too dark (underexposed). If too much light reaches the film, the picture will be too light (overexposed). The camera must be adjusted to allow the right amount of light (the correct exposure) to reach the film.

Types of Camera

All cameras, however cheap or expensive, have the same basic parts and work on the same principles. They consist of:

1. A light excluding body to house the film.
2. A viewfinder to frame the subject you are photographing.
3. A lens to give sharp picture definition.
4. A lens aperture(diaphragm) to control the intensity of light reaching the film.
5. A shutter to control the length of time that light reaches the film.
6. A shutter release to operate the shutter.
7. A film advance mechanism to advance the film for the next exposure.





CAMERA CONTROLS

- | | |
|---------------------------|-------------------------|
| 1. FRAME COUNTER | 7. LENS APERTURE RING |
| 2. SHUTTER RELEASE BUTTON | 8. DEPTH-OF-FIELD SCALE |
| 3. FILM ADVANCE LEVER | 9. FILM REWIND KNOB |
| 4. SHUTTER SPEED DIAL | 10. SELF-TIMER |
| 5. FILM SPEED SELECTOR | 11. LENS FOCUSING RING |
| 6. ACCESSORY SHOE | 12. FLASH SYNC. SOCKETS |

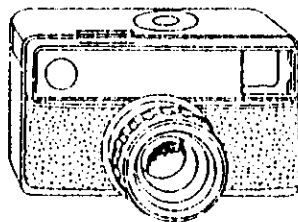
Although all cameras are basically the same, some cameras offer certain features that others don't.

- simple cameras have few or no adjustments to be made by the photographer and are therefore restricted to pictures in bright light conditions.
- Adjustable cameras have controls that allow taking pictures under a wide range of conditions.

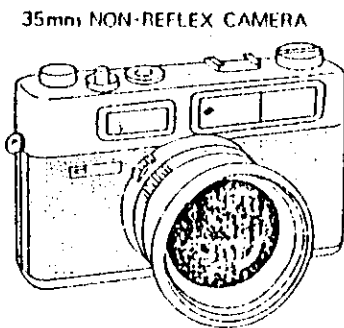
Cameras can be classified into groups according to picture size or operating characteristics.



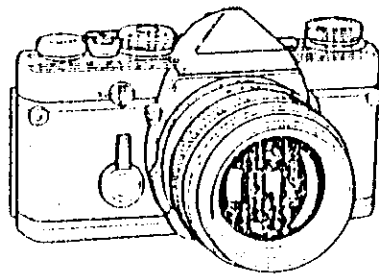
110 POCKET CAMERA



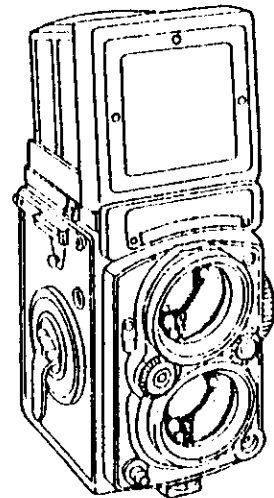
126 CARTRIDGE CAMERA



35mm NON-REFLEX CAMERA



35mm SINGLE-LENS REFLEX



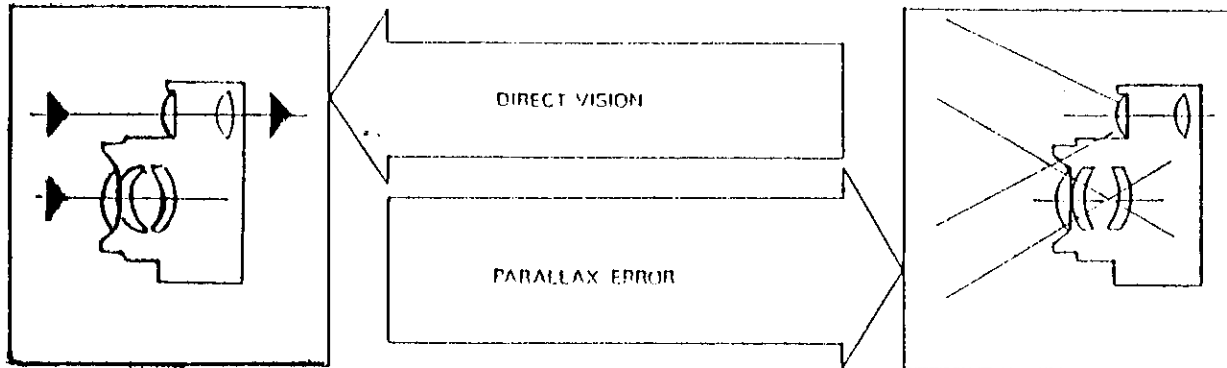
TWIN-LENS REFLEX

Various Types of Camera

Inside the Camera

i. The viewfinder

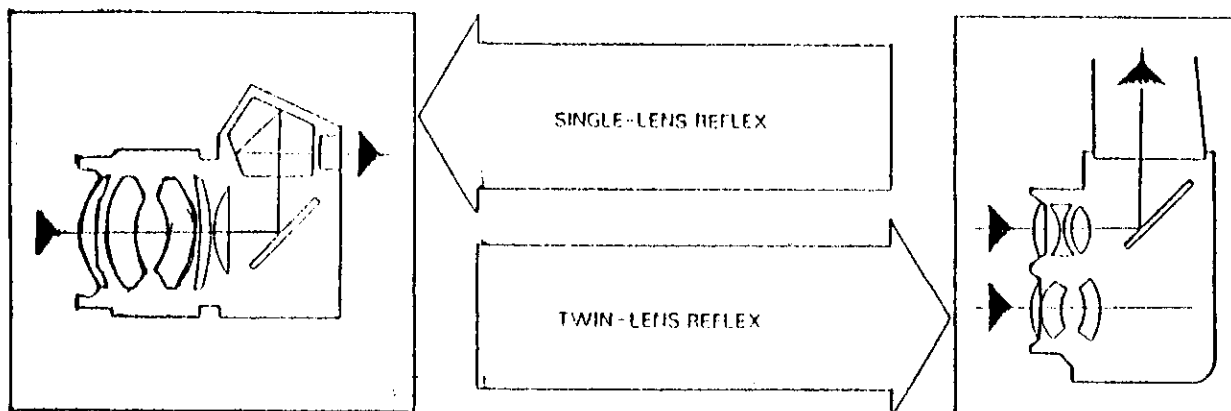
All the cameras have some kind of viewfinder through which to view (and perhaps focus on) the subject. The viewfinder shows the image "seen" by the lens, or an approximation of this. There are basically two types of viewfinder: direct vision and reflex.



On direct vision cameras the subject is viewed through a simple window that is separate from the camera lens. The displacement between the two viewpoints, known as parallax, may result in cutting of a portion of the subject. The closer the subject is the worse this parallax error becomes.

On reflex cameras the subject to be photographed is reflected by a mirror onto a glass where it can be focused and composed.

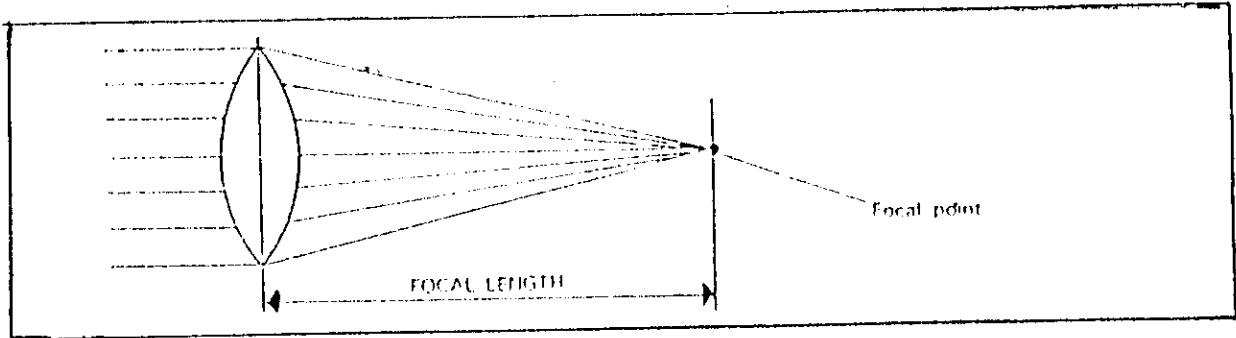
- Single-lens reflex cameras (SLR), allow viewing the subject through the same lens that takes the picture, thus avoiding parallax.
- On twin-lens reflex cameras (TLR), the subject is viewed through the top lens, and the picture is taken through the bottom lens.



ii. Lenses

A lens consists of one or more pieces of optical glass (which are referred to as elements) designed to collect and focus rays of light reflexes from a subject to form a sharp image on the film.

The major feature of a lens is its focal length - This term refers to the distance (measured in millimeters) from the center of the lens to the precise point behind the lens at which the light rays converge (with the camera focussed at infinity)-



The focal length determines the portion of a scene that is seen by a camera lens (angle of view) and the linear size of the subject (magnification).

A lens is called normal when the focal length is approximately equal to the diagonal of the negative or image area of the film with which it is being used.

A lens with a longer focal length than that of the normal lens is called telephoto lens (lens is physically shorter than its focal length).

A lens with a focal length shorter than the normal lens is called a wide-angle lens.

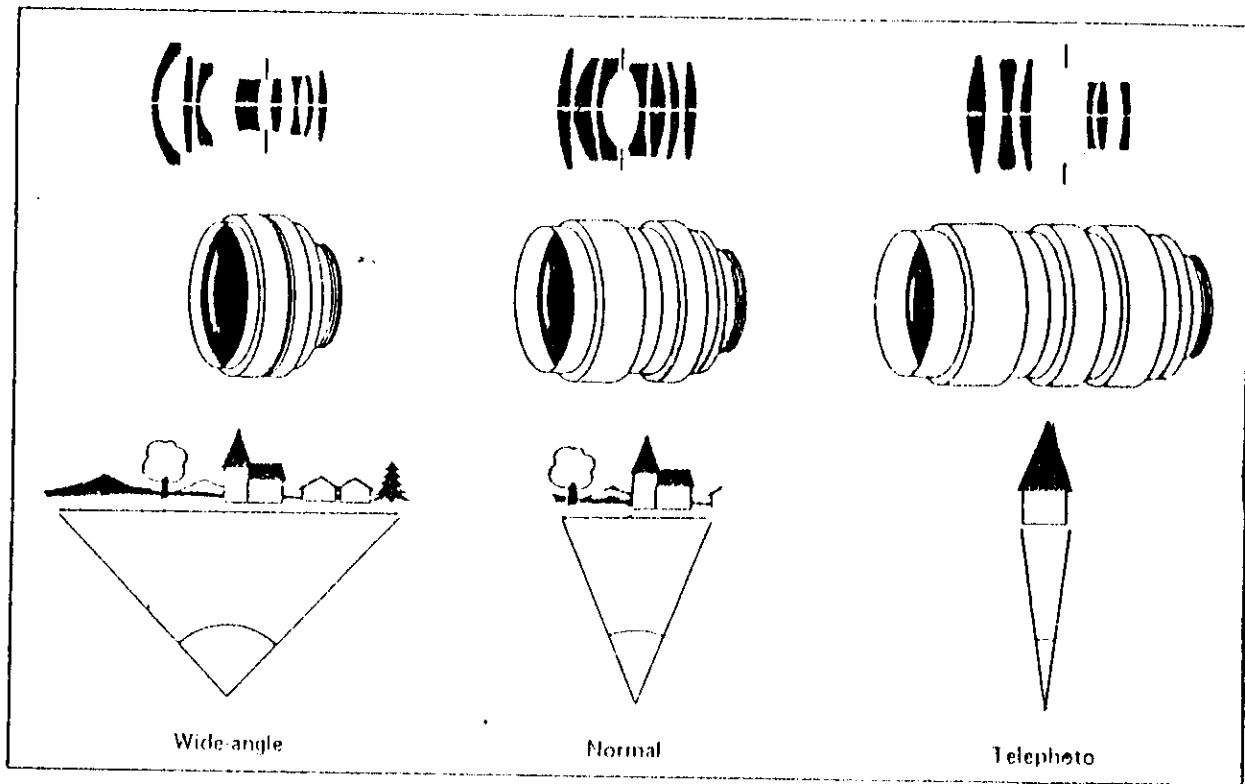
Zoom lenses have a variable focal length which permits a change of subject coverage without changing the camera position.

Many cameras accept interchangeable lenses by means of a screw or bayonet mount.

iii. Focussing

When you focus your camera, you adjust it for the proper camera-to subject distance. Methods used to focus the picture vary depending on the type of camera.

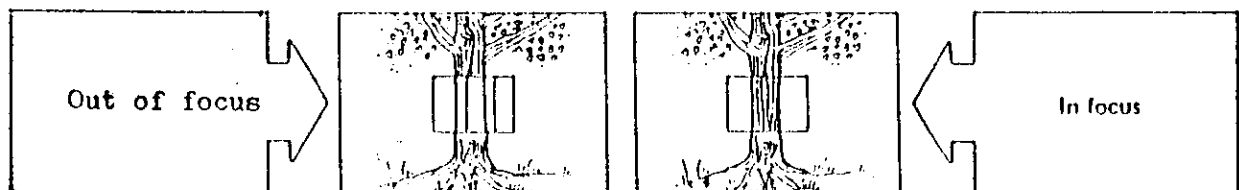
Although most simple cameras have fixed focus lenses, on some focussing can be adjusted by a control ring carrying either symbols or a distance scale in metres and /or feet.



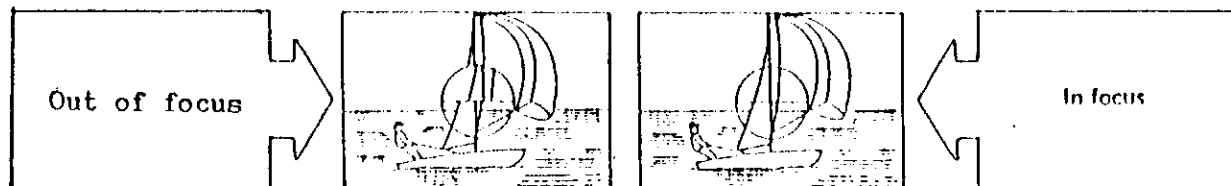
Various Types of Lenses

Some non-reflex cameras have a rangefinder coupled to the lens, which upon proper adjustment, sets the lens for the correct subject-to camera distance. The rangefinder may be either of two types:

- The coincident image rangefinder. The viewfinder shows two images of the subject. When the lens' focusing ring is turned, the two images are brought together until they coincide - then the subject is accurately focused.



- The split-image rangefinder. A small circle in the middle of the viewfinder is usually split horizontally across the middle and breaks the subject into two distinct halves. The lens focusing ring is turned until the two line up.



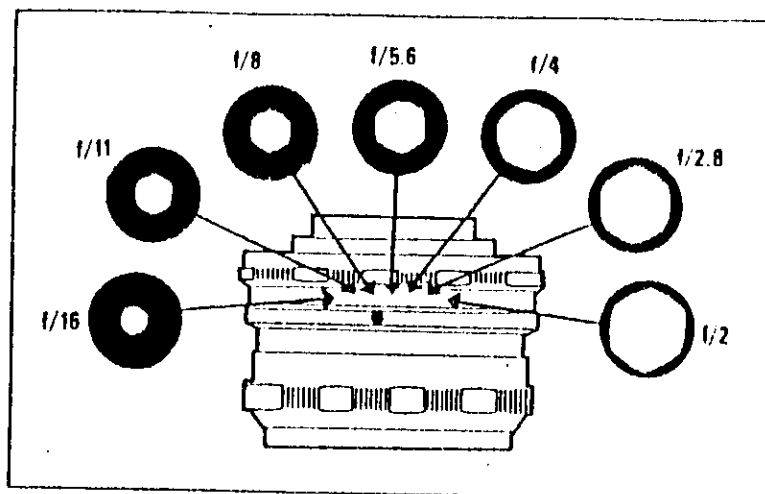
Single-lens reflex cameras allow focussing through the lens- the image is reflected upwards by a mirror onto a ground glass focusing screen. When the subject is out of focus, it simply appears blurred. The focussing ring is turned until the subject looks sharp in the viewfinder.

iv. Lens aperture (Diaphragm)

Light enters a camera by passing through the lens - the intensity of light entering is controlled by a lens aperture (diaphragm).

Although some simple cameras have a fixed lens aperture, others have an adjustable aperture controlled by a ring with weather symbols.

On adjustable cameras the size of the aperture is variable. The aperture control ring is calibrated in "f" numbers which indicate the size of the lens aperture in relation to its focal length. The smaller the "f" number the larger the aperture.



Range of Lens Apertures

The "f" numbers are determined by dividing the focal length of the lens by the diameter of the aperture.

Each number successively either halves or doubles image brightness.

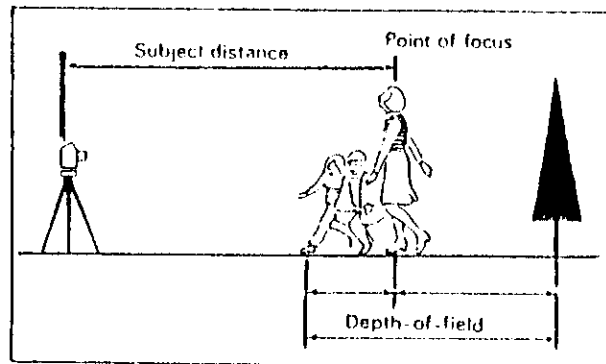
Lens apertures can also be used to control the amount of foreground and background that will appear sharp in the picture (depth-of-field).

v. Depth-of-field

Depth-of-field is concerned with the distance range between the nearest and furthest objects that appear in focus in a picture.

Depth-of-field depends on three factors - the size of the lens aperture, lens-to-subject distance, and focal length of the lens. Depth-of-field becomes greater as:

- the size of the lens aperture decreases;
- the subject distance increases:
- the focal length of the lens decreases (and the subject distance remains unchanged).

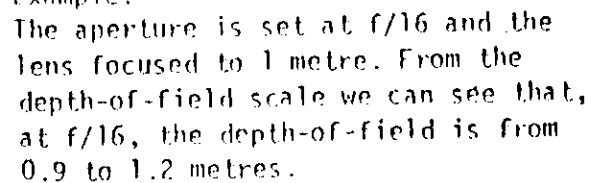


Depth of Field

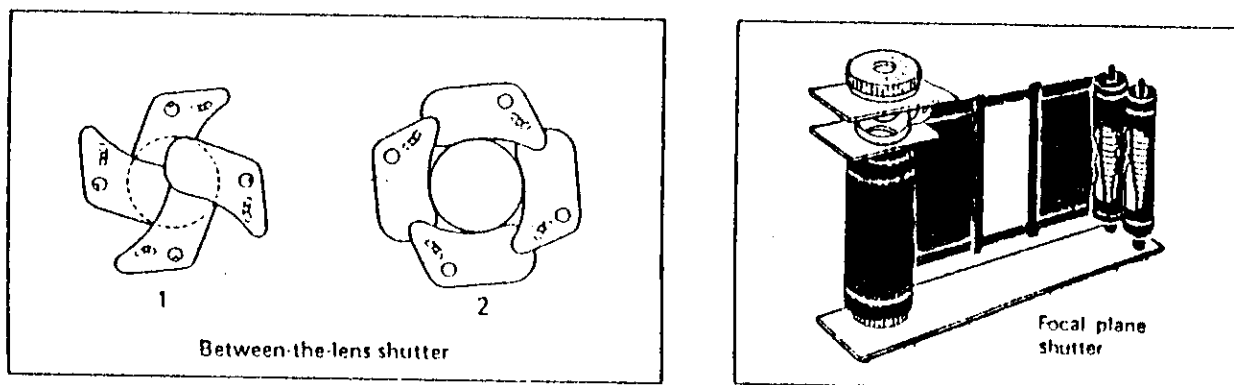
You can work out depth-of field in one of two ways:

On single-lens reflex cameras there is usually depth-of-field preview button. When this is pressed, the diaphragm closes down to the pre-selected aperture to allow you to see in the viewfinder what is and what isn't in focus.

Many cameras have a depth-of-field scale engraved on the lens barrel. This scale shows aperture figures radiating to the left and right of the focusing index. Simply focus the lens on the subject, then looking at the distance figures opposite the aperture figures on the scale you will know the depth-of-field for each aperture setting.



Shutter speeds control the way moving objects appear in the picture. The slower the shutter speed, the more blurred and undefined the image will become, while a fast shutter speed will "freeze" the moving subject and give overall definition to the image.



Slow shutter speeds may result in "fuzzy" pictures caused by inadvertent movement of the camera during exposure. For exposures of 1/30 second or longer, a tripod or some other firm support should be used to prevent camera shake.

vii. Exposure

The exposure of photographic materials involves a balance of time and intensity of light. This is expressed as a combination of an aperture and shutter speed. Since both the adjacent aperture settings and adjacent shutter speeds are in the 2-to-1 proportion, they may be used in various combinations to allow the same amount of light to reach the film. If the shutter speed is increased, the aperture must be opened by an equivalent amount, and vice-versa. In other words shutter speed and aperture are inversely proportional to each other.

$$f/8 \text{ at } 1/125'' = f/11 \text{ at } 1/60'' = f/16 \text{ at } 1/30''$$

viii. Film Speed

One of the most important factor involved in determining exposure is the speed of the film you are using. The film speed indicated a film's relative sensitivity to light, usually expressed in either ASA or DIN numbers.

With the ASA (American Standards Association) system, doubling of speed is shown by doubling of the number; the DIN (Deutsche Industrie Norm) system denotes doubling of speed by a rating increase of three.

To find the speed number of a film, look on the film pack or on the film data sheet. The film data sheet also suggest typical camera settings for a particular lighting situation. This information is a fairly good guide to exposure.

ASA	DIN	ASA	DIN
25	15	160	23
32	16	200	24
40	17	250	25
50	18	320	26
64	19	400	27
80	20	500	28
100	21	640	29
125	22	800	30

ix. Exposure meters

The most accurate method for determining exposure is with the use of an exposure meter. Exposure meters consist of three main parts: a light-sensitive cell, a light level scale, and a camera setting scale. All meters works on the basis of converting light into electrical current, which can be measured on a scale and translated into appropriate shutter speeds and lens apertures relative to the ASA/DIN speed of the film.

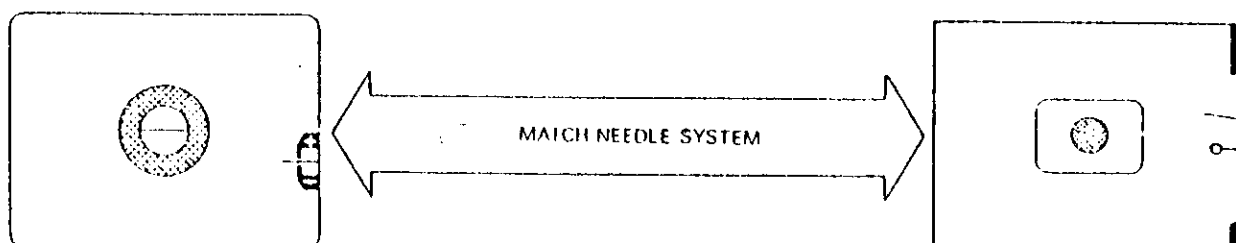
Built-in meters

Many cameras have built-in exposure meters. The simplest built-in meters have light reading cell around, or near, the camera lens and this is linked to the camera controls for either automatic or manually controlled exposures.

Most cameras with built-in metering have an ASA/DIN dial for setting the film speed. Once set, the meter will then give a reading with regard to the particular sensitivity of the film in use.

Manual exposure

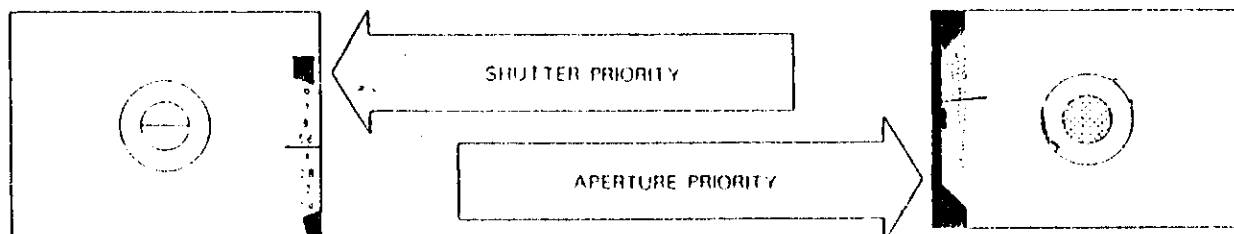
Exposure information can be supplied in different ways. Some cameras use the match-needle system. You set a shutter speed, then turn the aperture ring until a needle lines up with a certain marked spot within the viewfinder. When the two are aligned, you have correct exposure. Alternatively, you can set the aperture first, then turn the shutter dial until the needle lines up with the mark.



Automatic exposure

Automatic cameras fall into two basic categories

- shutter priority. The shutter speed is selected manually and the camera automatically selects the aperture for a correct exposure.
- aperture priority. The lens aperture is set manually and the camera selects the shutter speed automatically.



x. Other controls

Once the film is loaded into the camera it can be advanced by a lever (or knob) which is usually to the right of the camera's top plate. A nearby frame counter will indicate how many shots have been taken up to 36 frames. On cartridge cameras the frame number will appear in a window on the back of the camera.

Camera Care

The proper care and maintenance of photographic equipment are just as important as subject matter and correct exposure settings in striving for good photographic results. Cameras are fine precision instruments capable of providing years of reliable service without extensive maintenance.

However, there are some simple but essential things one can do to keep photographic equipment at top operating condition.

The instruction manual for your particular camera will give you more specific directions.

Camera body

Dust and dirt inside your camera can cause spots on your pictures and can jam the shutter mechanism as well. Use a blower brush to blow dirt from the inside of the camera.

Fragments of perforated film occasionally break off and fall between the lens and the film, sometimes ruining pictures.

Always inspect your camera before inserting a new roll of film. Be sure to clean in and around the film-spool cavities and sprockets.

There is less chance of dust and dirt on the outside of the camera body affecting the internal mechanisms, but it is a good idea to clean there also. Fine dust can work itself into the camera from the outside.

Camera lenses

To get the optimum sharpness from a lens, it must be clean. Dirt and fingerprints on the lens elements will produce hazy pictures. Don't touch the lens elements. Besides being difficult to remove the grease, a fingerprint can damage the lens coating.

The most common problem is dust. The best tools to remove dust are a blower brush or soft artists' brush (sable for example). A soft stroke of a brush will remove most of the grit of dust. If any marks still remain after brushing, a light wipe over with a clean, soft, lint-free material such as chamois or lens tissue should remove these. For stubborn stains moisten the lens tissue with a drop of clean water or special lens cleaner fluid, and wipe the lens.

Caution: Never use a treated cleaning material that you would normally use on eyeglasses for cleaning lenses on photographic equipment. The chemicals contained in these cleaning materials can remove the special coating on photographic lenses.

Clean both the front and back of the lens (if the back of the lens is accessible through the inside of the camera). On cameras with interchangeable lenses, remove the lens to clean both sides. Don't try to take apart the lens itself.

However, it's best to use preventive rather than remedial treatment. Fitting a skylight filter to the lens serves a dual purpose. Besides giving a "cleaner" looking picture, it is an excellent protector. It stops dust or grit getting on the lens element and if you have the misfortune to drop your lens or be hit by a flying object it's far better to replace an inexpensive filter than to replace a front element. Filters and viewfinder lenses can be treated and cleaned in the same way as described.

For final protection, always keep the lens cap on the lens when it is not being used.

For cleaning the body of the lens, a blower brush is best suited. This will get rid of any grit or dust which might find its way under the focusing ring and cause abrasion and damage.

Lubrication

As a rule of thumb, don't lubricate your camera. Most cameras are lubricated with a special "dry" lubricant by the manufacturer and usually need no further lubrication.

Lubrication on your equipment might collect dust, which can cause sluggish operation and possibly stoppage.

Batteries and electrical contacts

Many cameras need batteries - for built-in-flash, exposure meters, or electric motors. So it's quite important that you test your batteries and clean the battery and camera contacts periodically. Use the recommended batteries for your equipment. If your camera has a built-in tester for the batteries, you can easily check the condition of the batteries.

Batteries should be replaced periodically. The instruction manual for your camera will give you more specific instructions.

Batteries can produce substances that coat or corrode the contacts.

Alkaline batteries sometimes give off a gas that causes an insulating deposit to build up on equipment contacts and on the ends of the batteries. Since such deposits might not be visible, make sure they aren't present by periodically wiping the battery ends and camera contacts with a cloth dipped in clean water only. In fact, it's a good idea to clean new alkaline batteries before you install them, even though they're brand-new. Deposits can form during shipment and storage.

If the contacts in your equipment are difficult to reach with a cloth, clean them with a water-dampened cotton swab. Never use anything rough, like sandpaper, emery cloth, or a nail file, to clean the contacts. These will remove the plating on electrical contacts.

If your camera is likely to be idle for some time, remove the batteries to prevent corrosion damage. Storing batteries in a freezer will extend battery life. Be sure to wrap them in plastic to protect against moisture.

Sometimes the spring tension of the contacts might be too weak to provide good battery contact. If so, adjust the tension by bending the contacts slightly with a nail file or small screwdriver so that the batteries are held firmly in place. Recessed contacts can be lifted with a hook made from a paper clip.

EG 39979

8415

A 3420

FILM DEVELOPMENT

1. Prepare the Developer in white light : Decide which type of developer is to be used. When undecided, follow the recommendations of the film manufacturer.

It is recommended to use D-76 developer.
D-76 Developer - Dissolve the chemicals in the order given.

1. Water (about 125°F)	750 cc
2. Elon developing agent	2 gm
3. Sodium sulfite dessiccated	100 gm
4. Hydroquinone	5 gm
5. Borax granular	2 gm
6. Water to make	1 lit.

2. Prepare the stop bath in white light : Prepare the stop bath in accordance with the manufacturer's instructions.

Stop bath

1. Water	500 cc
2. Acetic acid 28%	250 gm
3. Sodium sulfate dessiccated	45 gm
4. Water to make	1 lit

3. Prepare the fixing bath in whitelight : Follow the manufacturer's instructions implicitly
Fixer

1. Water	750 cc
2. Sodium thiosulfate (hypo)	250 gm
3. Potassium metabisulfite	20 gm
4. Water to make	1 lit

Note: All the photographic chemicals are poisonous.

4. Check the temperature of all solutions : The normal temperature is 68°F

5. Set the timer : The time of development depends on the film type and the type of the developer. Consult the manufacturer's chart that accompanies the film and then determine the correct time of development in accordance with the temperature of the developer.

6. **Fill the film :** Make sure it is filled neither too high (or tank with else it will overflow when you immerse the developer film reel) nor too low (or else a strip along the top edge of the film will be incompletely developed).
7. **Arrange film, :** Arrange film, film reel, developing tank, film reel, and tank cover so that you can find them developing easily in the dark. Then turn off the tank & tank sefelight also.
cover
8. **Load the roll :** This must be done in total darkness. With film on the roll films it is best to unroll the film and spiral separate it completely from the backing paper before loading. Now load the film in the spiral.
9. **Place the :** Place the loaded spiral in the tank, and loaded spiral place the cover on the tank. Make sure the in the tank tank is light-tight. Now put on the light.

10. D-76

Development times in minutes	Film speed	Developer strength	18 ⁰ C 65 ⁰ F	20 ⁰ C 68 ⁰ F	22 ⁰ C 72 ⁰ F	24 ⁰ C 75 ⁰ F
400 ASA		Undiluted	10	8	6	5
		Diluted 1+1	13	11	9	8
125 ASA		Undiluted	7	6	5	4.5
		Diluted 1+1	10	8	6	5

11. **Start the timer** Adjust your timer according to chart and start the timer immediately.
12. **Agitate :**
 1. Correct agitation is a prerequisite for the production for evenly developed negatives of correct density. After the film has been in the developer for approximately half a minute, start agitation by holding the tank in both hands and moving it backward and forward while tilting and rotating it simultaneously. Continue for about five seconds. Repeat at half-minute intervals during the entire period of development. If you use a daylight-loading tank or a tank in which you can turn the reel by means of a rod inserted through the cover, slowly rotate the reel back and forth for the the first minute and thereafter for about five seconds every two minutes until development is completed.
 2. When the timer rings, without removing the cover of the tank, pour the developer

back into the bottle, and fill the tank with the stop bath.

3. Stop bath - Agitate for thirty seconds, then pour the stop bath out through the tank cover and discard it. It can be used only once. Pour in the fixing solution.

4. Fixing - Agitate at once for half a minute, repeat agitation several times during the next five to six minutes.

Now you can take the cover off the tank.

5. Washing - Remove the cover and fill the tank with water, rinse the film by dipping the reel up and down a few times, then pour out the water. Leaving the film on the spiral or reel in the open tank, wash for about 30 minutes under running water. Pull the film out of the spiral or reel, and hang it up to dry.

PRINT PROCESSING

1. Prepare the developer -

1. Water (about 125°F)	500 cc
2. Elon developing agent	3 gms.
3. Sodium Sulfite, dessicated	45 gms.
4. Hydroquinone	12 gms.
5. Sodium Carbonate, monohydrated	80 gms.
6. Potassium bromide	2 gms.
7. Water to make	1 lit.

Dissolve the chemicals in the order given. To use, mix one part of stock solution with two parts of water. Developing time at 68°F should be not less than one and not more than two minutes.

2. Prepare the Stop Bath -

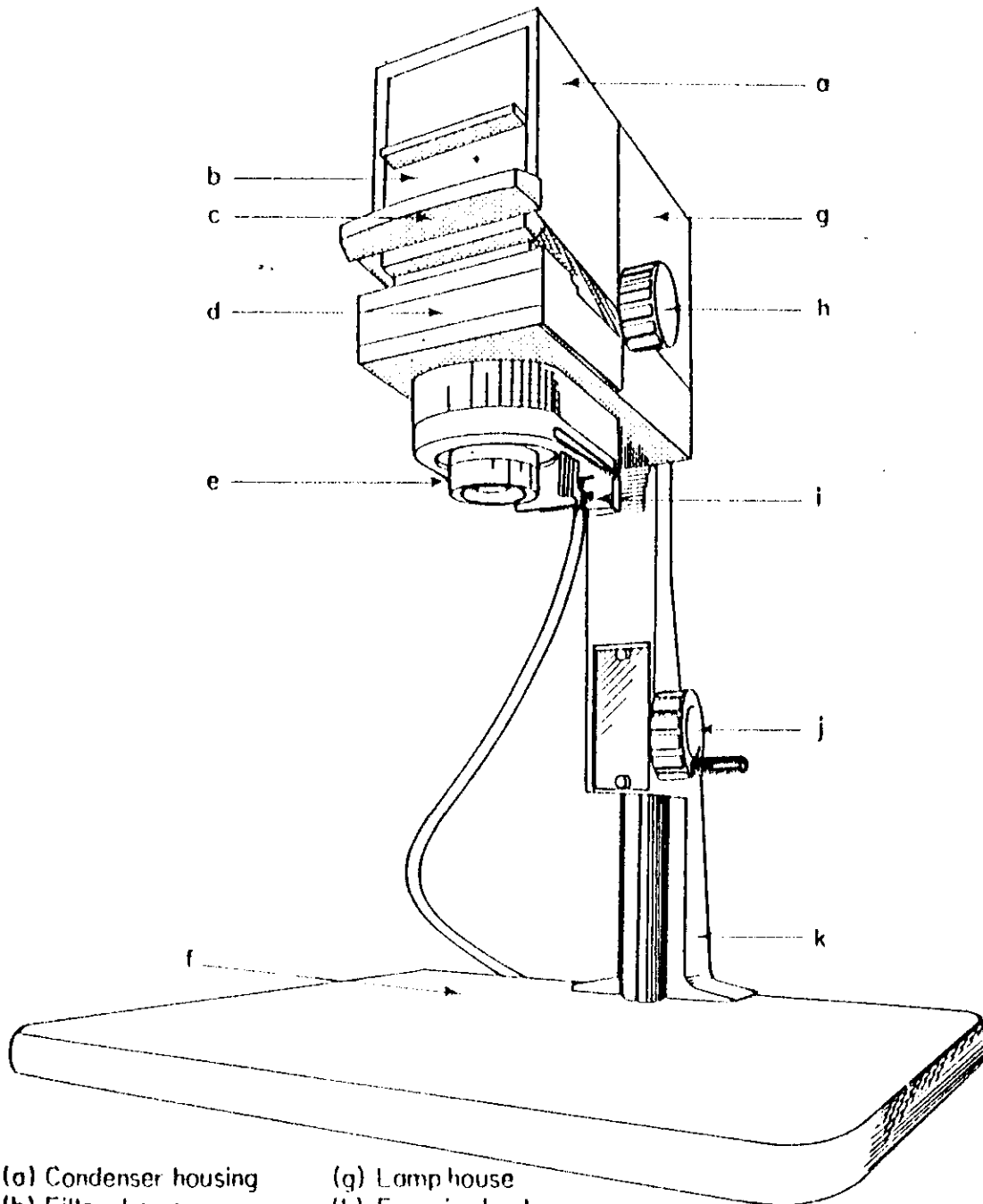
1. Water	1 lit.
2. Acetic acid, 28 percent	50 cc.

To make approximately 28 percent acetic acid from glacial acetic acid, dilute three parts of glacial acetic acid with eight parts of water. Treat the print for atleast five seconds.

3. Prepare the Fixing Bath -

1. Water	750 cc.
2. Sodium thiosulfate (hypo)	250 gms.
3. Potassium metabisulfite	20 gms.
4. Water to make	1 lit.

Printing



- | | |
|-----------------------------|-----------------------------|
| (a) Condenser housing | (g) Lamp house |
| (b) Filter drawer | (h) Focusing knob |
| (c) Condenser lifting lever | (i) Lamp holder |
| (d) Negative carrier | (j) Height adjustment crank |
| (e) Lens | (k) Socket |
| (f) Baseboard | |

A TYPICAL ENLARGER

Fix prints for not less than five and not more than ten minutes.

This fixer is for general use with both films and papers.

How to make contact prints :

For making contact prints a printing frame is needed. Select a paper of suitable gradation for your negative from among the followings :-

1. Single weight
2. Double weight
3. Extra white glossy

Character of the negative	Extreme Contrast	Contrast	Normal	Soft
Recommended paper gradation (Contrast grade numbers in brackets)	Extra Soft (1)	Soft (2)	Normal (2 or 3)	Hard (4)

Now place the negative, emulsion (dull) side facing up in the Printing Frame, making sure that the glass of the frame is clean and free of dust. This work can be done by putting on amber safe light.

Open the paper package in such a way that it can be reused for wrapping unused paper, remove one sheet, and place printing paper emulsion (shining) side down on negative. Handle the paper by the edges only to avoid leaving indelible fingermarks. Close the printing frame. Do not forget to wrap unused paper securely before exposing the print; otherwise, it would be fogged and ruined by the white light.

Place the printing frame, glass side up, beneath the printing lamp, and expose the paper in white light. Duration of the exposure depends on the density of the negative, the speed of the paper, the lamp, and the distance between lamp and printing frame.

How to make an Enlargement :

Enlargement or blowup is made with the aid of an enlarger by following the steps mentioned below :-

i) First clean the negative and then place the negative in the negative carrier of the enlarger, emulsion (dull) side down, facing the lens.

ii) Switch on the enlarger lamp, fully open the lens aperture and raise or lower the enlarger head on the column to bring the projected negative or the part of it you want to the required size on the masking frame (easel).

iii) Adjust the focus, by enlarger focussing knob.

iv) Turn enlarger lamp off. To make a test strip, cut a sheet of enlarging paper of suitable gradation into a number of pieces approximately four inches long and two inches wide. Place one of these strips (emulsion side up) on the easel in such a way that it includes both light and dark picture areas, such as high light and shadows, foreground and background or earth and sky. Expose the test strains by switching the enlarger lamp on. Find the correct exposure by stopped exposure series on these test strips by developing them in the developer from one to two minutes. The test should then include a correctly exposed strip to indicate the required exposure time.

v) Switch off the enlarger lamp and place the enlarging paper on the easel, and make the exposure in accordance with the time determined with the aid of the test strip. Stand motionless while you count off seconds or watch the timer, and touch neither the enlarger nor the bench or table on which it stands. Even the slightest vibration is sufficient to cause of slight degree of blur in the print. Do the necessary dodging; burn in parts that are too dense, hold back areas that are too thin.

Developing :- (By amber safelight)

Take the exposed paper and smoothly slide it edgewise into the developer, emulsion side up. Be careful not to get your hand wet. Use the print tongs to dunk and manipulate the paper. Agitate paper by gently rocking the tray for the entire duration of the development. Leave the print in the developer for not less than one and not more than two minutes. If by that time the picture is already too dark, the exposure was too long; if it is still too light, the exposure was too short.

Acid stop bath :- (By amber safelight)

Using the print tongs, take the print or enlargement out of the developer, and agitate the print in the Stop Bath five to ten seconds. Using fixer print tongs; then transfer print to fixer.

Fixing :- (By amber safelight)

Leave the print or enlargement in the fixing bath for five to ten minutes. Agitate repeatedly by using fixer print tongs. Now put on the ordinary white light.

Washing :- (By ordinary white light)

Wash single-weight prints or enlargements for about ten minutes and double weight prints for about half an hour under running water at 56° - 75°F.

Drying : (By white light)

Remove the washed prints or enlargements from the water, let them drain briefly and wipe off excess water and place the prints on a clean towel, leaving it to dry overnight. For glossy prints dry the paper in the Glazer, which is also suitable for rapid drying

(about ten minutes). For matte and semi-matte i.e. double weight prints/enlargements dry the paper in a photo blotter roll.

Trimming :- To trim prints, use a paper trimmer (Cutting Board).

Mounting :- Select the tone, colour and texture of the mounting board and paste the print on it.

PLANNING & PREPARATION OF NON-PROJECTED VISUAL AIDS

Although there are several non-projected visual aids, we will deal in the present section the techniques of planning and presentation of some such inexpensive and practically utilizable aids by the trainers themselves.

1. CHALKBOARD (Blackboard):

The chalkboard or blackboard is perhaps the most common and effective visual aid when used properly. It is also inexpensive and requires only a minimum of maintenance and care. It can be used as supplementary to other forms of aids.

When using a chalkboard, ensure that it is really clean before you start and that there is enough light falling on the board to enable it to be seen by everyone in the audience. A board measuring 120x180 cms (4'x6') will give a good working area and two boards of this size may be used with advantage. It must be remembered that following good techniques and little bit of planning this traditional aid can also be used very effectively in communicating ideas.

It is always better to plan chalkboard work and to note down exactly what is needed on the board. This is necessary because the work must be presented into logical order for the easy understandability of the material. All drawings and illustrations should be clearly legible from the furthest corner of the room. To be easily readable chalkboard writing should be between 5 to 6 cm (2 to 2.5") in height. Slanting writing is

difficult to read and writing which starts high on one side of the board and slopes down at the other is irritating to the observer. Moving across the board when writing helps to eliminate this error.

Use of colour : Coloured chalks can be very effectively used to highlight some of the points, in differentiating one item from the other and also in presenting diagrams. Coloured chalks vary in quality and colour density; pale colours are more effective than deep ones and some colours are easier to see than others, especially against a matte background.

White Yellow : Good contrast with green and black background

Red, Lightblue, : Valuable for adding interest to a board; for
Green adding colour to drawings or for underlining
key words.

Brown, Purple : Not so effective; some times very difficult to
Darkblue see.

An olive green chalkboard surface is restful to the eye and yellow chalk gives a good level of contrast against this surface colour.

Presentation - One of the problems associated with fixed chalkboard is that the materials cannot be prepared in advance and concealed. There are however several ways of overcoming this difficulty.

(1) A lightweight black curtain may be suspended from a wire and arranged to fall directly across the front of the chalkboard. The curtain can be drawn back stage by stage to reveal material already prepared. Thus the interest of the audience can be held in the subject matter.

(2) Sometimes it is useful to write pencil notes on board at eye level, so that they can be seen only by the user and may be prepared before the formal talk begins. They may be taken up step by step at the time of presentation. Thus it acts as an aid

to the memory and save constant reference to prepared notes by the speaker.

(3) The 'dot - dusting' technique is very useful and effective and requires only a little time and no expense. It is particularly useful if the same basic material has to be repeatedly presented. It can save hours of preparation and can give a really spontaneous look to the chalkboard work.

2. FLANNELGRAPH

The flannelgraph is one of the most adaptable and flexible teaching aid. The materials can be presented to the audience in a step by step manner with the help of separate pictures which ultimately lead towards building up of a composite story. Drawing, titles, illustrations and headings may be added at will and associations clearly demonstrated. Materials can be rearranged developed and simplified as per convenience.

Pictures, illustration, captions and other symbols prepared on light cards or stiff papers, backed with felt or sand paper are usually placed on a board covered with rough textured cloth or flannel cloth. The two rough surfaces interlock on contact and a light temporary adhesion takes place,. If the flannel board is lightly brushed before use, then such adhesion is improved.

Flannelboards may be quickly improvised by stretching a flannel cloth over a portable chalkboard (90x120 cms or 3x4 feet) and securing it with large spring clips. A permanent board may be made by lightly gluing cloth to a card board or a plywood surface. While applying glue, care must be taken so that it should not be permitted to penetrate the cloth or it will spoil the working surface and the adhesive quality of the board will be impaired. Flannel boards can be more efficiently used if they

are set at a slight angle to the vertical. The colour of the flannel cloth should be such so as to give a good contrast with the flannel graphs placed upon it. Black, drak blue, dark green or gray may be selected as colour of the cloth.

Preparation :- In Order to prepare the flannel graphs the different techniques of drawings stated earlier, maintaining regular paper clippings of different kinds of pictures from newspapers and magazines provide a good source of material from which you can select your pictures. With all these, you can prepare your own material even if you are lacking in artistic skill. A picture may be projected on to a piece of stiff paper with the help of epidiascope and then it can be copied. The following process has been found to be quite effective :

1. Draw a light out line of the projected material using a soft pencil and light pressure.
2. Switch off the projector and in daylight condition draw a bold outline following the pencil line using a felt tipped pen or black crayon.
3. Add colour very lightly.
4. Cutout the different parts/pictures in varying shapes.
5. Paste pieces of sand paper or felt paper on the back of each of them.
6. Allot serial numbers on the back of these cutout parts/pictures as per their sequence of presentation.

Presentation :

1. Rehearse presentation and arrange different parts as per the sequence.
2. Before presenting the lecture with the help of flannelgraphs, ensure that the audience can see them.
3. Stand to one side of the board when talking and placing pictures on the flannelboard. While

presenting flannelgraphs hold them in such a manner that they are concealed in your hand so that the pictures are not seen before presentation.

4. Donot clutter up flannelgraph with too many parts so as to create confusion.
5. Repeat presentation if necessary.
6. Call for questions and clarify confusions.

Flannelgraph has its limitations. Apart from the flair and aptitude on the part of the trainer needed in presentation, it is often difficult to use them at outdoor meetings where a breeze may blow away the parts/pictures from the flannelboard. In such situations, however, a magnetic board may conveniently be used instead of flannelboard. It possesses all the flexibility of the flannelgraph, and even moderate gusts of wind cannot move the part kept in place by magnetic attraction. The working surface of the magnetic board is usually coated with chalkboard paint which not only gives it the matt background, but also facilitates the use of both chalk & magnetic symbols on the same surface. The same parts of the flannelgraph pasted with magnetic tape instead of sand paper or felt paper may be used on the magnetic board.

3. FLASH CARDS

In order to emphasize important points in a talk or lecture, flashcards can be quite effectively utilised. These are simple illustrations on cards which should be large enough so that everyone in the audience can see them clearly. For the average group of people(25 to 30), the size of the cards should be 1.5 x 2 feet.

Preparation :

For preparing flashcards, a story has to be built up and the visual layout may be made by following story-board technique. After finalisation of the story-boards you should look for pictures and illustrations from available magazines. For this purpose the maintenance of regular paper clippings as suggested under flannelgraph will be useful. The pictures thus collected may be reproduced in required size on hard sheets of paper by following the same techniques of drawing utilised in preparing flannelgraphs. Add colours to the pictures and mark them with serial number as per the sequence of the presentation.

Presentation : As with other visuals, the presentation should be very carefully planned and rehearsed. The cards should be arranged as per sequence and displayed one after another with relevant verbal commentary. After the presentation is over, questions may be invited from the audience and discussed.

4. FLIP BOOKS

Many trainers find a flipbook easier to use than flannelgraph or flashcards, as visual aid. A flipbook can be used to present a series of pictures which help to develop the lesson in a clearly understandable fashion, step by step as a sequence, or presented as a story.

Preparation : Flipbook can be prepared with paper pages fastened between two hard covers. Before finalizing the pictures, the rough layout is to be prepared following the story board

technique as utilised in flashcards. The posters, wallcharts and illustrated literature are good sources of illustrations for cuttingout and pasting onto the flipbook pages. In drawing as well as making the letterings, care must be taken to make it legible from a distance.

Presentation : The pages fastened between the covers should be turned over one by one and relevant points related to each page be narrated. The points relating each step in the development of the picture can be written or printed boldly on the reverse side of the page immediately preceding that exposed to the audience. Thus the flipbook not only serves as a visual aid but also helps in the memorisation of the teaching outline for the speaker.

PLANNING & PREPARATION OF PROJECTED VISUAL AIDS*

1. SLIDES

Slides are photographs taken on positive films so that after processing, they can be placed in a projector and shown on a wall or screen to a group of people. They are particularly useful for compressing a lengthy sequence of events into a convenient teaching time. The main steps of any action programme taking long time from launching to its completion in the field can be compressed into a thirty to forty minute slide show. In this way the results of the programme can be carried to many more people who were not associated with the actual action. Apart from this, the slides may be conveniently used to demonstrate some off season farming techniques or some phenomena which are difficult to be observed by naked eyes. Thus the microscopic views of some causal organisms of diseases and pests of crops plant can be shown through slides. In this way the slides can highlight on the salient features of any topic.

Preparation :

If you have got a camera and are interested in photography, it is not at all difficult for you to produce slides with local appeal for using them as communication media. The usual sizes of photographic slides are 2" x2". Normally they are made up of 35mm films available in two forms. They are : coloured and black and white. The coloured slides though costly, are very effective in its actual form and colour. Thus through coloured slides, you can show your extension worker participants or even the

farmers in its actual form how the lesions of Brown Spot appears on the leaf of a paddy plant or what is the symptoms of Red Rot of sugarcane.

For the preparation of coloured slides, you can purchase from the local market any good type of coloured slide film and expose them by following the techniques of photography stated earlier. In order to process such films, you have to depend upon the professional coloured photo laboratories. After exposing the film send to the company through your dealer and after sometime you will get the processed and mounted slides.

The black and white slides are suitable for projecting any written material or charts and graphs. For preparing such slides the reversal films are useful. The negative films may also be used if the change of direction of the elements in the picture donot affect the meaning . The developing of the film is to be done in the same way as mentioned earlier in the chapter on photography. For copying of written or graphic materials, the artwork is to be prepared following the requisite proportion, i.e. 2:3. Copying of such materials should preferably be done with the help of copy stand. Wall chart and flannelgraph presentations may also be good materials for making slides.

Guidelines to the Preparation of a Slide - Tape Programme

Slides can be more effectively used in combination of a recorded commentary with the help of tape recorder. The combined impact of the visual stimulus together with the audio stimulus make slide-tape a very forceful medium. The visuals and the

soundtrack together perform a much more efficient communication function than either can perform alone. It is the combination of the two channels, where one reinforces the other which is one of the great strengths of any slide-tape presentation. This is the all important guideline towards the production of a successful programme.

These remarks may seem obvious, but all too frequently we see programmes that completely ignore this important characteristic. In the extreme, the finished product is either a series of 'pretty' pictures to which the sound-track adds very little, and can indeed intrude aggressively, or the programme becomes a talk to which the visuals have only vague relevance.

Usually an unsuccessful slide-tape presentation is the result of inappropriate initial planning . On some occasions, the enthusiastic photographer shoots a series of pictures 'off the cuff' and then a soundtrack is prepared around the pictures. This is the lesser of the two evils. Worse, and more common, is the enthusiast who writes a wordy script thinking purely in terms of the story he wants to tell and then calls upon the photographer to fit pictures to his words. He has forgotten that a large part of his story will be told in pictures; so the outcome is frustration and eventually a complete rewrite of the script.

Practical approach

The most practical approach is to use the storyboard technique which encourages us to think in terms of both visual and sound

together. This is simply a series of thumbnail sketches of the pictures with a brief caption written underneath as a guide to the content of the soundtrack. Something on the lines of a strip cartoon except that you don't need to be a skilled artist. Simple pin figures or even a written description of the visual will suffice. The purpose of the storyboard is to help us get away from our normal habit of thinking in words and instead to think in terms of pictures. The storyboard emphasises that the picture makes the initial statement and then the soundtrack makes that statement more specific. Planning a programme by this method is the one sure way of determining close harmony between the audio and visual channels.

Slide-tape is such a flexible medium that it can be successfully applied to a wide range of programmes from pure entertainment to those concerned with instruction or motivation and in every case the following basic plan of campaign can be followed step by step.

Step 1 : TREATMENT

Outline the theme and content of the programme very briefly. Be certain that slide-tape is the appropriate medium, for the subject and determine the eventual form of presentation.

Step 2 : STORYBOARD

Translate the outline into visual terms with simple thumbnail sketches and concise written notes as outlined above.

Not until these two planning steps have been completed should the next three practical steps be taken.

Step 3: GATHERING PICTURES

The storyboard is sufficiently detailed to guide the cameraman in specific viewpoints, type of shot, the style of photography, etc.

Step 4 : GATHERING SOUND EFFECTS

The sound effects may be natural sounds taken on location or 'stock' sounds from records but don't overdo them. Differentiate between general background sounds and particular sounds.

Step 5 : SELECTION OF MUSIC

Important in creating the right atmosphere. Avoid very familiar music especially as a background to a commentary.

It is assumed that any graphic material and title slides have been completed during these three practical steps.

Step 6: WRITING THE SCRIPT

Assuming the storyboard has been carefully planned and the visuals faithfully reflect the storyboard then the final script will be very straightforward.

Where a commentary is involved avoid overloading it. A rule of thumb is not more than 20 to 30 words per slide or, looking at it another way, slides should not normally be held on the screen for longer than ten to 15 seconds.

Step 7 : MAKING THE SOUNDTRACK

An open reel tape recorder offers more facilities to make a quality master tape. Copies can then be made on cassettes if required.

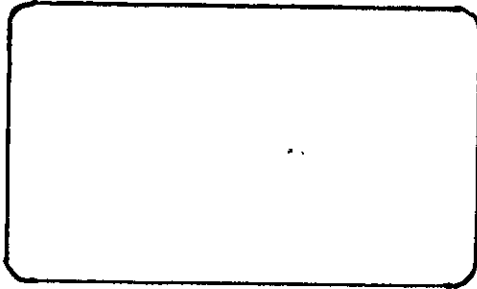
Step 8 : SYNCHRONISATION

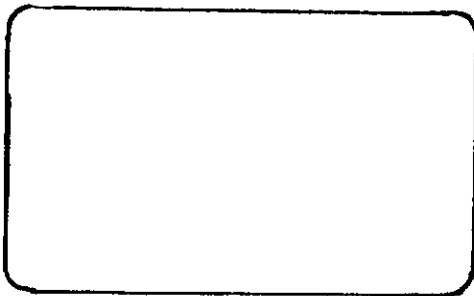
May be cue marks on script, audible bleeps, spoken instructions or automatic slide changing depending on facilities and type of programme.

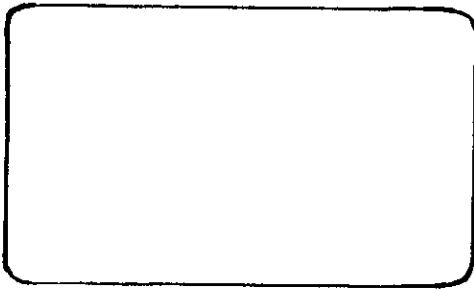
Presentation :-

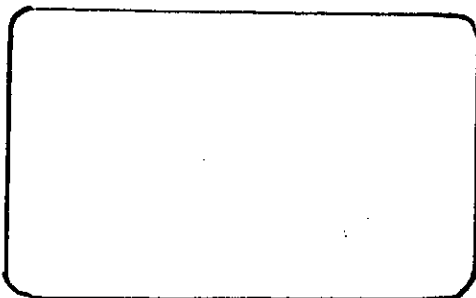
For projecting the slides, the help of slide projector is necessary. Although there are different kinds of slide projectors available, the most commonly used slide projectors are electrically operated. There are however light, easily

STORY BOARD FORMAT









transportable projectors which you can use in villages (where electricity is not available) with the help of Battery of your jeep. The electric slide projectors may be either manual or automatic. Whatever may be the kind of projector, follow the basic steps in presenting a slide programme.

1. Before giving a slide show, test and check the projector and ensure that there is a spare lamp.
2. Limit the show to thirty to fifty slides.
3. Whenever possible include pictures of local interest.
4. Arrange slides in correct order keeping the indicator on the top right hand corner facing you.
5. If you are not using slide programme synchronized with recorded commentary, prepare a list of the slides and teaching notes or outline on which the commentary will be based.
6. Rehearse the presentation before the audience arrives.
7. Set up the projector and screen in advance and arrange the seat so that everyone in the room will be able to have a clear view of the screen.
8. Introduce briefly your topic and prepare the audience.
9. Keep each slide on the screen long enough so that the message is fully understood by the audience.
10. Invite questions and if necessary show again those slides which are the subject of the questions.
11. Distribute related literature on the subject after the show. If a projector is not available you can use battery operated or a daylight type handviewer for showing slides to individuals of a small group. Both these types of viewers are in-expensive.

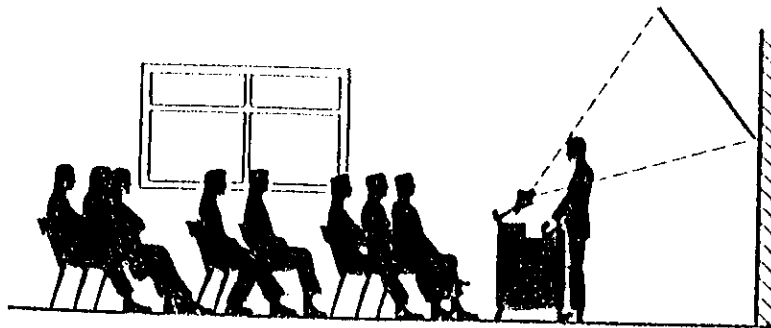
2. FILMSTRIPS

Sometimes filmstrips are used in place of slides. Although they may be utilised in the same way as slides but the disadvantage is that the sequence of pictures in the filmstrip

cannot be changed as per convenience of the speaker. A filmstrip attachment to the slide projector is necessary in order to show filmstrips. The techniques of preparation and use are however the same as used in case of slides.

3. OVERHEAD TRANSPARENCIES

Overhead transparency is one of the projected visual materials which can be very effective in different levels of education and training. This can be conveniently produced by hand, using transparent acetate sheets, coloured inks, coloured adhesive film and felt tipped pens suitable for work on glass or plastic surfaces. In order to project this kind of material over short distance the help of overhead projector is essential to give an enlarged image. Unlike other projectors, the overhead projector is designed in such a way that it can be operated by the speaker facing the audience under normal daylight condition.

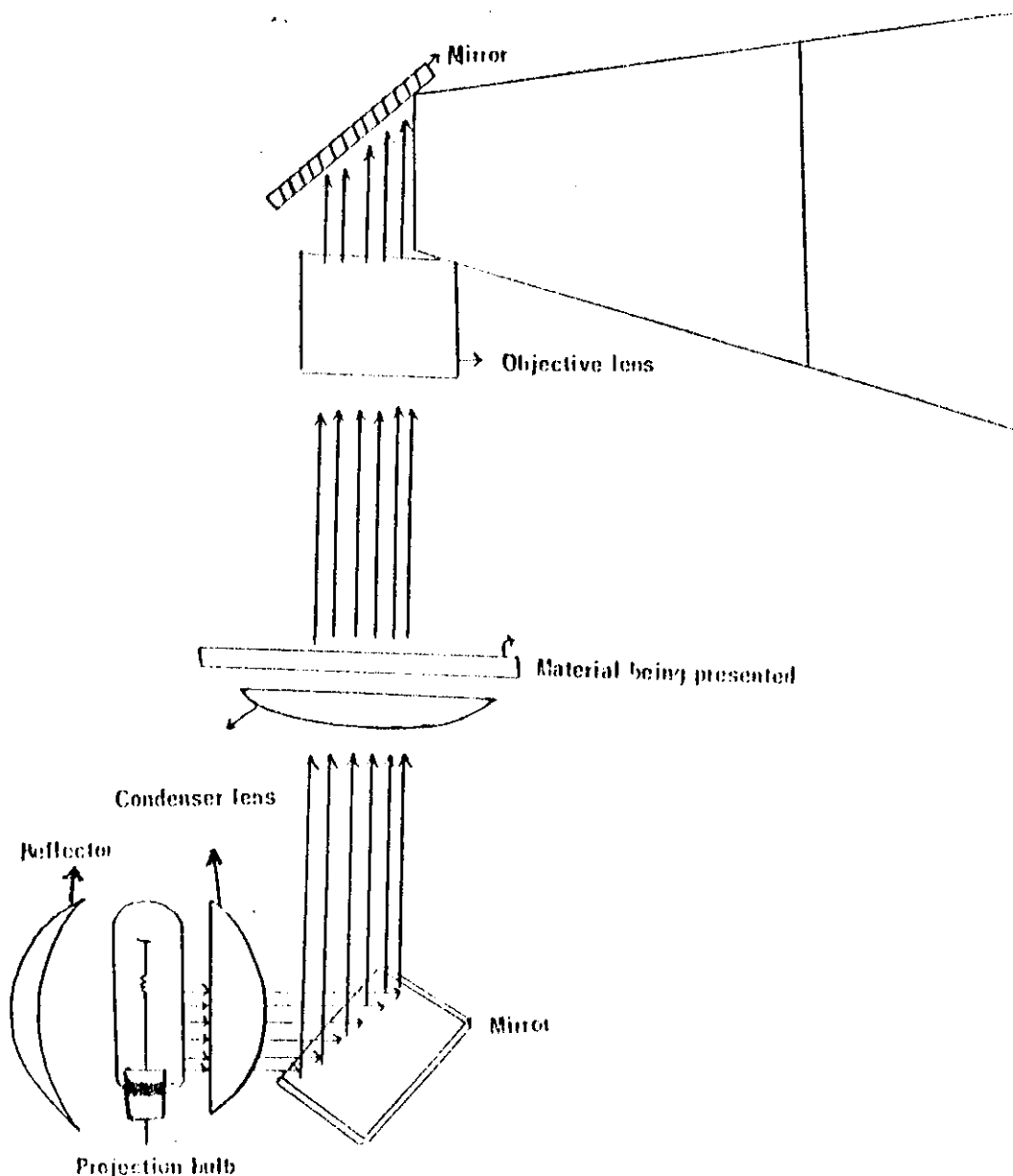


Overhead Projection

1. Uses of the overhead projector

Ingenuity..and imagination will show many instructional uses for the OHP, the most common of which are referred to below :

- a. as an alternative to the chalkboard : writing or drawing on to acetate sheets or scroll, using suitable pens, directly upon the projector work surface as the lecture proceeds;
- b. for the presentation of prepared transparencies;

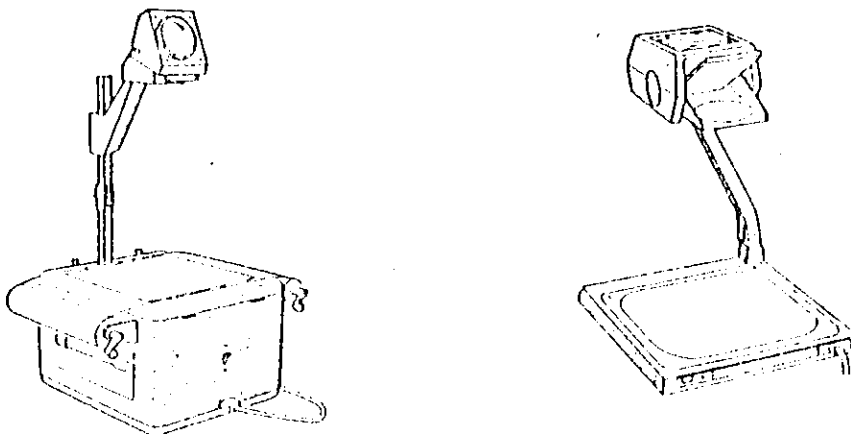


Indirect Projection (Overhead Projector)

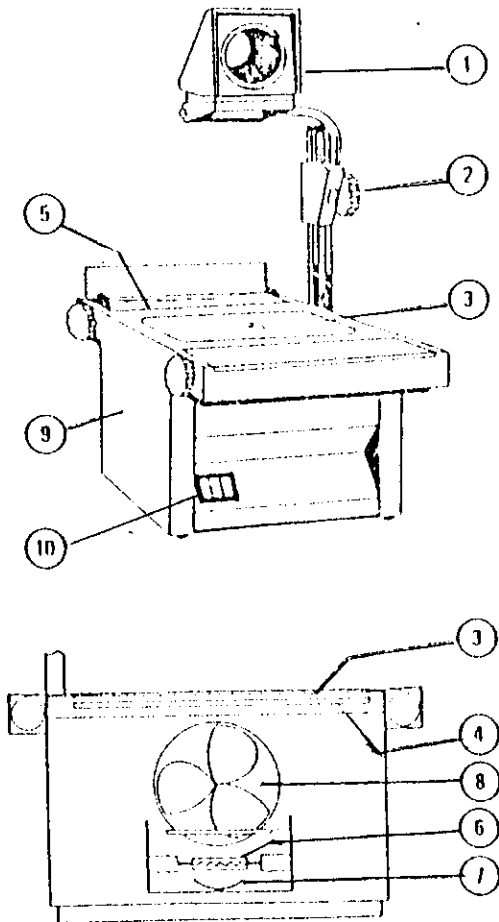
- c. for showing silhouettes of cut-out shapes or opaque objects ;
- d. for using models, both static and moving, made from perspex or other materials;
- e. for physical demonstrations and experiments - such as magnetic lines of force, using iron filings and magnets;
- f. for presenting diagrams in animated form using a polarising filter with specially prepared transparencies.

2. Different parts of the overhead projector

There are basically two types of overhead projector. The more usual is the standard lecture hall type which may be quite heavy and not easily transportable. The second type is the portable projector, lighter in weight, which can be folded up into briefcase form.



Many models are available on the commercial market. Although the design and facilities offered by different manufacturers while most overhead projects have basically the same, main parts. These are illustrated overleaf : .



1. Projection head : assembly containing the objective lens and mirror to direct the projection beam towards the screen.
2. Focus control : the image is focused by raising or lowering the projection head.
3. Projection stage : working area where transparencies are placed for projection.
4. Fresnel lens : special type of condenser lens used to change the divergent beam of light from the lamp into a convergent beam.
5. Scroll : long roll of transparent film base material.
6. Projection lamp.
7. Reflector.
8. Cooling fan.
9. Housing.
10. Switches : to control cooling fan motor and lamp.

3. Maintenance

The overhead projector is very simple to maintain. The only maintenance operations are the replacement of burnt-out lamp, and the cleaning of operating surfaces. Although all modern projectors conform to safety standards, it is advisable to disconnect the power supply before commencing maintenance operations.

Care should be exercised while fitting a new lamp. A quartz-iodine lamp should never be held in bare hands as this can considerably shorten the life of the lamp. It is advisable to hold the lamp between layers of dry tissue when fixing it into the socket.

The projection stage and lens should be kept clean at all times. Use a damp cloth to thoroughly clean the surfaces and wipe them dry afterwards with a soft duster.

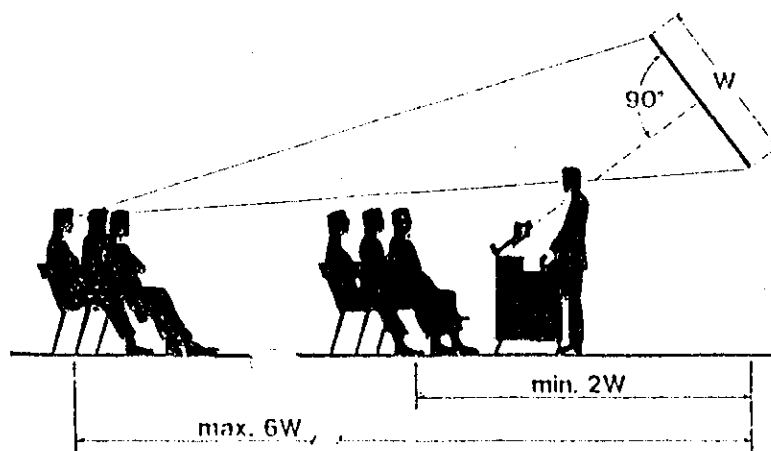
4. Setting up the projector and screen

The method of setting up of the projector and screen upon depends on the type of room, size of audience, lecture style etc. The simple rules for placement of OHP and screen are based on two considerations :

- an unobstructed view of the screen for the audience ;
- convenience and comfort for the lecturer.

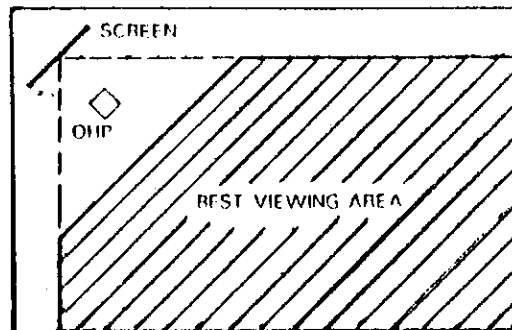
The best type of screen for OHP work is one with a matt, white surface. This offers the best viewing area.

The size of the screen is determined by the maximum viewing distance. The width of the screen should be not less than one-sixth of the distance from the screen to the furthest viewer. The projector to screen location should be adjusted to fill the screen with the projected image.



The screen must be raised to permit viewing over the head of the lecturer, and be tilted slightly forward so that it meets the projected beam at right angles. This will avoid the distortion which is known as the Keystone effect.

The best position for the projector and screen is often towards the corner of the room. This tends to spread the best viewing area over a greater proportion of the class.



Although the overhead projector is a daylight projector, the picture is adversely affected if strong light falls directly on to the screen.

5. Presentation techniques

The overhead projector can be used in a seated or standing position. The visuals can be quickly registered into position and there is easy access to the projector controls. While standing, care must be taken not to obscure the screen.

Using a pen or pencil as a pointer is very effective in drawing attention to major points of a message. Simply point at the item on the projector stage and the pointer's shadow focuses attention on the same detail on the screen.

Switching on and off helps to emphasize points as well as direct the audience's attention from the screen to the speaker.

Adding information to prepared visuals helps underline important points during the presentation.

Complex topics can be developed in stages using the overlay or revelation techniques.

PREPARING OVERHEAD PROJECTOR TRANSPARENCIES

Many processes have been developed for preparing overhead projector transparencies. They range from straight forward hand

lettering or drawing to methods requiring special equipment and skill.

1. Materials required

Because of their physical characteristics and use, transparencies demand specific types of materials. Listed here are some of the materials designed to meet the particular requirements of overhead projection.

a. Clear acetate : An excellent transparent drawing surface that will accept certain pens and markers, available in varying thicknesses and sizes, in rolls and sheets.

b. Felt/Fiber-tip pens and markers: Designed to produce vivid transparent colour lines. Three line widths - fine, medium and broad - and assorted Colour available.

There are two types of such pens

- soluble (water based) - writing is easily erased with a damp cloth;

- permanent (spirit based) - removable with white spirit.

c. Dry transfer lettering: Opaque or transparent coloured instant lettering in assorted typefaces and Colour. Give a professional finish to transparencies. Range of symbols also available.

d. Adhesive colour film : Full range of self-adhesive films in projectable colours. Suitable for large colour areas.

e. Transparent tapes : Adhesive tapes in projectable colours available in various colours and widths. Ideal for charts and diagrams.

f. Transparency mounts : Cardboard frames add durability and ease to the handling and storage of transparencies.

2. Preparation of hand-drawn transparencies

The preparation can be divided into three stages :

- the master drawing
- tracing the drawing onto the acetate
- mounting the finished transparency.

a. The master drawing : Layout and lettering may present some difficulty, and it is advisable to try out several possible ideas before settling on one. The drawing should show everything that is required on the final transparency.

Any type of paper may be used but grid sheets or graph papers are useful as guides for drawing and lettering .

The drawing must be laid out to use the image area of the transparency mount (20 x 24 cm). A safe margin should be left around the edges to avoid losing that part of the image.

All lettering should be shown in the master drawing whether it is to be done freehand or with transfer lettering on the acetate. This is to make certain that spelling is correct and that the word or words fit into the space intended.

b. Tracing the drawing onto the acetate :

A sheet of acetate should be placed over the master drawing and both sheets fastened to the working surface to prevent movement.

The drawing is traced onto the acetate with the felt tipped pens. Markings take some time to dry and care must be taken to avoid smudging the tracing . It is advisable to keep a sheet of paper under the hand when working to prevent grease getting onto the acetate.

When the tracing is dry, areas of colour may be added by applying adhesive colour films and tapes.

c. Mounting the transparency : Single-sheet transparencies may be projected unmounted if the acetate is thick enough to lie flat on the stage of the overhead projector. However, a transparency mount provides a solid basis for easy handling and storage, and provides a convenient border for writing lecture notes. The completed transparency can be fastened to the mount with adhesive tape.

3. The use of overlays

Overlays can help simplify complicated concepts and allow you to build up your presentation step by step.

The preparation of overlays is divided into two stages :

- preparation of the master drawing;
- tracing and mounting the transparencies.

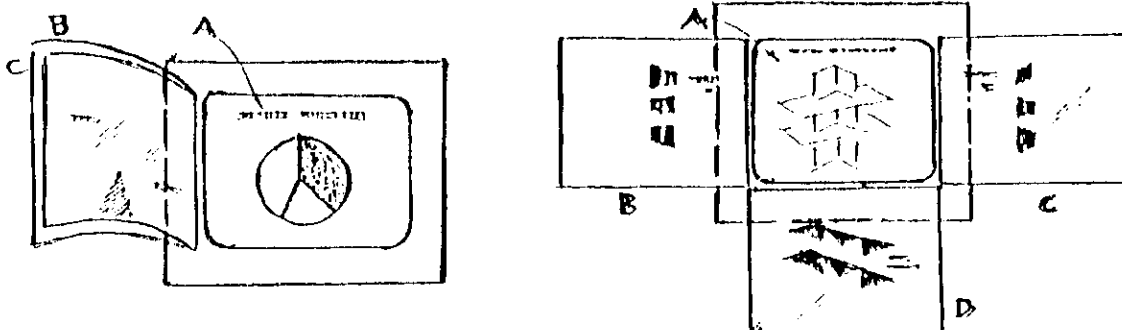
a. The master drawing : the master drawing should show everything that will appear on the transparency with all the overlays in position. The technique of the drawing has already been described in the previous paragraph 2a.

b. Tracing and mounting the transparencies

The base transparency : the base shows the first piece of information. It is the one onto which further information will be built up with the overlays. The drawing is traced by the same method as described in para. 2b.

The overlays: a clean sheet of acetate must then be positioned over the base transparency and fastened to the working surface. This is the first overlay and the information required on it is traced from the drawing underneath. This process is repeated for each overlay required. It is generally recommended to limit the number of overlays to four.

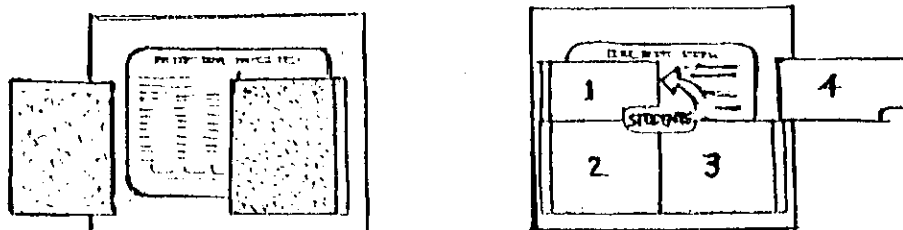
Mounting the transparencies : the base transparency is fastened to the mount, in the correct sequence, taping along one edge. If all the overlays follow the same sequence, they can all be attached on the same edge, preferably on the left side. If you wish to vary the sequence, the overlays may be fastened to any of the four edges of the mount.



Overlay Technique

Masking devices

Masking devices can be used to achieve a controlled-pace presentation. A progressive disclosure is obtained by masking all or a portion of the transparency with an opaque card. Masks can be cut into any shape desired and hinged to the mount with adhesive tape.



Masking Technique

Storage of transparencies

Finished transparencies should be stored to protect the acetate from dust, dirt and scratches, and to stop sunlight bleaching felt and fibre-tip markings.

Many existing storage containers and facilities can be adapted for housing transparencies (L.P. record cases, ring binders, filing cabinets, etc.).

4. MOTION PICTURES

The motion picture is one of the most effective media of communication as the audience get psychologically involved with the subject matter. Although motion pictures are a series of still pictures on a long strip of film, but flashing of each of them momentarily on the screen produces an illusion of movement. So whenever it is important to show movement, a film may be used in preference to slides. However it may be remembered while using the film for training, that the producer has produced the film with some general purpose. It is therefore necessary to prepare the audience towards the specific points of references which the communicator wants to highlight in showing the film. If they know what to look for in a film, they will derive more benefit from it.

Types of films

There are different kinds of movie films which are produced commercially. They are : 8 mm, super 8 mm, 16 mm, 35 mm, 70 mm films.

Projection of 16 mm film

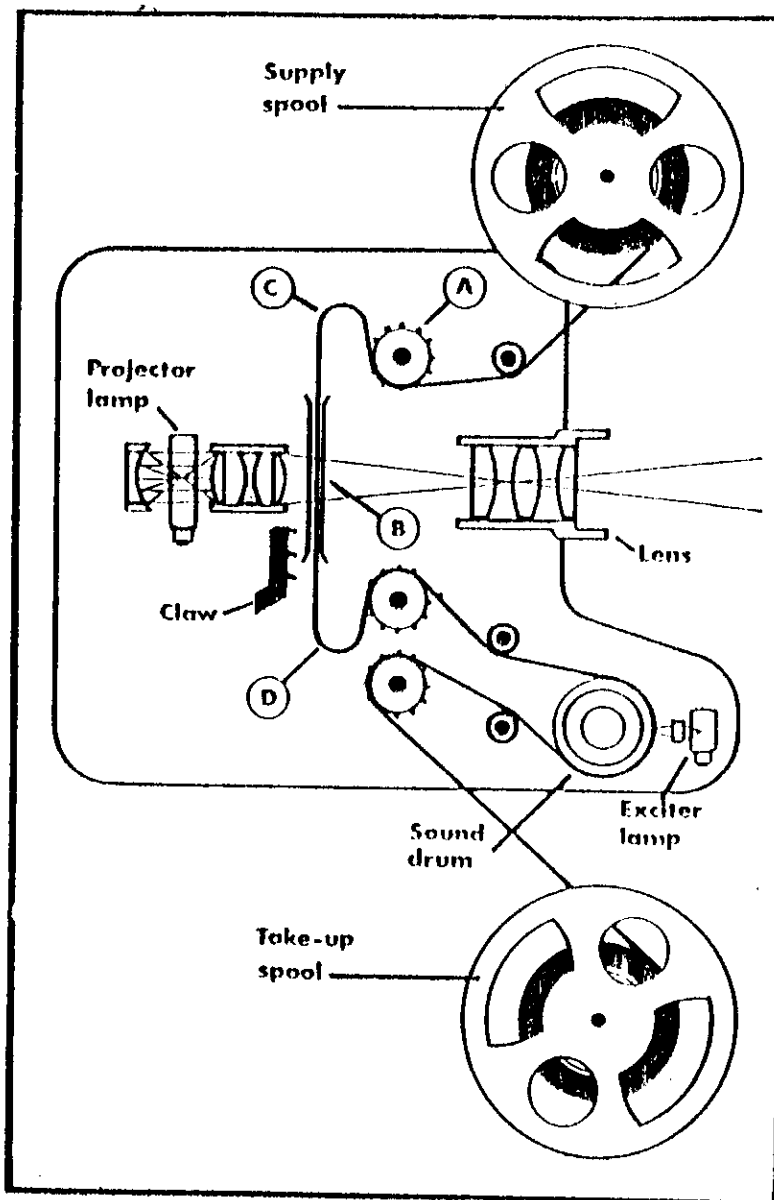
Projection : The cine projector consists of two basic systems, the light system and the sound system. The illustration shows the diagrammatic form of a typical sound projector. Here the

film is taken from the film spool and fed into the projector by a sprocket wheel at point A. It then passes through the gate at point B, where each frame (or single picture) is slid momentarily while a beam of light passes through it, before it is quickly replaced by the next frame. The flashes of light and the movement of the film are both so rapid that the human eye cannot distinguish between individual pictures shown on the screen, and so the illusion of a moving picture is created. The film is thus subject to a very rapid intermittent motion as it passes through the gate, and the necessary allowance is made for this by the introduction of loops of film (at points C and D in the illustration) at the top and bottom of the gate system. This permits an easy change from constant to intermittent motion and back. Failure to maintain these loops correctly is a major cause of film damage.

The film is then passed into the sound section of the projector. This is usually optical, but may be magnetic. Some projectors have provision for both systems. It is very important that a constant film speed be maintained over the sound drum (optical) or sound head (magnetic). Any variation will be unpleasantly obvious in the form of unsteady sound. With the optical sound system, a very finely focused split of light is beamed through the sound track of the film and variations of either density or area of the track interrupt the light path, and changes in light are detected by the photoelectric cell, a light sensitive device coupled to the sound amplifier inside the projector casing. Thus being converted into electrical energy,

the signals are amplified and fed into the loudspeaker. A playback head similar to that found in a tape recorder is used for magnetic sound strip films.

These basic principles are true of all 16 mm sound projectors. It is important, however, that the instruction manual supplied with each projector be studied with care, that



Principal Components of 16mm Sound Film Projector

emergency procedures are known, and that the machines are serviced at the requisite intervals. Apart from this, it is the responsibility of the user to keep the projector spotlessly clean, taking special care to see that there are no abrasive particles of any kind along the film path, and that no accumulation of dust is allowed either on the gate or on the optical sound system.

Techniques of use :

Every trainer using educational film should confidently be able to use a 16 mm projector. Even if this is usually the responsibility of a projectionist or technician, there may be cases when he is not available and the trainer wishing to use the film will be forced either to set up and operate the projector himself or forget completely about the film and hastily replan his lesson. Sadly, the latter is too often the cases. There is little point in making effective use of the software if one is not familiar with the functioning of the basic equipment.

Although there are a number of excellent books on the subject, there is still a great need for the "Dos and don'ts" of 16 mm projection to be made more widely known.

Before the showing :

A successful film showing depends on looking after a number of details. You will need an adequate power supply that matches the requirements of the projector. This means checking on details such as extension cords and electrical connections etc.

Some means should be available to darken the room. Before the audience arrives the machine should be set up, threaded with film, focused on the screen and tested. The projector should be high enough to project over the heads of the audience and the screen high enough from the floor, for all to see easily the bottom of the picture. A good rule is 4 feet from the floor to the bottom of the screen.

Check list for the show

You will need all or some of the following :

1. The film (more than one reel ?)
2. Spare reels - and they must be large enough.
3. Mains and extension cables.
4. Extension speaker - plugs into projector.
5. Microphone (see later) for Public Address.
6. Spare lamp, exciter lamp and fuse (unless readily available).
7. Gate cleaning brush.

Setting up

Check each reel of the film separately. Are the leader and first few feet undamaged? Then stack films carefully with associated spare reels in correct running order and consider how you will restock as you change reels in a hurry later.

1. Turn on projector amplifier and check machine settings- sound on optical or magnetic (magnetic sound film will have beading of oxide on the film edges but most films will be optical sound); sound/silent set; volume control almost at zero : tone control set at half-way.
2. Lamp on - will economy setting do ? If machine has economy lamp, setting this may double the lamp life; focus the frame and adjust machine's position to suit screen size; note if frame edges are dirty and if so brush clean the filmgate.
3. Fit film reels securely and thread up.

4. Check first few feet of film for damage by letting them run lightly through your finger and thumb from the machine; focus; adjust frame and check sound - note probable maximum sound setting.
5. Rewind to start and shut down; leave volume almost off. Switch off at the mains if you go away.
6. Note that on some machines you can only change speed or check sound when machine is running.

Projector for Public Address (PA)

If you are to show in a large hall or auditorium, it may be useful to be able to address brief remarks to the audience using a microphone. In this case, all you need to do is to plug in a suitable microphone to the 16 mm projector mic. input, switch on the amplifier and turn up volume (if a loud howl ensues this will be because you have the mic. too near the front of a live loudspeaker - just move away).

Showing the film

1. Unplug microphone if there is one. Switch off room lights.
2. Switch on motor and lamp.
3. Fade up sound and focus quickly. If the room is full, you may need more volume. You may also find that extra treble tone setting will improve sound clarity, though 16mm sound is never marvelous. If you are showing without having set up in advance, run the leader through with lamp on and your hand or a piece of card in front of the lens. Watch the film and, as title reaches the gate, remove hand/card, fade up sound, focus and frame.
4. Stay near projector in case of stoppage. At reel end, fade out sound and turn off lamp. Leave motor running to cool off lamp and never move the projector until it has cooled (feel the air from the fan getting cooler).

Reverse running

Be sure the machine is cleared for reverse running because a number of older machines have the nasty habit of chewing up film when reversed.

Still picture and animation

Most modern machines have a 'still picture' facility which allows a frame to be projected in the gate when the motor is stopped. To permit this, the still-picture selector causes a heat filter glass to come between the projector lamp and the film to prevent the film being burnt. This glass absorbs light as well as heat to reduce heat intensity reaching the still frame. You may need to revert to the full brightness setting if you were using economy setting. If an animation button is fitted, it allows the still pictures to be moved on frame by frame as the button is pressed.

Safety

Never neglect safety. The thoughtful user will always run an eye over the equipment whenever it is handled. Look particularly for condition of cables and plugs and for any sign of breakage from being dropped, etc. In use, listen for the unusual noise and note any signs of overheating, e.g. smells and smoke; these are unlikely occurrences but, having thought of them beforehand, you are better prepared to act quickly. Report defects immediately; you return the equipment and if necessary take the machine out of use and label it unserviceable.

Finally you can't be too careful with trailing cables.

After the show

Rewind the reels properly, report any damage rather than try to fix it, complete any form including the occasional audience research and, most important, return the film on time for the next user.

There are a number of books and other materials on projection, but I believe that any trainer with a little practice and organisation can acquire the confidence and, moreover, will find adequate material in the catalogue to make it worth the trouble. None will appreciate your efforts more than your audience especially if the effort is well organised and the showing runs smoothly.

Projection screens and seating arrangements for projection rooms

Projection Screens :-

The main functions of a projection screen can be specified as follows :

- The screen should reflect a maximum of light from the projector to the entire audience.
- The screen should reflect a minimum of light onto the walls and ceiling. The 'stray light' lost in their way is often reflected back onto the screen thereby decreasing the contrast of the picture.
- The screen should reflect a minimum of light from other light sources such as windows, lamps etc., to the audience. Such reflections will disturb the picture and the contrast will be decreased still further.

Various kinds of screens are available to meet these differing demands. For practical application, the screens described below must be considered.

Matt white screens

Matt screens can be composed of many different materials, such as white painted or plastered walls, sheets, or matt white painted boards. The type of coating and finish may have a considerable influence on the practical properties.

Matt screens can be advised if:

- Price is important.
- Dead-sharp pictures are a prime consideration. In this case, the surface must be matt, but without any visible structure or pattern.

- The projection takes place in a pronounced wide room.

Because of the wide angle of reflection obtained with matt white screens, the room must be rather well darkened to reduce stray light reflection.

In special projection rooms, ceilings are often coated with a dark, non-reflecting paint to further eliminate the influence of stray light on the picture contrast.

Patterned or specially prepared white screens

Patterned or prepared white screens are available in many forms and with many different characteristics. These screens are more or less generally suitable, but are often chosen for use in relatively wide rooms. Darkening of the room remains desirable because of the relatively wide angle of reflection.

Metalized screens

Metalized screens produce more direct reflection than those previously mentioned. There are many different types of metalized screens available. With narrow-beam metallic screens in particular, there is less need to darken the room.

Glass beaded screens

Glass beaded screens are used in situations where a high concentration of reflected light is essential. The screens have a matt white base, coated with minute glass beads. Because of this concentrated reflection, glass beaded screens are useful for long, small rooms and for projectors having a relatively low light output. Although not strictly necessary, liberal room darkening will contribute to picture quality.

Seating arrangements for projection rooms

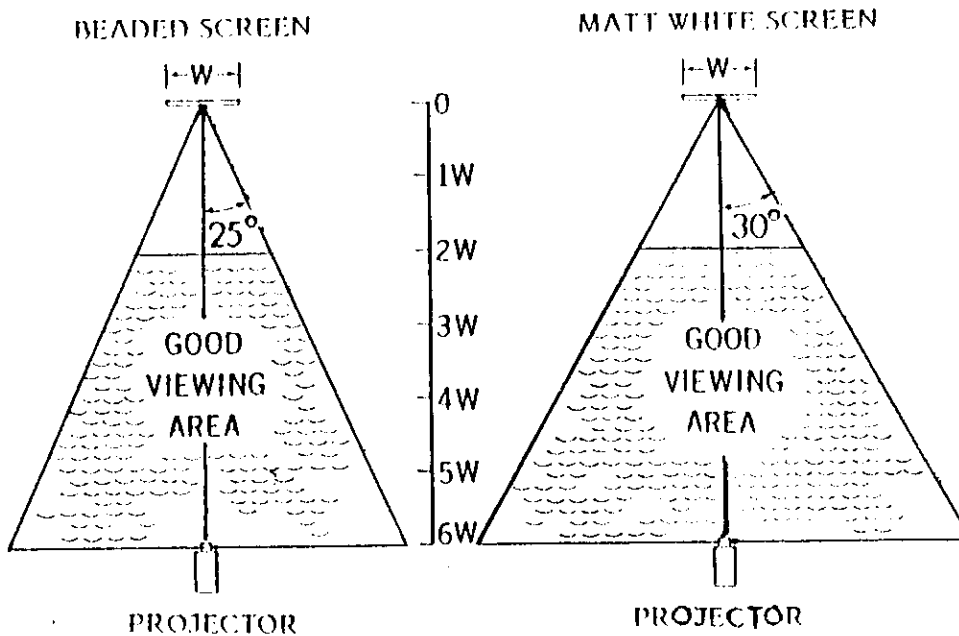
When a room is to be equipped for projection, the main points to consider are the proper balance between projector and screen, size of the room, arrangement of the audience and presence of ambient light.

The general geometric arrangement of the audience is defined by certain rules:

- Minimum viewing distance is 2x screen width (2W).
- Maximum width of audience area is 3xscreen width (3W) or maximum viewing angle (this is the angle with perpendicular) 45°.

- Maximum depth of audience area is $6 \times$ screen width ($6W$).

A viewing angle of over 45° is not recommended because distortion of the image will take place. A generally acceptable value is 30° .

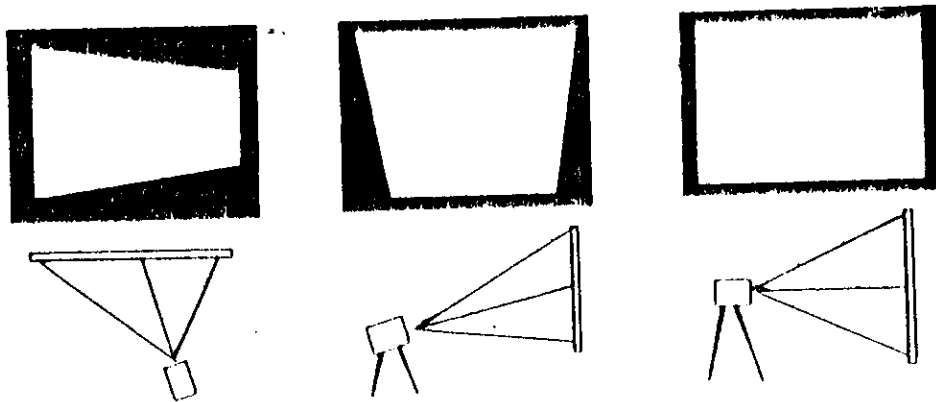


Good Viewing Angle for Different Types of Screens

Frequently, a screen is installed too low or too high, in both cases it will be a source of discomfort to the viewers. An acceptable position is with the base of the screen approx. 1.25 - 1.2 m (4feet) above the floor level.

If the projector is placed within a relatively short distance of the screen, such as with overhead projectors or other

short-focus projectors, risk of keystone distortion cannot be ruled out". This will occur if the screen is not perpendicular to the optical axis of the projector. Apart from considerable picture distortion, focussing will be difficult. The effect is overcome by tilting the screen sufficiently.



Proper Placement of Screen for Projection

Important steps in good film Utilisation

1. Select the film caerfully

- 0 Preview the film before showing it.
- 0 Be sure, the film actually helps to meet the training need you have in mind.
- 0 Avoid selecting films which are too long to permit adequate introduction before .and appropriate group discussion after the film showing.

II. Plan the presentation

- 0 Make notes on the points you want to stress in the film.
- 0 Prepare transition comments those are necessary.
- 0 Allow adequate time for introducing the film and for summarising and discussing it after the showing.
- 0 Prepare a written outline covering the introduction and

discussion periods.

- 0 Secure the services of a projectionist or train one to assist you.

III. Have the room and equipment ready for the film showing

- 0 Have the equipment and keep film ready before the group assembles.
- 0 Check the seating and ventilation arrangements to ensure maximum comfort for the audience.
- 0 Audience location should be within a thirty-degree angle from the screen for best vision.

IV. Prepare your audience for the film

- 0 Explain the purpose of the film.
- 0 Briefly indicate what the film contains.
- 0 Tell the group members what to look for in the film.
- 0 List important points briefly on the blackboard.
- 0 Let group member know your plan to have an exchange of ideas after the showing.
- 0 Explain any qualifications about the film content which seem appropriate.

V. Show the film

- 0 If possible do not rewind the film or start to pack up the machine until the audience has left the room.
- 0 If you have more than one reel, rewinding and/or changing should be done at this time by an assistant.
- 0 Discuss briefly one of two points or questions with the group while the reel is being changed.

VI. Summarise and discuss film content

- 0 Get group discussion on the major points presented in the film. (Refer to blackboard list)
- 0 Use a planned discussion outline which includes thought-provoking questions.
- 0 Did you get something from this film and our discussion which can be put into operation in your job ? How do you plan to do it ? Will you need to consult your chief ? Others ?

0 Close discussion before interest lags. .

5. EPISCOPE

Among the several kinds of projected visual aids, Episcopes is the only piece of equipment capable of projecting non-transparent materials. The light from the projector lamp is concentrated on the opaque material held in contact with a glass plate and the reflected image of this material is directed through the projection lens and focussed on the screen. Illustrations, diagrams from books and any printed matter of appropriate size may be presented directly without the need for any intermediate process.

The materials which are required to be presented frequently, may be mounted on sheets of cardboard or on a long strip of paper folded concertina-wise and conveniently arranged for feeding through the projector. Mounted materials should never be rolled.

The episcopes must have a very efficient optical system to gather all possible reflected light, necessitating the use of large diameter lenses and a powerful light source. The most powerful projectors will need some mechanical aid for cooling, for much heat is generated at the time of projection. Such projectors are large and heavy and are not convenient to carry from one place to another. An efficient form of room blackout is essential as small leaks of light may seriously affect the picture quality. Total blackout of the room may be of great disadvantage as note taking becomes impossible and ventilation difficult. Due to the short throw of the lenses normally used, episcopes should be placed in the centre rather than at the back of the room. It is

better suited for more permanent installations like training centres.

Episcope may be very effectively utilised for the copying of materials needed for the preparation of other kinds of visuals like charts, flannelgraphs, posters etc.

Usually little is required in the way of maintenance as there are very few mechanical parts. It is important however to keep the reflectors and all other glass surfaces and lenses clean to maintain maximum efficiency and to keep the projector covered up when it is not in use. Do not however, cover it until complete cooling has taken place.

FACTORS INFLUENCING SELECTION OF MEDIA

It is very important to select appropriate combination of media from the total gamut of audio-visual communication aids. Such selection will however be influenced by a series of factors concerning the instructor, the audience, the message or even the teaching/learning objectives of the trainer. The golden rule for media utilisation is to use combination of media to produce maximum change in the audience.

1. Nature of the Message :

The complexity and type of message is the factor which the trainer should take into consideration while selecting the media. More complex the message, more intense should be the use of media at individual level. In order to train the extension workers, the method of mixing a number of insecticides and applying them at a particular point of the paddy crop to control

Brown Plant Hopper, demonstration with the live objects coupled with filmshow will be effective rather than the use of posters or charts.

2. Type of Learning Task:

The trainer intends to bring about changes in the behaviour of the audience usually at the levels of their knowledge, skill and attitude. While the change in knowledge or attitude usually takes place at the affective level, skill change involves more of motor learning. Hence method or result demonstration with the help of actual object, model, slide cum tape presentation or video or motion picture will be more appropriate to help audience gather information on how to do a particular practice. In order to change the level of knowledge or attitude, the trainer should generally use a combination of various types of media. The general guideline is to use impersonal media like posters, charts, motion picture at the initial stages of learning like awareness and interest, but shift to greater use of personalised media like showing of actual objects, presentation of with the help of photographs, slides or video (if they cannot be taken to the actual site) for motivating the audience to action.

3. Characteristics of the Audience:

The audience in the form of their size, education level and experience in the particular field of the message also influence selection of the media. With the increase in size of audience, use of chalk board, actual objects or demonstration with the help of models etc. should be abandoned in favour of more of mass

media like television, recorded media, motion picture, print media etc. Similarly, their education level will influence the selection of media involving written symbols etc. With less educated clientele more of visual and audio-visual media need to be incorporated in the teaching plan.

4. **Skill of the Trainer:**

The selection of media should be basically dependent on the confidence of trainer on a particular method. If the trainer does not possess skill of operating a movie projector and in case the operator is not available, he cannot keep this media in his teaching plan. Similarly the use of non-projected media like flannel graph or flash cards also require the skill of presentation on the part of the trainer. Hence the selection should be made from those media only which the trainers is skilled enough to handle.

5. **Cost Related to Funds:**

The training fund will ultimately restrict the trainer from using media, even if they are considered to be effective in specific situations. As a result, even if the use of video cassettes or slide stories, appear to be more effective in a situation the trainer will have to remain contented with less costlier methods inspite of being less effective, if his funds do not permit to procure such expensive hardware or software. However, sometimes alternative less costlier gadgets are also available. For example, if the size of audience is smaller, one can use relatively less expensive slide viewer instead of electrically operated slide projectors.

6. Practical Constraints:

A number of practical constraints involving availability of physical infrastructure also influence the selection of media.

They are:

- (a) availability of materials
- (b) availability of software
- (c) availability of spareparts
- (d) availability of space
- (e) availability of maintenance facilities.

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Manual on audio visual communication in training



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